

## VISUAL IMPACT ASSESSMENT

# PROPOSED ALBANY WIND ENERGY FACILITY, EASTERN CAPE, SOUTH AFRICA

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**November 2021**

This Report should be cited as follows: CES, 2021: *Albany Wind Energy Facility, Visual Impact Assessment.*

**REVISIONS TRACKING TABLE**



**REPORT TITLE:**

VISUAL IMPACT ASSESSMENT: PROPOSED ALBANY WIND ENERGY FACILITY, EASTERN CAPE, SOUTH AFRICA.

**REPORT VERSION:**

FINAL

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## EXECUTIVE SUMMARY

CES Environmental and Social Advisory Services (CES) has been appointed by Albany Wind Power (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to undertake an Environmental Impact Assessment (EIA) of the proposed Albany Wind Energy Facility (WEF).

One of the significant environmental issues identified during the scoping phase of the EIA was the visual impact that the proposed WEF could have on the surrounding landscape. In addition, the DFFE Screening Report for Environmental Authorisations (March 2020 & October 2021), identified landscape and flicker impacts as very high sensitivity issues requiring a Landscape/Visual Impact Assessment and Flicker Assessment.

In addition to the EIA, CES was also appointed to conduct the independent specialist Visual Impact Assessment (VIA).

### Project background

The proposed Albany WEF is located on a large, elevated area of land that will be visible from many locations within the 30 km radius viewshed, including towns such as Makhandla, surrounding public nature reserves such as the Great Fish River Nature Reserve, and private game reserves such as Kwandwe and Indalo Protected Environments, farms and homesteads, and roads. The majority of the land surrounding the WEF is agricultural land.

The proposed Albany WEF comprises 43 turbines with the turbines arranged within a band spread out over a distance of about 20km from the most westerly turbine to the most easterly turbine. The approximate width of band ranges from about 3-4 km. The turbines are also arranged in three distinct clusters: western, central and eastern.

The current final VIA is based on a significantly reduced number of turbines compared with the draft VIA, where 23 turbines have been removed, including 12 turbines in the western cluster that are particularly visible to the Kwandwe and Indalo Protected Environments in the west and north west of the WEF. This includes five turbines that were originally located almost immediately adjacent to the south east boundary of the unprotected portion of Kwandwe. While the remaining turbines still remain visible, this reduction in turbine numbers will reduce the density of turbines and numbers of visible turbines.

### Comments on the draft VIA

A number of submissions were made by I&APs with respect to drafts of the VIA. The main issues raised in the first draft VIA included:

- Poor selection of vantage points for visual assessment.
- Omission of the Great Fish Nature Reserve.
- The visual impact on wildlife and nature tourism in the area would be of fatal proportions.
- The 20-25 year lifespan of the WEF as it affects the HIGH impact rating, is questioned.
- Questions draft VIA statement that the landscape of the study area is not pristine or of very high scenic value.
- Fails to adequately address the cumulative impacts of WEFs in the area.
- Questions the limited mitigation measures proposed, such as reduced hub height and reduced turbine numbers and the no-go alternative.
- The VIA did not adequately assess other alternatives.
- No attempt to implement the hierarchical approach to impact management through impact avoidance.
- The VIA fails to ensure that the assessment is undertaken by an independent visual specialist.
- Inaccurate baseline information.

- VIA ignores the REDZ visual mapping showing the classification of the relevant portion of REDZ 3 as very high visual sensitivity.
- The impact of night lighting has not been addressed at all.
- Limited evidence of project screening to avoid visually sensitive areas.

Responses to comments on the second draft VIA are provided in the Issues and Response Trail (IRT) report.

### **Approach and methodology**

While there are no gazetted Regulations or guidelines indicating the methodology for VIA's, CES has adopted a systematic approach based on current best practice, particularly that of Oberholzer (2005) and also input from the REDZ SEA (2015), which we believe is objective and repeatable.

The current assessment of the visual impacts of the Albany WEF on sensitive receptors, is based on the following criteria:

- Visibility – extent of project visible to receptor (hubs with height at 130 metres)
- Visibility – extent of project visible to receptor (blades at height of 215 metres)
- Visual exposure – distance of receptor
- Landscape sensitivity – of receptor
- Visual intrusion – on receptor daytime
- Visual intrusion – on receptor night lighting
- Visual sensitivity – of receptor
- VAC – concealment potential

A combination of methods was used for assessing visual impacts including:

- Viewshed analyses for the project and study area as a whole, and for seven (7) public nature reserves and eight (8) private game reserves.
- 3D simulated views for selected viewer points during the daytime (9) and turbine night lighting (8).
- Field observations for assessing impacts on:
  - Surrounding towns and villages;
  - Farms hosting and surrounding the wind turbines; and
  - Various roads, passes and scenic routes in the study area.

### **Identification of potential sensitive visual receptors**

The identification of potential sensitive visual receptors within a 30 km radius of the proposed 43 Albany WEF turbines was based on the sensitivity features used in the REDZ SEA Landscape Sensitivity Analysis Report (2015), including:

- Ridgelines, scarps, prominent elevations and geological features;
- Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves;
- Private reserves and game farms;
- Towns, villages and settlements;
- National roads;
- Scenic routes, passes and ports; and
- Provincial and arterial roads.

Generally, all public nature and private game reserves within a 30 km radius of the WEF were classified as sensitive, including the following 15 public nature and private game reserves:

### **Public proclaimed reserves**

- Ecce Nature Reserve (Local Authority)

- Waters Meeting Nature Reserve (EC Parks)
- Roundhill Oribi Nature Reserve (Local Authority)
- Kap River Reserve (Local Authority)
- Great Fish Nature Reserve (EC Parks)
- Beggar’s Bush State Forest

**Private Protected Environment**

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Buffalo Kloof Protected Environment

**Private un-protected reserves**

- Kwandwe Private Game Reserve North - none Indalo Protected Environment
- Kudu Ridge Private Game Reserve
- Bucklands Private Nature Reserve
- Salvatore Farms
- Coleridge Private Game Reserve
- Hunters Hoek Lodge

Due to the significant size and varying views of the proposed WEF, the viewshed assessment for Kwandwe Private Game Reserve has been assessed under three components, namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Kwandwe Private Game Reserve North - none Indalo Protected Environment

**Overall results**

The following overall results are presented according to the visual assessment framework proposed by Oberholzer (2005).

**Overall visibility of the project**

The overall visibility of a development is an indication of where in the region the development will potentially be visible from. As expected, due to the turbine heights and their location on relatively elevated land, a high number of wind turbine hubs and blades will be visible from a significant proportion of the study area (30 km radius of the WEF). The viewshed area for the proposed Albany WEF will be about 1,300 km<sup>2</sup> and will have a **HIGH** overall visibility within the region.

**Turbine density**

The REDZ SEA provides turbine cluster sensitivity severity guidelines based on density limits. The following is applicable with respect to Albany WEF turbine density:

Criteria	Albany WEF	Rating per REDZ SEA
Cluster size	43	MEDIUM – below 60m turbines threshold
Buffer between clusters	6 km if within same viewshed as another cluster	VERY HIGH – Grahamstown WEF within 4 km of Albany WEF – further assessment required
Development density		
- ha/turbine	146 ha/turbine	LOW – below 160 ha/turbine threshold
- MW/km <sup>2</sup>	4.7 MW/km <sup>2</sup>	LOW – well below 1.4 MW/km <sup>2</sup> threshold

**Integration with heritage features**

The specialist Heritage Impact Assessment (HIA) identified the following main heritage features:

- Some age artifacts at various locations;

- Several stone packed features such as kraals and farm walls at various locations; and
- Various historical ruins, such as farmhouses, other buildings and a church.

It is our opinion that the proposed Albany WEF will not have a significant detrimental impact on these heritage resources.

**Overall visual sensitivity of the surrounding landscape**

Visual sensitivity is the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement patterns.

The study area to the north and north west includes a number of public nature reserves (such as the Great Fish River Nature Reserve) and private game reserves (such as Kwandwe Private Game Reserve) which are sensitive receptors in the surrounding landscape. However, the majority of the land in the study area consists of agricultural land, particularly to the north east and east, and towns and villages, which are a less sensitive visual receptors.

The majority of the landscape in the study area has been transformed to some degree by historical agricultural activities. Man-made structures, activities and effects are present in most views of the landscape. The scenic value could be described as HIGH (but not pristine or unique) due to presence of good condition Fish Arid and Fish Valley thicket vegetation.

It is concluded that the surrounding landscape will have a **MODERATE** overall visual sensitivity for agricultural and residential areas to **HIGH** overall visual sensitivity for the nature and game reserves.

**Overall visual intrusion of the project on the surrounding landscape**

Visual intrusion is the level of compatibility or congruence of the project with the particular qualities of the landscape of the affected area, or its 'sense of place'. Based on the criteria for overall visual intrusion provided by Oberholzer (2005), it is concluded that the Albany WEF will have a **HIGH** overall visual intrusion since it will result in a noticeable change in the surroundings.

**Visual assessment of individual potentially sensitive receptors**

Section 12.4 of this report provides a comprehensive visual impact assessment of the individual sensitive visual receptors based on the following seven sensitivity criteria proposed by Oberholzer (2005):

- Visibility – extent of project visible to receptor
- Visual intrusion – on receptor daytime
- Visual intrusion – on receptor night lighting
- Landscape sensitivity – of receptor
- Visual sensitivity – of receptor
- Visual exposure – distance of receptor
- VAC – concealment potential

It is projected that the proposed Albany WEF will have a HIGH severity visual impact on the following sensitive receptors.

Visual Receptors	Overall severity of impact
<b>Provincial and Municipal Nature Reserves</b>	
Ecca Nature Reserve	HIGH
<b>Private Protected Environment</b>	
Kwandwe Private Game Reserve North (Indalo)	MODERATE to HIGH
Kwandwe West Indalo Protected Environment	HIGH western cluster
Buffalo Kloof Protected Environment	HIGH
<b>Private reserves and game farms</b>	

Visual Receptors	Overall severity of impact
Kwandwe Private Game Reserve (non Indalo)	MODERATE to HIGH

### Assessment of Impacts for EIA Reporting

The following is a summary of the impact ratings for EIA reporting purposes according to the CES EIA impact rating system, where the severity rating is based on the overall severity of visual impacts as described above.

#### Construction phase impacts

Impact	Pre-Mitigation	Post Mitigation
Impact 1: Visual impact of construction activity	MODERATE	MODERATE

#### Operational phase impacts

Impact 2: Impact of wind turbines on visually sensitive receptors.	Overall significance	
	Pre-Mitigation	Post Mitigation
<b>Visual Receptors</b>		
<b>Proclaimed Public Nature Reserves</b>		
Ecca Nature Reserve	HIGH	MODERATE
Waters Meeting Nature Reserve	MODERATE	MODERATE
Roundhill Oribi Local Authority Nature Reserve	MODERATE	MODERATE
Kap River Nature Reserve	MODERATE	MODERATE
Great Fish Nature Reserve 13-20 km	MODERATE	MODERATE
Great Fish Nature Reserve 20-50 km	MODERATE	MODERATE
Beggars Bush State Forest	MODERATE	MODERATE
<b>Private Protected Environment</b>		
Kwandwe Private Game Reserve (Indalo) North	HIGH	HIGH
Kwandwe West Indalo Protected Environment	HIGH	HIGH
Buffalo Kloof Protected Environment	HIGH	MODERATE
<b>Private Non-Protected Reserves</b>		
Kwandwe Private Game Reserve North (none Indalo)	HIGH	HIGH
Kudu Ridge Private Game Reserve	MODERATE	MODERATE
Bucklands Private Nature Reserve	MODERATE	MODERATE
Salvatore Farms	MODERATE	MODERATE
Coleridge Private Game Reserve	MODERATE	MODERATE
Huntershoek Lodge	MODERATE	MODERATE
<b>Surrounding towns and villages</b>		
Makhana	MODERATE	LOW
Bathurst	LOW	LOW
KwaNdwanyana	LOW	LOW
<b>Other receptors</b>		
Residents on local farms	LOW	LOW
N2 to Peddie and Makhanda	LOW	LOW
Ecca Pass	LOW	LOW
N2 along Botha's Hill	LOW	LOW
R67 to Fort Beaufort	LOW	LOW
R67 to Port Alfred	LOW	LOW
Committees Drift Road	LOW	LOW

Impact	Pre-Mitigation	Post Mitigation
Impact 3: Impact of night lights on the surrounding landscape	MODERATE to HIGH	MODERATE to HIGH
Impact 4: Shadow flicker	NEGLIGIBLE	NEGLIGIBLE
Impact 5: Visual impact of 132kV powerline and ancillary infrastructure	MODERATE	MODERATE

**Decommissioning phase impacts**

Impact	Pre-Mitigation	Post Mitigation
Impact 6: Visual impact of decommissioning activity	MODERATE	MODERATE

**Cumulative impacts**

Impact	Pre-Mitigation	Post Mitigation
Cumulative Impact 1: Visual impact of facility construction and operation	HIGH	HIGH

**No-go impacts**

Impact	Pre-Mitigation	Post Mitigation
No-Go Impact 1: Impact of wind turbines on sensitive visual receptors	NONE	NONE

In assessing the direct impacts to visual resources, it has been recognised that, although the lifespan of the project is likely to extend for 20-25 years, all of the components of the superstructures can be removed on decommissioning, after which the landscape will be rehabilitated back to a near natural state. This means that although the proposed facility will undoubtedly have an impact on the visual resources of the area, it does not represent a completely irreversible loss of scenic resources.

**Conclusions**

According to Oberholzer (2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

- Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
- Non-compliance with conditions of existing Records of Decision.
- Impacts that may be evaluated to be of high significance and that are considered by stakeholders and decision-makers to be unacceptable.

Overall, the visual impacts of the Albany WEF range from LOW for many receptors (either due to low sensitivity of receptors or distance from the WEF), to HIGH for other more sensitive receptors such as formally protected nature reserves and game farms.

Based on the analyses, visual impacts are considered to be MODERATE to HIGH for the following four sensitive visual receptors, particularly to the closer western turbine cluster:

- Kwandwe Private Game Reserve (Indalo);
- Kwandwe West Indalo Protected Environment;
- Buffalo Kloof Protected Environment;
- Kwandwe Private Game Reserve (none Indalo).

The MODERATE to HIGH rating is due to the diminishing impact with increasing distance from the WEF for the four receptors with the higher rating being for portions of the properties located closer to the WEF. Night lighting will in particular, contribute to the HIGH impact and every effort should be made to minimise turbine lighting requirements.

There are many other receptors including public nature reserves and private game farms, farms, towns and villages, roads, etc. where the impacts will be LOW to MODERATE mostly due to low receptor sensitivity, distance and potential screening mostly due to the varied topography, particularly in the region of the Ecca Pass/Ridge to the north of the WEF.

The Albany WEF will have a HIGH visual impact on the landscape. However, this impact should be considered within the context of the following:

- The wind farm will not be a permanent development (i.e. 20-25 years life span), after which the turbines and other superstructure will be removed on decommissioning, failing which a new Environmental Authorization will need to be secured;
- The landscape can be restored through rehabilitation after decommissioning;
- Although limited, certain recommended measures can be implemented to mitigate the impacts to some extent;
- The landscape of the immediate study area (farms on which turbines will be located) is not pristine or of very high scenic value; and
- The wind farm is partially situated within and adjacent to a Renewable Energy Development Zone (REDZ 3 - Cookhouse) and adjacent to the already approved Grahamstown Wind Farm.

While the Albany WEF will have high negative visual impacts, benefits will also accrue in terms of job creation and local economic development, and in terms of energy security (particularly in the context of national energy shortages) and national obligations for the reduction of greenhouse gas emissions.

Based on the results of the current VIA, it is our opinion that even though the Albany WEF will have HIGH visual impacts on certain private game reserves and Protected Environments, the proposed Albany WEF should be approved provided that the proposed recommended mitigation measures are included as conditions in the Environmental Authorisation, particularly those relating to reducing night lighting impacts.

## **SPECIALIST DECLARATION OF INDEPENDANCE**

Coastal & Environmental Services (Pty) Ltd (CES) is an independent consultant and has no business, financial, personal or other interest in the activity, application or appeal in respect of which the Company was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. No circumstances arose during the course of the project that compromised the objectivity of the CES specialist(s) that performed the work.

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**SPECIALIST CHECKLIST**

<b>Section</b>	<b>NEMA 2014 Regs - Appendix 6(1) Requirement</b>	<b>Position in report</b>
1	A specialist report prepared in terms of these Regulations must contain—	
(a)	details of-	
	(i) the specialist who prepared the report; and	Section 1.9
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.9
(b)	a declaration that the person is independent in a form as may be specified by the competent authority;	Page iii
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 2
(d)	the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	NA
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 4
(f)	the specific identified sensitivities of the site related to the activity and its associated structures and infrastructure;	Sections 6 and 7
(g)	an identification of any areas to be avoided, including buffers;	There are no areas to be avoided and a 200m buffer along all roads is proposed.
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitive of the site including areas to be avoided, including buffers;	Figure 6.6, 6.7, 9.1 and 9.2.  Detailed viewsheds are provided at: Figures 9.3 – 9.17.
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.8
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 12
(k)	any mitigation measures for inclusion in the EMPr;	Section 12
(l)	any conditions for inclusion in the environmental authorization;	Section 12
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	NA
(n)	a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorized and (ii) if the opinion is that the proposed activity of portion thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 13
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Any comments, which were received, relating to the Visual Impact Assessment have been included in the Issues and

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Visual Impact Assessment

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Section	<i>NEMA 2014 Regs - Appendix 6(1) Requirement</i>	Position in report
		Response Trail (IRT) in the Final EIR.
(q)	any other information requested by the competent authority.	Not Applicable

## GLOSSARY OF TERMS

**Project area**

The farm portions on which the project infrastructure will be established.

**Study area**

The wider geographical area surrounding the project area, and including the project area, that will experience visual impacts, generally within a 30km radius of the project site.

**Viewshed**

The outer boundary defining a view catchment area, usually along crests and ridgelines.

**Viewpoint**

A selected point in the landscape from which views of a particular project or other feature can be obtained.

**Visually sensitive receptor**

Visual receptors include viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible.

**Sense of place**

The unique quality or character of a place, whether natural, rural or urban and relates to uniqueness, distinctiveness or strong identity. Sometimes referred to as *genius loci* meaning 'spirit of the place'. The natural and cultural landscape characteristics generally encompass visual, scenic, aesthetic and amenity values which contribute to the overall "sense of place" of an area.

**Visual absorption capacity (VAC)**

The ability of an area to visually absorb development as a result of screening topography, vegetation or structures in the landscape.

## 1. INTRODUCTION

CES Environmental and Social Advisory Services (CES) has been appointed by Albany Wind Power (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to undertake an Environmental Impact Assessment (EIA) of the proposed Albany Wind Energy Facility (WEF).

One of the significant environmental issues identified during the scoping phase of the EIA was the visual impact that the proposed WEF could have on the surrounding landscape. In addition, the DFFE Screening Report for Environmental Authorisations (March 2020), identified landscape and flicker impacts as very high sensitivity issues requiring a Landscape/Visual Impact Assessment and Flicker Assessment (Refer to Appendix F for comparison of DFFE maps in 2020 and 2021).

In addition to the EIA, CES was also appointed to conduct the independent specialist Visual Impact Assessment (VIA).

### 1.1. Change in project detail

This VIA report provides specialist input into the Albany WEF EIA process. The draft EIAR completed in March 2020 was based on a proposed WEF project that comprised a maximum of 66 wind turbines and associated grid infrastructure.

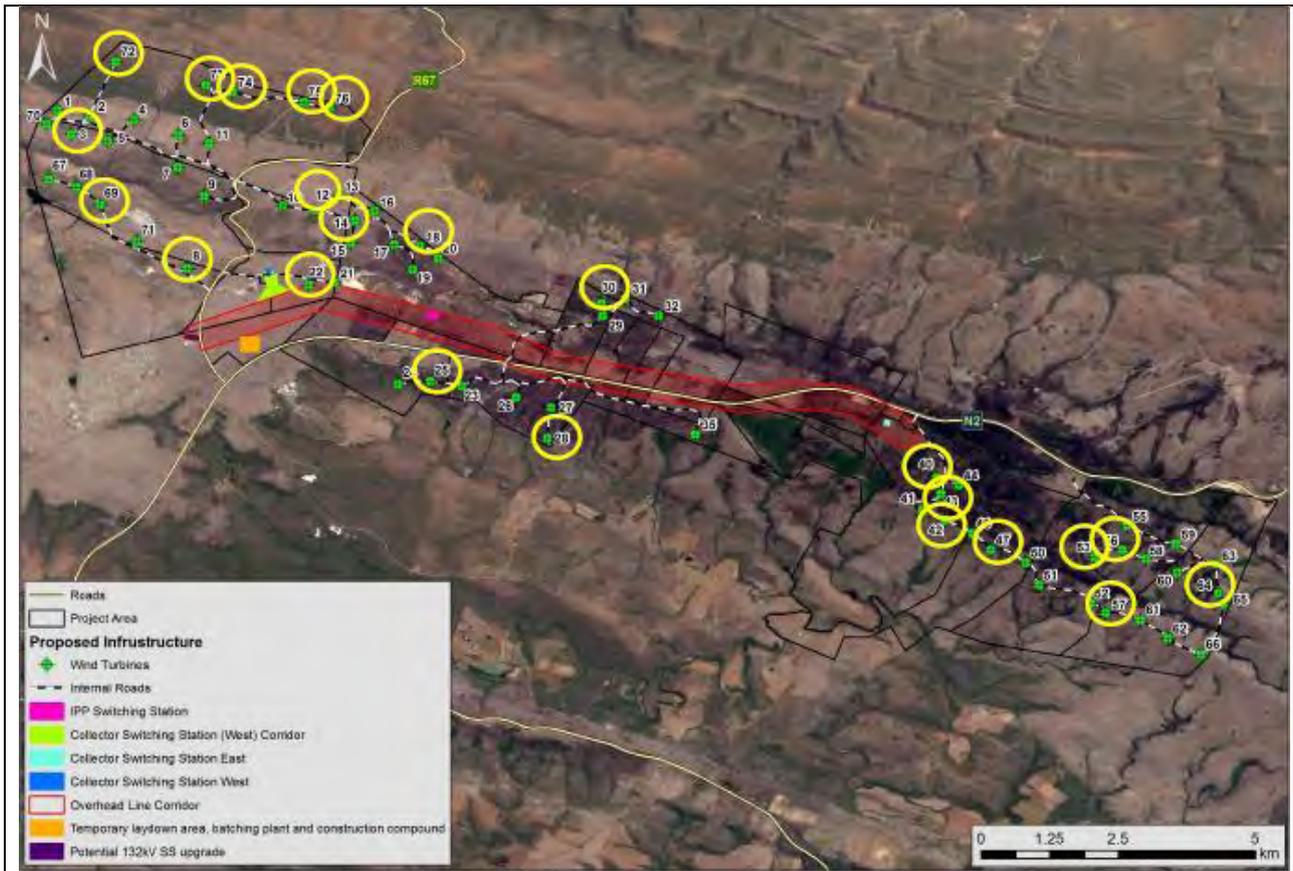
Based substantially on the comments received relating to the draft EIAR and VIA, the project proponent has reduced the number of turbines from 66 to 43, amounting to a reduction of 23 turbines or 35% of the original proposed number of turbines.

The removal of turbines was largely done to reduce the visual impact on neighbouring game reserves. Out of the 23 turbines that were removed, 15 were removed to reduce the visual impact:

- Five (5) turbines were removed to reduce the visual impact on Kwandwe (North West turbines on Makana properties);
- Seven (7) turbines were removed from the Eastern section of the site to reduce the visual impact; and
- Three (3) turbines were removed from the middle southern section to reduce the for visual impact.

The remaining eight (8) turbines were removed for technical reasons (e.g. topographical challenge or to reduce wake effects). Overall, the applicant took the decision to reduce the overall number of turbines based on the comments from the I&AP's and the findings of the initial visual report.

This final VIA is, therefore, based on the reduced number of turbines as shown in Figure 1.1 below, where the circled turbines are those that have been removed.



**Figure1.1: Map showing the locations of the 23 turbines that have been removed (circled) from the project.**

### 1.2. Specialist Reporting Requirements

The specialist checklist at the beginning of this VIA provides the requirements for specialist reports as specified in Appendix 6 of the Environmental Impact Assessment Regulations of 2014 (as amended in 2017).

Key elements of the specialist requirements relevant to this VIA include:

- 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;
- An identification of any areas to be avoided, including buffers;
- A description of any assumptions made and any uncertainties or gaps in knowledge;
- A description of the findings and potential implications of such findings on the impact of the proposed activity;
- Any mitigation measures for inclusion in the EMPr;
- Any conditions for inclusion in the environmental authorisation;
- A reasoned opinion:
  - whether the proposed activity, activities or portions thereof should be authorised;
  - regarding the acceptability of the proposed activity or activities; and
  - 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;
- A description of any consultation process that was undertaken during the course of preparing the specialist report; and
- A summary and copies of any comments received during any consultation process and where applicable all responses thereto.

### 1.3. VIA Guidelines

For the purposes of conducting the VIA, guidance has been taken from the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005). These are the only VIA guidelines that have been issued in South Africa.

Oberholzer (2005) notes that visual, scenic and cultural components of the environment can be seen as a resource, much like any other resource, which has a value to individuals, to society and to the economy of the region. In addition, this resource may have a scarcity value, be easily degraded, and is usually not replaceable. Therefore, the guidelines recommend that the following specific concepts should be considered during the visual input into the EIA process:

- An awareness that 'visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- The consideration of both the natural and the cultural landscape, and their inter-relatedness.
- The identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region.
- An understanding of the landscape processes, including geological, vegetation and settlement patterns, which give the landscape its particular character or scenic attributes.
- The need to include both quantitative criteria, such as 'visibility', and qualitative criteria, such as aesthetic value or sense of place.
- The need to include visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design, and hopefully the quality of the project.
- The need to determine the value of visual/aesthetic resources through public involvement.

### 1.4. Terms of Reference

The following VIA terms of reference were recommended in the Plan of Study for the EIAR, in the Scoping Report.

The overall aim of a VIA is to determine the current landscape quality (scenic views, visual sensitivity) and the visual impact of the proposed Albany WEF. The terms of reference for the VIA includes the following tasks:

1. Undertake a desktop survey using 1:50 000 survey maps, 1:10 000 orthophotos, digital colour aerial imagery and any other high-resolution images.
2. Conduct a site reconnaissance visit and photographic survey of the proposed project site.
3. Conduct a desktop mapping exercise to establish visual sensitivity:
  - Describe and rate the scenic character and sense of place of the area and site;
  - Establish extent of visibility by mapping the viewsheds and zones of visual influence;
  - Establish visual exposure to viewpoints; and
  - Establish the inherent visual sensitivity and visual absorption capacity of the site by mapping slope grades, landforms, vegetation, special features and land use and overlaying all relevant above map layers to assimilate a visual sensitivity map.
4. Review relevant legislation, policies, guidelines and standards.
5. Preparation of a draft Visual Baseline/Sensitivity report:
  - Assess the proposed project against the visual sensitivity criteria such as extent of visibility, the sites inherent sensitivity, visual sensitivity of the receptor's, visual absorption capacity of the area and visual intrusion on the character of the area;
  - Assess impacts based on a synthesis of criteria for each site (criteria = nature of impact, extent, duration, intensity, probability and significance); and
  - Establish mitigation measures/recommendations with regards to minimizing visual risk areas.

### 1.5. Legislative context

Currently there is limited legislation relating directly to Visual Impact Assessments. There are, however, guidelines that provide direction for visual assessments as well as pieces of legislation that aim to protect visual resources. Relevant guidelines and legislation include:

**The National Environmental Management Act (NEMA)** and the Regulations in terms of Chapter 5 of NEMA (Act No. 107 of 1998), and NEMA EIA Regulations (2014) apply as the proposed wind farms are a listed activity. The need for a visual assessment as part of the EIA has been identified.

**The National Heritage Resources Act (NHRA)** (Act No. 25 of 1999), provides legislative protection for natural, cultural and scenic resources as part of the National Estate. This report deals with visual considerations, while archaeological, paleontological and historical sites will need to be identified by a Heritage Specialist.

**DEA&DP Guideline for Involving Visual and Aesthetic Specialists in EIA Processes** (Oberholzer, 2005) are applicable in the Western Cape and provide good general guidance for the preparation of visual specialist input into EIA processes. The guidelines document the requirements for visual impact assessment, factors that trigger the need for specialist visual input, timing and nature of visual input as well as choice of visual specialists, preparation of terms of reference and guidance for specialist input / visual assessment methodology.

### 1.6. Seasonal Changes

In terms of Appendix 6 of the 2014 EIA Regulations, a specialist report must contain information on *“the date and season of the site investigation and the relevance of the season to the outcome of the assessment”*. The site visit was undertaken in Summer (February 2019) and again in November 2020. The season in which the site visit was undertaken does not have any considerable effect on the significance of the impacts identified, the mitigation measures, or the conclusions of the assessment since the vegetation cover does not vary significantly over the seasons.

### 1.7. Information Base

The following information was used to conduct the VIA:

- Documentation and KML files supplied by the client;
- ToR for the visual specialist;
- Photographs and information captured during the site visits;
- Google Earth software and data (aerial imagery - 2019);
- Sentinel-2 Satellite Imagery (2019);
- SRTM Digital Elevation Model;
- SA Protected Areas Database;
- South African National Landcover dataset (2018);
- Eskom dwelling Framework;
- National Landcover; and
- Wind turbine model generated in SketchUp.

### 1.8. Assumptions, uncertainties and gaps in knowledge

#### ***Spatial data accuracy***

Spatial data used for visibility analysis originate from various sources and scales. Inaccuracies and errors are, therefore, inevitable. Where relevant, these are highlighted in the report. Every effort was made to minimize their effect.

**Viewshed calculations**

- a) Calculation of the viewsheds is based on the use of the Shuttle Radar Topography Mission (SRTM) Digital Elevation Models (DEMs) downloaded from the USGS Earth Explorer Website. These raster images have a resolution of 30 metres, which means that each pixel of the raster covers an area of 30 m x 30 m (900 m<sup>2</sup>) and is assigned a single height value.
- b) The viewsheds were calculated both for turbine hub heights of 130 metres and turbine tip heights of 215 metres (130 metres + 85 metre blade length).
- c) An observer in the surrounding landscape was assumed to be 1.8m tall.
- d) Calculation of the viewsheds does not take into account the potential screening effect of vegetation and buildings. Due to the size and height of the wind turbines, and the relatively low vegetation cover in the region, the screening potential of vegetation is likely to be minimal over most distances.

**Simulated views**

In this report a simulated view will be defined as a view generated by using a 3D Wind Turbine model in Google Earth Pro (Section 7).

**1.9. Authors Details**

**Dr Alan Carter, Author and reviewer**

Alan is an Executive Director at CES overseeing the East London and Port Elizabeth offices, and has over 30 years of experience in both environmental science and financial accounting disciplines including with international accounting firms in South Africa and the USA. He holds a PhD in Plant Sciences (Marine Phycology) and a BCom Honours degree in financial accounting. Alan is a member of a number of professional bodies including American Institute of Certified Public Accountants (AICPA), South African Council for Natural Scientific Professions (SACNASP) and Institute of Waste Management South Africa (IWMSA). He is also certified as an Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and as an ISO14001 EMS auditor with Exemplar Global (formerly the American National Standards Institute). Areas of specialization include: environmental impact assessment, coastal management, waste management, climate change and emissions inventories, aquaculture, environmental accounting and auditing and visual impact assessment. Alan has been involved in numerous VIAs, where his responsibility has included author, reviewer and project leader.

Relevant VIA experience:

Project	Responsibility
Boulders WEF	Project Leader/Reviewer
Umsobomvu WEF	Project Leader/Reviewer
Waihoek WEF	Project Leader/Reviewer
Chaba WEF	Project Leader/Reviewer
Great Kei WEF	Project Leader/Reviewer
Tomas River WEF	Project Leader/Reviewer
Peddie WEF	Project Leader/Reviewer
Qunu WEF	Project Leader/Reviewer
Bayview WEF	Review and Quality Control
Nqamakwe WEF	Project Leader/Author
SANBI Kwelera National Botanical Garden	Project Leader/ Reviewer
East London IDZ Solar PV Facility	Project Leader/ Author
Langa Energy Solar PV Facility	Project Leader/ Author
Theza Langa Solar PV Facility	Project Leader/ Author
Zulu Dam (Lusikisiki Regional Bulk Water Scheme)	Project Leader/ Author
Quko Conservancy and Estate	Project Leader/ Author
Cyprea Sands Residential Estate	Project Leader/ Author
Blacklight Solar PV Facility	Project Leader/ Author
Peddie Solar PV Facility	Project Leader/ Author

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<b>Project</b>	<b>Responsibility</b>
Rietkloof WEF	Review and Quality Control
Plan 8 Grahamstown WEF amendment	Review and Quality Control
Golden Valley 2 WEF amendment	Review and Quality Control

**Mr Michael Johnson, GIS and mapping**

Michael holds a BSc in Geoinformatics, a BSc (Hons) *cum laude* in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the Council for Scientific and Industrial Research (CSIR) in Stellenbosch. During this time, in addition to his Master's studies, he provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students. Michael graduated in March 2018 and has been working for CES since. Since joining CES, Michael has been involved in a number of projects where his GIS and Remote Sensing skills have been utilised. These include, but are not limited to, landcover mapping for the King Cetswayo District Municipality Environmental Management Framework, the use of remote sensing to map invasive alien plant species for the Swartland and Buffalo City Invasive Alien Species Management Plans and multiple Visual Impact Assessments which require GIS modelling.

Michael has also been part of the project team that has recently completed an independent completion audit for MCA-Malawi for 6 RAPs conducted for the Infrastructure Development Project in Malawi. These RAPs documented the physical and economic displacement impacts and compensation for assets of people affected by wayleave corridors along 400kV, 132kV, 66kV and 33kV OHLs, as well as for substations and permanent access roads.

Michael is registered with the International Association for Impact Assessments (IAIA) and the South African Geomatics Council as a Candidate Geomatics Practitioner: GISc Professional (CGPrGISc 0299).

Relevant VIA experience:

<b>Project</b>	<b>Responsibility</b>
SANBI Kwelera National Botanical Garden	Viewshed Analysis
Eskom Lesokwana Powerline	Viewshed Analysis
Bayview WEF	Author
Boulders WEF (Internal)	Author
Rietkloof WEF	Author
Indyebo WEF	Author
Rietkloof WEF amendments	Author
Umsobomvu WEF amendments	Author
Coleskop WEF amendments	Author
Plan 8 Grahamstown WEF amendments	Author
Golden Valley 2 WEF amendments	Author
Great Kei WEF amendments	Author
Dassiesridge WEF amendments	Author
Ukomeleza WEF amendments	Author
Mother WEF amendments	Author
Alt-E Paalfontein WEF Screening Assessment	Author

## 2. TRIGGERS FOR SPECIALIST VISUAL INPUT

As indicated above, the DEFF Screening Report for Environmental Authorisations (March 2020), identified landscape and flicker impacts as very high sensitivity issues requiring a Landscape/Visual Impact Assessment and Flicker Assessment. In addition, the DEA&DP guideline suggests various triggers for conducting a Visual Impact Assessment (VIA). With respect to the proposed Albany WEF, a number of aspects of the development that would suggest the need for a VIA. These include:

- Areas lying outside a defined urban edge line;
- Areas of important tourism or recreation value;
- Areas with important vistas or scenic corridors;
- Areas with visually prominent ridgelines or skylines; and
- Possible visual intrusion in the landscape.

The overall purpose of conducting a VIA is to determine:

- The visibility of the proposed project;
- The potential visual impact on visual/scenic resources;
- The nature, extent, duration, magnitude, probability and significance of impacts, as well as measures to mitigate negative impacts and enhance benefits; and
- The character and visual absorption capacity of the landscape.

### 2.1. Selecting appropriate approach for the visual impact assessment

The category of development influences the level of visual impact to be expected. As is illustrated in Table 2.1, a “wind energy farm” is considered to be a category five (5) development.

**Table 2.1: Key to categories of Development**

<p><b>Category 1 development:</b> e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.</p> <p><b>Category 2 development:</b> e.g. low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.</p> <p><b>Category 3 development:</b> e.g. low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.</p> <p><b>Category 4 development:</b> e.g. medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure.</p> <p><b>Category 5 development:</b> e.g. high density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.</p>
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Not all areas surrounding the proposed Albany WEF will be equally visually impacted by the proposed wind farm. Road routes such as the N2 and R67, that transect the WEF site, are not all wilderness areas of particularly high scenic value. However, there are various game and nature reserves within the wider study area, particularly to the north of the WEF, including the Indalo Private Game Reserve Association (including the Kwandwe Game Reserve and Ecca Nature Reserve), that do have HIGH to VERY HIGH scenic value that could potentially be negatively affected by the WEF.

VIA's become more critical where wilderness or protected landscapes are involved, as well as when high density urban development or large-scale infrastructure are being considered. Based on the "type of environment" categories provided in Table 2.2 below, the immediate Albany WEF site would probably fall within a MEDIUM scenic value category while some locations in the wider study area (generally within a 30km radius of the proposed WEF) could be considered to be of HIGH to VERY HIGH scenic, cultural or historical significance, such as the Indalo Protected Environment and Ecca Pass area.

**Table 2.2: Categorization of issues to be addressed by the visual assessment (DEA&DP Guidelines)**

Type of environment	Type of development (see Box 3) Low to high intensity				
	Category 1 development	Category 2 development	Category 3 development	Category 4 development	Category 5 development
Protected/wild areas of international, national, or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance / disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

Table 2.3 below describes the category of visual impact expected. With regards to the proposed Albany WEF, the visual impacts will vary for different areas surrounding the WEF site, ranging from:

- **Very high visual impact expected** – with potentially **significant effect** on wilderness quality or scenic resources; to
- **Moderate visual impact expected** – with potentially **some effect** on protected landscapes or scenic resources.

**Table 2.3: Description of the key categories of visual impact expected.**

<p><b>Very high visual impact expected:</b>                  Potentially significant effect on wilderness quality or scenic resources;                  Fundamental change in the visual character of the area;                  Establishes a major precedent for development in the area.</p>
<p><b>High visual impact expected:</b>                  Potential intrusion on protected landscapes or scenic resources;                  Noticeable change in visual character of the area;                  Establishes a new precedent for development in the area.</p>
<p><b>Moderate visual impact expected:</b>                  Potentially some effect on protected landscapes or scenic resources;                  Some change in the visual character of the area;                  Introduces new development or adds to existing development in the area.</p>
<p><b>Minimal visual impact expected:</b>                  Potentially low level of intrusion on landscapes or scenic resources;                  Limited change in the visual character of the area;                  Low-key development, similar in nature to existing development.</p>
<p><b>Little or no visual impact expected:</b>                  Potentially little influence on scenic resources or visual character of the area;                  Generally compatible with existing development in the area;                  Possible scope for enhancement of the area.</p>

Based on the above considerations, the approach adopted for the Albany WEF VIA is that prescribed for a development or activity where a HIGH to VERY HIGH visual impact is expected.

According to the DEA&DP guideline, this will require a Level 4 Visual Assessment.

Approach	Type of issue (see Box 4)				
	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	Very high visual impact expected
Level of visual input recommended	Level 1 visual input	Level 2 visual input	Level 3 visual assessment	Level 4 visual assessment	

A Level 4 Visual Assessment consists of the following main elements:

- Identification of issues raised in scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Description of alternatives, mitigation measures and monitoring programmes; and
- 3D modelling and simulations.

### 3. COMMENTS ON THE DRAFT VIA

#### 3.1. Comments

The following submissions were made by I&APs with respect to the first draft of the VIA.

- Richard Summers Inc. Attorneys representing Kwandwe Private Game Reserve supported by:
  - Review of VIA by Oberholzer and Lawson.
  - Review of EIA Report by Global Green.
  - Client Survey on Potential Renewable Energy Developments Near Kwandwe Private Game Reserve.
- EScience Associates (Pty) Ltd supported by:
  - Cover letter from Indalo Private Game Reserve Association.
  - EScience Comments on Albany EIA process: Inadequacies in EIR and Specialist studies.
  - EScience VIA Report View Simulation and Motivation.
- Other inputs:
  - Amakhala Game Reserve
  - Buffalo Kloof Private Game Reserve
  - Kariega Game Reserve
  - Coleridge Game Reserve
  - Lalibela Game Reserve
  - Pumba Private Game Reserve
  - Shamwari Private Game Reserve
  - Sibuya Game Reserve
  - ECPTA

Copies of the various submissions are provided in the PPP section of the EIAR. The main issues raised by the Indalo and Kwandwe submissions are provided in more detail at Appendix A.

Table 3.1 below provides a summary of the main concerns raised by I&APs relating to the draft VIA and the visual impacts associated with the proposed Albany WEF.

**Table 3.1: Main issues raised by I&APs relating to the draft VIA and current responses.**

Main issues raised by I&APs	Response
Poor selection of vantage points for visual assessment.	The selection of vantage points is considered to be adequate in order to assess the visual impacts within the study area. However, the Great Fish River Nature Reserve has been added in the current report.
Omission of the Great Fish Nature Reserve.	The Great Fish Nature Reserve has been included.
The visual impact on wildlife and nature tourism in the area would be of fatal proportions.	An unsubstantiated opinion.
The 20-25 year lifespan of the WEF as it affects the HIGH impact rating, is questioned.	The WEF is not a permanent structure and will be decommissioned after the end of its useful life. A new application for EA would need to be secured to extend the life of the WEF.

**Visual Impact Assessment**

<b>Main issues raised by I&amp;APs</b>	<b>Response</b>
Questions draft VIA statement that the landscape of the study area is not pristine or of very high scenic value.	The uniqueness and scenic value of the landscape has been addressed in more detail in the current report. The majority of the landscape in the study area has been transformed to some degree by historical agricultural activities. Man-made structures, activities and effects are present in most views of the landscape such as roads, Eskom powerlines and substation, telkom towers, etc. The scenic value could be described as HIGH due to presence of good condition Fish Arid and Fish Valley thicket vegetation but not pristine or unique.
Fails to adequately address the cumulative impacts of WEFs in the area.	Cumulative impacts have been adequately addressed in Section 11 of the current report.
Questions the limited mitigation measures proposed, such as reduced hub height and reduced turbine numbers and the no-go alternative.	The applicant has reduced the number of turbines from 66 to 43 largely based on the comments received on the draft VIA relating to the visual impacts.
The VIA did not adequately assess other alternatives.	The VIA assessed the preferred alternative and the no-go alternative.
No attempt to implement the hierarchical approach to impact management through impact avoidance.	The applicant has reduced the number of turbines from 66 to 43.
The VIA fails to ensure that the assessment is undertaken by an independent visual specialist.	CES provides independent EAP and various other independent specialist services including VIAs. In addition, the VIA will be reviewed by an external specialist.
Inaccurate baseline information.	The baseline information section has been substantially updated in the current report.
VIA ignores the REDZ visual mapping showing the classification of the relevant portion of REDZ 3 as very high visual sensitivity.	A section on the REDZ has been included in the current report.
The impact of night lighting has not been addressed at all.	The draft VIA did consider the impacts of night lighting. However, the impacts of night lighting has been expanded in the current report.
Limited evidence of project screening to avoid visually sensitive areas.	The screening potential (vegetation and topography) has been addressed in the current report.

Responses to submissions were made by I&APs with respect to the **second draft of the VIA** are provided in the Issues & Response Trail (IRT) report.

## 4. APPROACH AND METHODOLOGY

The current section outlines the approach taken by CES in assessing the visual impacts of the proposed Albany WEF and the methods adopted. We believe that our approach is systematic, objective and repeatable.

The assessment and mitigation of visual impacts of wind farms should be conducted in the following manner:

- Identify visual impact criteria (key theoretical concepts);
- Identify potentially sensitive visual receptors;
- Conduct a visibility analysis; and
- Assess the impacts of the proposed wind farm taking into consideration factors such as sensitivity of viewers and viewpoints, visibility, visual exposure, landscape sensitivity, visual intrusion and visual absorption capacity (VAC).

Oberholzer (2005) notes that thresholds of significance define the level or limit at which point an impact changes from low to medium significance, or medium to high significance. These thresholds are often determined by current societal values which define what would be acceptable or unacceptable to society and may be expressed in the form of legislated standards, guidelines or objectives. However, unlike water quality or air quality, thresholds for visual or scenic quality cannot be easily quantified, as they tend to be abstract, and often relate to cultural values or perceptions.

A second difficulty is that natural, rural and urban landscapes are constantly changing, and the assessment will, therefore, need to consider this in determining the significance of impacts.

A third difficulty may be the divergence of opinion on what constitutes 'acceptable' change, by the individual, the community or society in general.

The visual assessment should recognise that some change to the landscape over time is inevitable with the expansion of urban areas and introduction of new technologies, such as communication masts. This will have a bearing on significance ratings, particularly in identified growth areas.

### 4.1. Field Surveys and Photographic Survey

Field surveys for the current VIA were conducted in February 2020, August 2020 and again in November 2020, and provided an opportunity to:

- Determine the actual or practical extent of potential visibility of the proposed WEF, by assessing the screening effect of landscape features;
- Conduct a photographic surveys of the landscape surrounding the WEF; and
- Identify sensitive landscapes and visual receptors.

### 4.2. Baseline Description

A desktop study was conducted to establish and describe the landscape character of the receiving environment. A combination of Geographic Information System (GIS), literature review and photographic survey was used to analyse land cover, landforms and land use in order to gain an understanding of the current landscape within which the development will take place (GLVIA, 2002). Landscape features of special interest were identified and mapped, as were landscape elements that may potentially be affected by the development.

**4.3. Selection of sensitive receptors**

Visually sensitive receptors are locations or areas where people may have a significantly increased visual sensitivity or exposure to changes in the surrounding environment. The REDZ SEA Landscape Sensitivity Analysis Report (2015) provides a useful framework of receptor categories for the identification of potentially sensitive visual receptors. Those receptor categories applicable to the current VIA include:

- Ridgelines, scarps, prominent elevations and geological features.
- Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.
- Private reserves and game farms
- Towns, villages and settlements
- National roads
- Scenic routes, passes and ports.
- Provincial and arterial roads.

**4.4. Visual Impact Assessment**

**4.4.1. Specific criteria for visual impact assessments**

Oberholzer (2005) recommends that specific visual impact assessment criteria should be considered in a VIA. These are provided in Table 4.1 below.

**Table 4.1: Visual Assessment Criteria (Oberholzer, 2005).**

	<b>Criteria</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
<b>Applied to the study area as a whole</b>	<b>Visibility of the project</b> – the geographic area from which the project will be visible, or view catchment area. (The actual zone of visual influence of the project may be smaller because of screening by existing trees and buildings). This also relates to the number of receptors affected.	<i>High visibility</i> – visible from a large area (e.g. several square kilometres).	<i>Moderate visibility</i> – visible from an intermediate area (e.g. several hectares).	<i>Low visibility</i> – visible from a small area around the project site.
	<b>Visual sensitivity of the area</b> – the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement pattern. This translates into visual sensitivity.	<i>High visual sensitivity</i> – highly visible and potentially sensitive areas in the landscape.	<i>Moderate visual sensitivity</i> – moderately visible areas in the landscape.	<i>Low visual sensitivity</i> – minimally visible areas in the landscape.
<b>Applied to the whole study area and receptors</b>	<b>Visual intrusion</b> – the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.	<i>High visual intrusion</i> – results in a noticeable change or is discordant with the surroundings;	<i>Moderate visual intrusion</i> – partially fits into the surroundings, but clearly noticeable;	<i>Low visual intrusion</i> – minimal change or blends in well with the surroundings.
<b>Applied to specific identified</b>	<b>Visual sensitivity of Receptors</b> – The level of visual impact considered acceptable is dependent on the type of receptors.	<i>High sensitivity</i> – e.g. residential areas, nature reserves and scenic routes or trails;	<i>Moderate sensitivity</i> – e.g. sporting or recreational areas, or places of work;	<i>Low sensitivity</i> – e.g. industrial, mining or degraded areas.

**Visual Impact Assessment**

	<b>Criteria</b>	<b>High</b>	<b>Moderate</b>	<b>Low</b>
	<b>Visual exposure</b> – based on distance from the project to selected viewpoints. Exposure or visual impact tends to diminish exponentially with distance.	<i>High exposure</i> – dominant or clearly noticeable;	<i>Moderate exposure</i> – recognisable to the viewer;	<i>Low exposure</i> – not particularly noticeable to the viewer;
	<b>Visual absorption capacity (VAC)</b> - the potential of the landscape to conceal the proposed project.	<i>Low VAC</i> - e.g. little screening by topography or vegetation.	<i>Moderate VAC</i> - e.g. partial screening by topography and vegetation;	<i>High VAC</i> – e.g. effective screening by topography and vegetation;
	<b>NOTE ABOUT VAC</b> It should be noted that the impacts associated with VAC work opposite to the other impacts where HIGH VAC reduces the overall negative impact LOW VAC increases the overall negative impact.			

In order to assess the visual impacts of the Albany WEF according to the criteria recommended above by Oberholzer (2005), a combination of the following methods was adopted:

- Viewshed analyses;
- 3D simulations; and
- Field observations.

The current assessment of the visual impacts of the Albany WEF on sensitive receptors, is based on the following criteria and methods:

**Table 4.2: Approach adopted for assessing impacts on sensitive visual receptors.**

<b>CRITERIA</b>	<b>METHOD</b>
• Visibility – extent of project visible to receptor (hubs with height at 130 metres)	Viewshed analysis
• Visibility – extent of project visible to receptor (blades at height of 215 metres)	
• Visual exposure – distance of receptor	
• Landscape sensitivity – of receptor	
• Visual intrusion – on receptor daytime	3D simulations
• Visual intrusion – on receptor night lighting	
• Visual sensitivity – of receptor	Proclamation status per SA Protected Areas Database
• VAC – concealment potential	Based on a combination of viewshed analysis (topography) and site observations

**4.5. Viewshed Analyses**

GIS was used to calculate viewsheds for the 43 proposed wind turbines. These included:

- Turbine hubs of 130 metres height; and
- Turbine blades of 251 metres in height (worse case scenario).

Other structures (such as access roads, a substation station and operational and maintenance buildings) will also be built. However, the visual impact of these features will not generally affect sensitive receptors were not considered in the VIA.

The viewshed analysis for hubs and blades was conducted for:

- The study area as a whole – the entire area within a radius of 30 km of the WEF;

- Individual sensitive receptors – mostly nature reserves and game farms located within a radius of 30 km of the WEF,

Three main visual criteria were assessed with respect to the viewshed analyses: visibility, exposure and landscape sensitivity.

**Visibility**

Oberholzer (2005) indicates that visibility relates to the geographic area from which a project is visible and provides the following guidelines with respect to the visibility of a project study area as a whole:

- HIGH visibility is where the project is visible from a large area;
- MODERATE visibility is where the project is visible from an intermediate area; and
- LOW visibility is where the project is visible from a small area around the project site.

With respect to the current Albany WEF project, it is suggested that the visibility of the WEF to individual sensitive receptors should be based on the overall observation of the number of turbines that will be visible (hubs and blades) to the individual receptors and relative to the size of the affected areas (as not all areas are equally affected) as determined in the viewshed analyses maps.

There are no guidelines for rating the “visibility” of wind turbines for individual receptors or what appropriate “affected area” thresholds should be. This will be particularly difficult when assessing receptors that comprise large areas of land (sometimes exceeding 1,000’s of ha’s in size) with a high variation in terrain and visibility. However, the following matrix has been developed for five different turbine visibility intensities and attaching % affected area thresholds of:

- 25% to the affected area for turbine hubs; and
- 50% to the affected area for turbine blades (since blades have a much lesser visual intensity than hubs as shown in Figure 4.1 below).



**Figure 4.1: Image showing the lower visual intensity of viewing hubs versus turbines tips (circled).**

We believe that this is a reasonable and repeatable approach and that the thresholds for affected areas are conservative (see Table 4.3 below).

**Table 4.3: Turbine visibility impact criteria for individual sensitive receptors to the Albany WEF.**

Number of visible turbines	Visibility rating
<ul style="list-style-type: none"> <li>• Hubs - 75% (31) or more turbine hubs are visible for more than 25% of the receptor area.</li> <li>• Blades - 75% (31) or more turbine blades are visible for more than 50% of the receptor area.</li> </ul>	<b>VERY HIGH</b>
<ul style="list-style-type: none"> <li>• Hubs - 50% (21) or more turbine hubs are visible for more than 25% of the receptor area.</li> </ul>	<b>HIGH</b>

Number of visible turbines	Visibility rating
<ul style="list-style-type: none"> <li>Blades - 50% (21) or more turbine blades are visible for more than 50% of the receptor area.</li> </ul>	
<ul style="list-style-type: none"> <li>Hubs - 25% (11) or more turbine hubs are visible for more than 25% of the receptor area.</li> <li>Blades - 25% (11) or more turbine blades are visible for more than 50% of the receptor area.</li> </ul>	<b>MODERATE</b>
<ul style="list-style-type: none"> <li>Hubs - 1% (1) or more turbine hubs are visible for more than 25% of the receptor area.</li> <li>Blades - 1% (1) or more turbine blades are visible for more than 50% of the receptor area.</li> </ul>	<b>LOW</b>
<ul style="list-style-type: none"> <li>Hubs - No hubs visible.</li> <li>Blades - 1% (1) or more turbine blades are visible in less than 50% of the receptor area.</li> </ul>	<b>VERY LOW to NEGLIGABLE</b>

It should be noted that it is well understood that humans judge distance to objects in the landscape in part by assessing the effects of atmospheric perspective, where the decrease in contrast between an object and its background as distance increases. As distance increases, the colours of the object become less distinct and shift toward the background colour, usually blue or grey. Atmospheric perspective is an important cue for an observer to determine relative distance of objects in the landscape. The loss of sharpness and lower contrast of photographs relative to *in-situ* viewing may exaggerate the effects of atmospheric perspective, thus may affect the perception of scale and distance to objects in the landscape, making them appear farther away than they actually are.

**Visual exposure**

The visual exposure is based on distances from the WEF according to the following criteria (as adapted from Oberholzer 2005, and the Scottish Planning Advice Note 45 2002):

- High exposure – 0 to 5km from the development – dominant and clearly visible.
- Moderate exposure – 5km to 15km from the development – recognizable to the viewer.
- Low exposure – greater than 15km from the development – not particularly noticeable to the viewer.

**Landscape sensitivity**

The REDZ SEA and Landscape Scoping Report (2015) provides a useful set of criteria relevant to the landscape sensitivity that have also been considered in the current VIA (see Table 4.4 below).

**Table 4.4: Landscape sensitivity features adopted by the SEA and the Landscape Scoping Report (2015).**

Sensitivity feature	Potential sensitivity mapping application to wind farms
Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.	Very high sensitivity – within 3 km viewshed.
	High sensitivity – between 3 and 5 km viewshed.
	Medium sensitivity – between 5 and 10 km viewshed.
	Low sensitivity – greater than 10 km viewshed.
Private reserves and game farms	Very high sensitivity – within 2 km viewshed.
	High sensitivity – between 2 and 5 km viewshed.
	Medium sensitivity – between 5 and 7 km viewshed.
	Low sensitivity – greater than 7 km viewshed.

**4.6. 3D Simulations**

Viewpoint simulations have not been conducted for every sensitive receptor, but the selected viewpoints are believed to be a sufficiently representative sample that provides additional information (in addition to the viewshed analyses) for assessing the severity of the visual impacts within a 30 km radius of the proposed WEF.

It should be noted that although 3D simulations do not accurately replicate the real-life situation, but they do provide important visualisation input on the visibility (including numbers of turbines) and visual intrusiveness of turbines in the landscape.

Viewpoints were chosen using the following criteria:

- High visibility – sites from where most of the wind farm will be visible;
- High visual exposure – sites at various distances from the proposed site; and
- Sensitive areas and viewpoints from which turbines will potentially be seen such as nature reserves and game reserves.

3D simulations were conducted for:

- Certain nature and game reserves; and
- Certain road routes.

Viewpoint simulations have also been conducted for daytime and turbine night lighting.

The following guidelines were adopted for assessing visual intrusion (Oberholzer 2005).

- High visual intrusion – results in a noticeable change or is discordant with the surroundings;
- Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable; and
- Low visual intrusion – minimal change or blends in well with the surroundings.

#### **4.7. Other observations**

“Other observations” included obtaining photographic and other observational descriptions in the field where it was not practicable to conduct a viewshed analysis or 3D simulation due the receptor not being easily defined spatially (e.g. a ridge or pass) or the receptor is mostly mobile (e.g. motorists using roads).

Field observation information was used to assess the following:

- Residents of surrounding towns and villages, Makhanda, Bathurst and KwaNdwanyana;
- Residents on farms hosting and surrounding the wind turbines;
- Roads and motorists using the main roads in the study area; and
- Scenic routes and passes (e.g. Ecca Pass).

#### **4.8. Overall Visual Impact Assessment**

As part of the EIA process, the visual impacts of the proposed Albany WEF should be incorporated into the standard CES EIA impact rating system (provided at Appendix E). The overall visual impact assessment severity ratings have been used to inform the severity rating of the impacts in Section 12.5.

## 5. PROJECT INFORMATION

### 5.1. Relevant project information

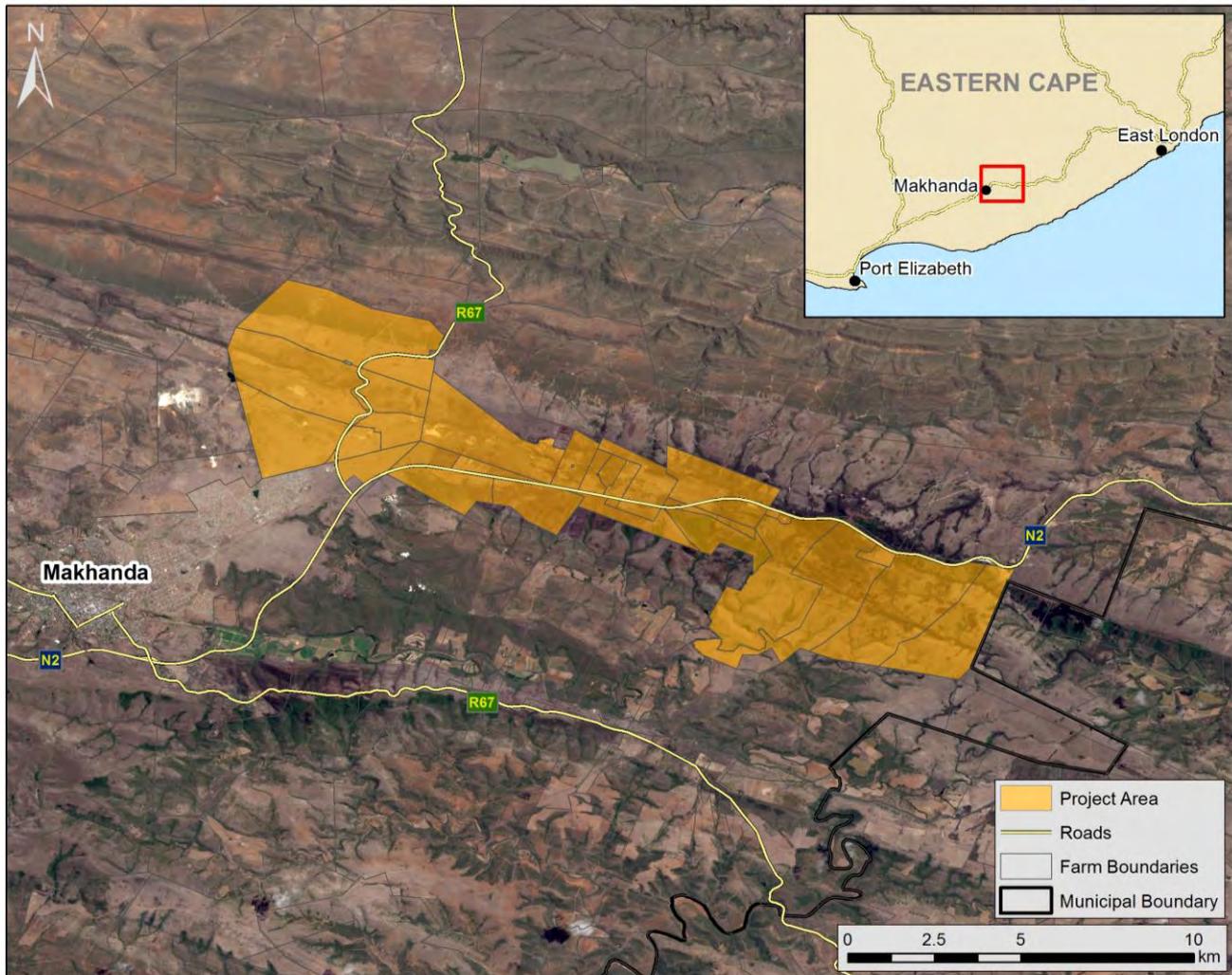
The proposed Albany WEF and associated grid infrastructure is located east of Makhanda (previously known as Grahamstown) in the Eastern Cape Province. The project site is situated in the Makana Local Municipality, which forms part of the Sarah Baartman District Municipality (Figure 5.1). The proposed WEF will be developed in a single phase and will host a maximum of 43 turbines, with a total maximum output capacity of 297 MW. The anticipated life span of the wind farm is 20 – 25 years.

The proposed Albany WEF falls across 28 farm portions (provided in Table 5.1 and seen in Figure 5.1). These farm portions cover a cumulative area of 6,285 ha and are collectively referred to as the “**project site/area**”. When this report refers to the “**study area**”, it is referring to the area within a 30 km radius of the proposed project area.

The project area can be accessed from the N2 which traverses the project site in an east-west direction and the R67 which traverses the site in a north-south direction. A number of existing public and private farm roads are also present within the project area.

**Table 5.1: Farm portions on which the proposed development is located**

Farm Name	SG Digit Number	Area (Ha)
Farm 223, Remaining Extent & Portion 2	C0020000000022300002	84.5
The Orchards 233, Portion 3	C0020000000023300003	477.0
Farm 234, Portion 1	C0020000000023400001	37.3
Collingham Towers 235, Remaining Extent	C0020000000023500000	142.0
Tempe 240, Portion 10	C0020000000024000010	82.4
Tempe 240, Portion 11	C0020000000024000011	167.0
Tempe 240, Portion 12	C0020000000024000012	116.0
Tempe 240, Portion 7	C0020000000024000007	117.0
Tempe 240, Portion 8	C0020000000024000008	416.0
Tempe 240, Portion 9	C0020000000024000009	543.0
Tempe 241, Remaining Extent	C0020000000024100000	672.0
Grobbelers Kloof 334, Portion 1	C0020000000033400001	204.0
Grobbelers Kloof 334, Portion 2	C0020000000033400002	210.0
Grobbelers Kloof 334, Portion 3	C0020000000033400003	75.4
Grobbelers Kloof 334, Portion 4	C0020000000033400004	54.4
Farm 358, Portion 1	C0020000000035800001	8.31
Farm 358, Portion 3	C0020000000035800003	6.73
Allandale 581	C0020000000058100000	36.0
Miniplaas 582	C0020000000058200000	51.7
Nutwood 583, Remaining Extent	C0020000000058300000	51.8
Farm 599, Remaining Extent	C0020000000059900000	111.0
Farm 601, Remaining Extent	C0020000000060100000	125.0
Green Hills 663, Remaining Extent	C0020000000066300000	437.0
Green Hills 663, Remaining Extent & Portion 1	C0020000000066300001	616.7
Green Hills 663, Remaining Extent & Portion 2	C0020000000066300002	575.8
Green Hills 663, Remaining Extent & Portion 3	C0020000000066300003	34.2
Green Hills 663, Remaining Extent & Portion 4	C0020000000066300004	641.2
Erf 4807, Remaining Extent	C00200020000480700000	192.0



**Figure 5.1: Location of the proposed Albany Wind Energy Facility.**

## 5.2. Details and nature of the Albany WEF

The components of a typical wind turbine subsystem include:

- A rotor, or blades, which are the portion of the wind turbine that collect energy from the wind and convert the wind's energy into rotational shaft energy to turn the generator. The speed of rotation of the blades is constant and controlled by the nacelle, which can turn the blades to face into the wind ('yaw control'), and change the angle of the blades ('pitch control') to make the most use of the available wind.
- A nacelle (enclosure) containing a drive train, usually including a gearbox (some turbines do not require a gearbox) and a generator. The generator is what converts the torque of the turning motion of a wind turbine's rotor (mechanical energy) into electricity. Inside this component, coils of wire are rotated in a magnetic field to produce electricity. The nacelle is also fitted with brakes, so that the turbine can be switched off during very high winds, such as during storm events. This prevents the turbine from being damaged. All this information is recorded by computers and is transmitted to a control centre, which means that operators don't have to visit the turbine very often, but only occasionally for a mechanical check.
- A tower, to support the rotor and drive train; The tower on which a wind turbine is mounted is not only a support structure, but it also raises the wind turbine so that its blades safely clear the ground and so can reach the stronger winds at higher elevations. The tower must also be strong enough to support the wind turbine and to sustain vibration, wind loading, and the overall weather elements for the life time of the turbine.
- The foundation unit upon which the turbine is anchored to the ground.

- Electronic equipment such as controls, electrical cables, ground support equipment, and interconnection equipment.

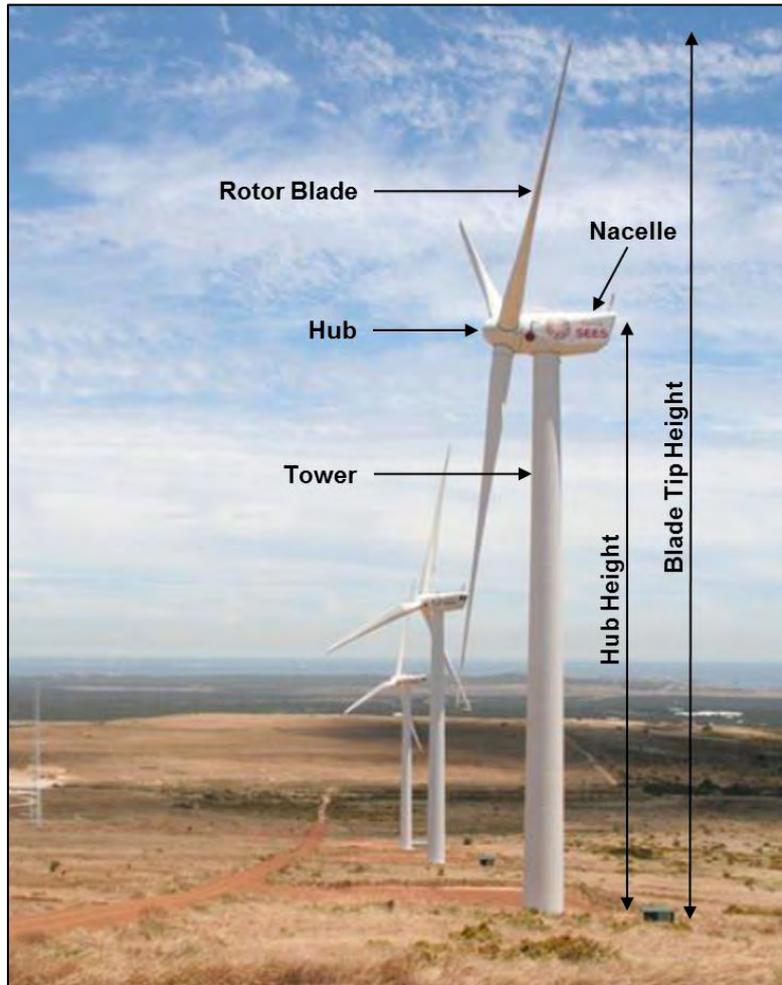


Figure 5.2: Example of wind turbines - Darling Wind Farm, Western Cape, South Africa.

The proposed Albany WEF will have an energy generation capacity of up to 297 megawatts (MW), and will include the following infrastructure:

Wind Energy Facility

- Temporary infrastructure including a site camp and a laydown area of approximately 30 m<sup>2</sup> per turbine (all to be rehabilitated post-construction).
- Up to forty-three (43) wind turbines with a rotor diameter of up to 170 m, a hub height of up to 130 m and blade length of up to 85 m - each with an output of between 4 and 8 megawatts (MW).
- Foundations (up to 550 m<sup>2</sup>) for each wind turbine.
- A laydown area next to the locations of the proposed wind turbines (3 900 m<sup>2</sup> for crane hardstand per turbine).
- Areas of approximately 25 m<sup>2</sup> for the switchgear and/or transformer at each turbine;
- Internal access roads of between 8 m (during operation) and 14 m (during construction, to be partly rehabilitated) wide to each turbine.
- Medium voltage (MV) cabling between turbines and the switching station, to be laid underground where technically feasible.
- Overhead medium voltage powerlines between turbine rows, where necessary.
- Overhead powerlines to connect the facility to the electrical grid.
- Existing roads will be used as far as possible. However, where required, internal access roads will be constructed between the turbines.
- A temporary area of approximately 90,000 m<sup>2</sup> which will include a batching plant, laydown facilities, concrete tower manufacturing and steel tower processing and construction compound.

Grid Connection Infrastructure

- An up to 23,000 m<sup>2</sup> IPP Substation (MV/132kV) which will include, battery storage and site office area, situated in the middle of the site.
- Two collector substations, each 10,000 m<sup>2</sup>, (Collector s/s West and Collector s/s East) will be constructed.
- The grid connection will be a LILO on the Pembroke-Albany 132kV line;
- All turbines will connect, via underground MV lines, either directly to the IPP substation or to a collector. Each collector will in turn connect to the IPP substation via MV or 132KV overhead line/s within the grid corridor.
- Grid corridor width is 500m wide to allow for manoeuvrability for the final line position within the corridor.
- The corridor from Collector s/s West to the main corridor is 170m in width with a flanking area to accommodate for the line turn in.

Figures 5.3 and 5.4 below show the Albany WEF layout with the original 66 turbine and the reduced 43 turbine layouts, respectively.

The current Albany WEF layout essentially comprises three (3) distinct clusters of turbines as seen in Figure 5.4 below:

Cluster	Number of turbines
Western	20
Central	8
Eastern	15
TOTAL	43

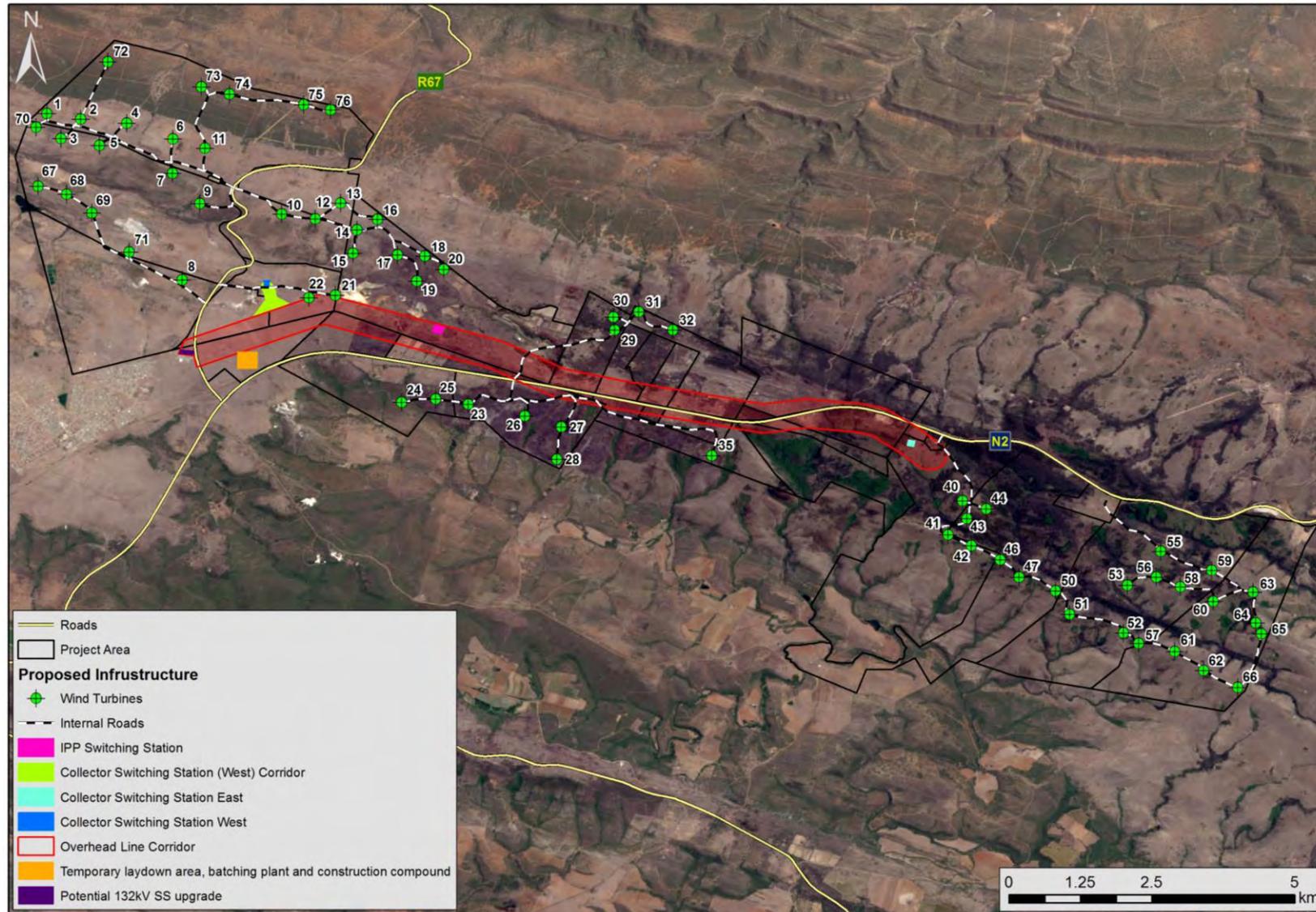


Figure 5.3: Original proposed layout of the Albany WEF consisting of 66 wind turbines.

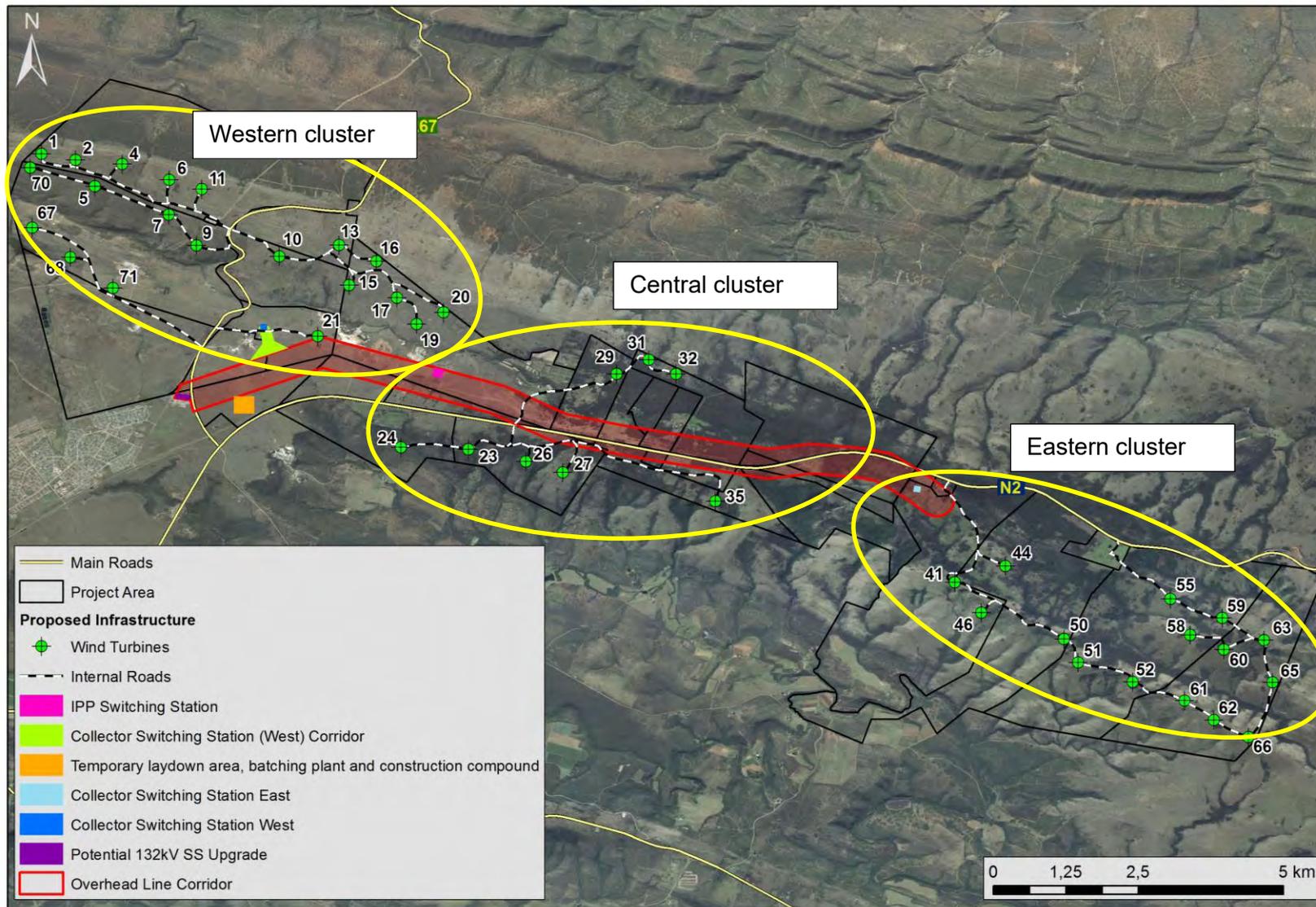


Figure 5.4: Revised proposed layout of the Albany WEF consisting of 43 wind turbines located in three distinct clusters.

## 6. BASELINE DESCRIPTION

The current section provides the baseline visual sensitivity context for the proposed Albany WEF where the following aspects are considered to be relevant to describing the visual sensitivity of the project site and wider study area and identification of potentially visually sensitive receptors:

- Current landcover, land-use and zoning;
- Physical environment, such as topography;
- Protected area status;
- Vegetation conservation status;
- Existing built environment; and
- Other relevant features.

Other additional information is also provided that is considered relevant to the sensitivity of the project area and wider study area with respect to the proposed WEF, including:

- Renewable Energy Development Zones (REDZ); and
- Distance and impacts.

### 6.1. Baseline visual sensitivity

#### 6.1.1. Landcover, land use and zoning of the project area and study area

Appendix C provides the National Land Cover Map for the project area and study area (within a radius of 30km of the project site).

#### *Landcover, land use and zoning of the project area*

In terms of landcover, the project area is characterised by three main landcover types:

- Natural grassland
- Open woodland
- Low shrubland

The three distinct turbine clusters tend to be associated with three distinct land cover and land usages as described in Table 6.1 below.

**Table 6.1: Land use descriptions for the three turbine clusters.**

Cluster	Number of turbines	Land cover and land use
Western	20	Natural grasslands mostly used for communal stock grazing.
Central	8	Woodlands (mostly alien species) with some grasslands, mostly used for stock farming and tree plantations.
Eastern	15	Low shrubland and woodlands (mostly alien species) mostly used for stock farming and tree plantations.
TOTAL	43	

*Western turbine cluster*

The western turbine cluster straddles the R67 as it approaches Makhanda from the north. The area mostly comprises natural grassland areas that are interspersed with some shrubland and woodland elements which based on site investigations mostly appears to be clusters of the invasive Black Wattle alien species. The grassland to the west is state owned land designated as communal land and used mostly for grazing of stock including cattle and goats (See Figure 6.1 below).

The land in the western cluster is zoned as agriculture and allocated as new stock grazing commonage for the Makhanda community (see Figure 6.2 below).



**Figure 6.1: Views of the western turbine cluster area from both west and east of the R67 entering Makhanda.**

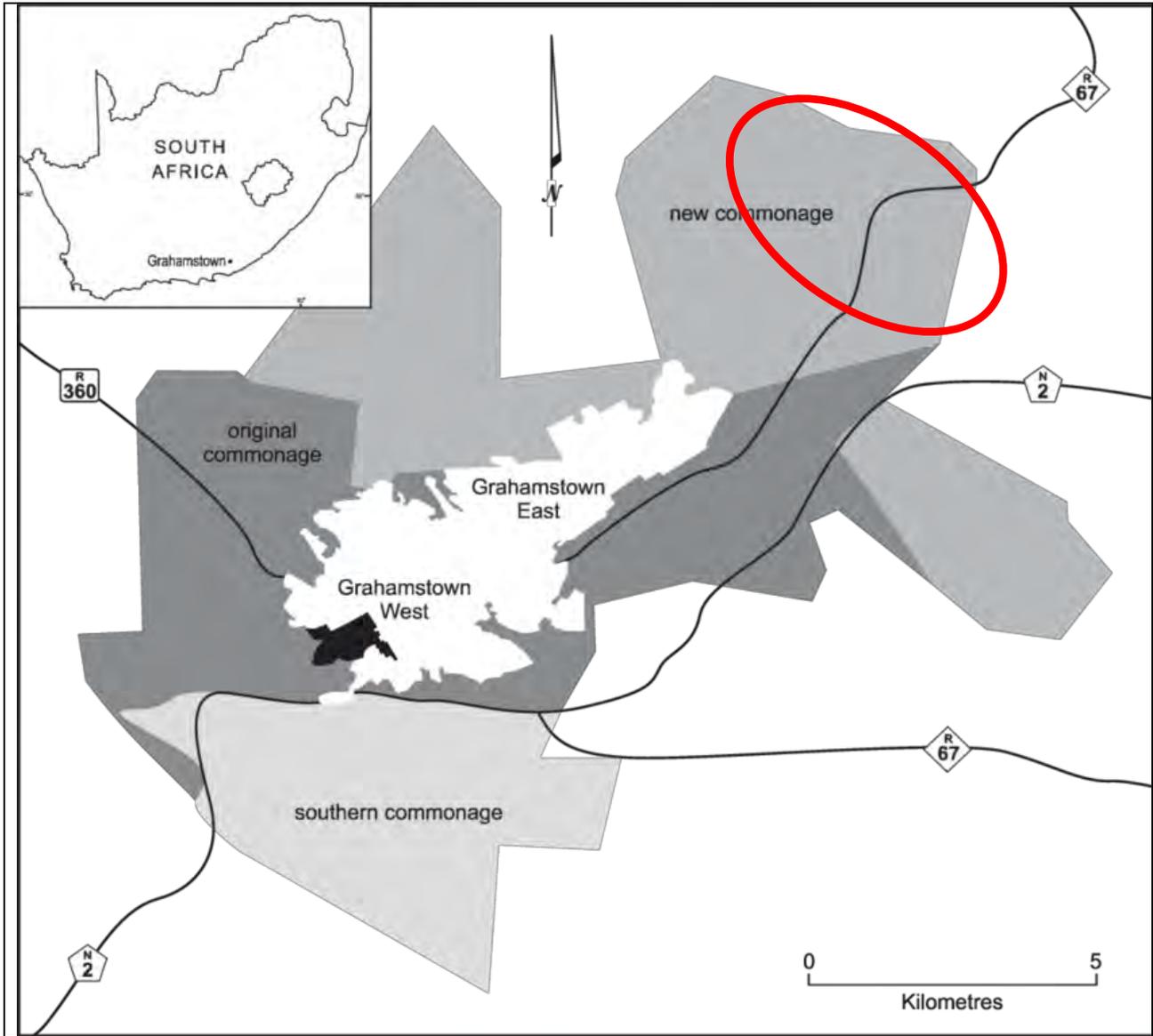


Figure 6.2: Commonage areas of Makhanda with location of the western turbine cluster of the Albany WEF circled in RED.

*Central turbine cluster*

The central turbine cluster is straddles the N2 north of Makhanda towards Peddie. The area mostly comprises woodland, which again on inspection, mostly consists of stands of mixed alien tree species such as Pine, Eucalyptus and Black Wattle. This area is also interspersed with cultivated and grassland elements. The land is mostly privately owned and used for grazing, cultivation and remnant commercial woodlots (see Figure 6.3 below).

The land in the central cluster is all zoned as agriculture land.



**Figure 6.3: Views of the central turbine cluster area both north and south of the N2 between Makhanda and Peddie.**

*Eastern turbine cluster*

The eastern turbine cluster is again located south of the N2 towards Peddie. The area mostly comprises low shrubland with elements of Fynbos located mostly on the high incised ridges to the far east of the cluster. The area is also interspersed with cultivated areas and large remnant commercial woodlots comprising clusters of the invasive Black Wattle and other alien tree species. The land is mostly privately owned and used for grazing, cultivation and remnant commercial woodlots (see Figure 6.4 below).

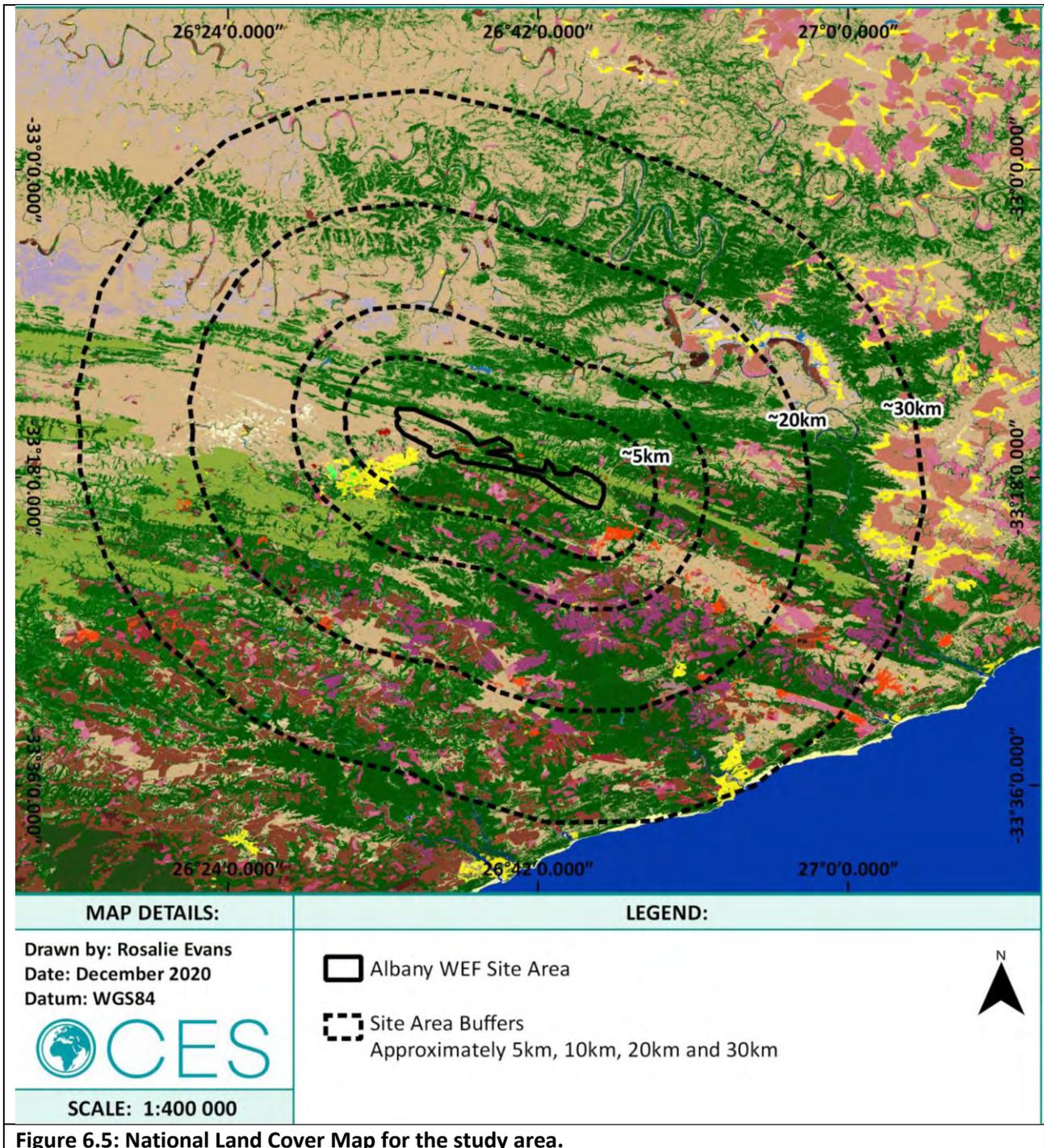
The land in the eastern cluster is zoned as agriculture land.



**Figure 6.4: Views of the eastern turbine cluster area both north and south of the N2 between Makhanda and Peddie.**

**Landcover, land use and zoning of the study area**

The landcover of the study area (within a 30km radius of the project site) comprises a wide range of landcover types (See National Land Cover Map at Figure 6.5 below and at Appendix C).



**Figure 6.5: National Land Cover Map for the study area.**

Based on the National Land Cover Map in Figure 6.5 above (and Appendix C), the predominant landcover types within the study area include:

- Contiguous low forest and thicket
- Dense forest and woodland
- Plantation forests
- Open woodland
- Low shrubland (including Fynbos and Succulent Karoo)
- Natural grassland

- Cultivated orchards
- Residential (formal and informal)

The study area generally includes grasslands (particularly to the north west of the site) and shrublands on the hills, and thicket in the valleys. Small patches of forest also occur in some of the valleys to the east. Irrigated agriculture occurs mostly in the Great Fish River floodplain, while some dryland cultivation of crops also occurs (Makana Municipality 2011).

Makhanda and Bathurst are the largest settlements in the study area. KwaNdwanyana is a rural village spread out all along the northern bank of the Great Fish River. This village is surrounded by commonage land that is used for a mix of agricultural purposes including crops and livestock which are farmed primarily on a subsistence basis (Ngqushwa Municipality 2011).

In terms of land use, the main activities include within the study area include:

- Conservation (public and private);
- Game farming (private);
- Stock farming (communal and private);
- Crop farming (communal and private);
- Commercial forestry;
- Urban development; and
- Rural development.

There are a number of both public and private nature/game reserves within the study area that have formal conservation status either as proclaimed or declared a protected environment in terms of the Protected Areas Act (see Figure 6.6 below and expanded SA Protected Areas Database Map at Appendix D). These are listed in Table 6.2 below and probably account for about 15% to 20% of the total study area with the biggest contributions being the Indalo Protected Environment and the Great Fish Nature Reserve.

The Great Fish River Nature Reserve managed by the Eastern Cape Parks and Tourism Agency (ECPTA), is located at a distance ranging from about 15km to 40km from the nearest turbines.

There are also a number of private game reserves that do not have formal protected status (i.e. zoned Agriculture) such as the non Indalo portion of the Kwandwe Private Game Reserve, Kudu Ridge Private Game Reserve and Bucklands Private Nature Reserve. These private nature reserves probably contribute in the order of a further 5% to the total study area.

The **vast majority** of the land within the study area is non-conservation agricultural land or communal (i.e. zoned Agriculture), particularly in the Fish River valley north and north east of the project area and to the east and south east of the project area.

**Table 6.2: Summary of protection status of public and private nature/ game reserves within the study area.**

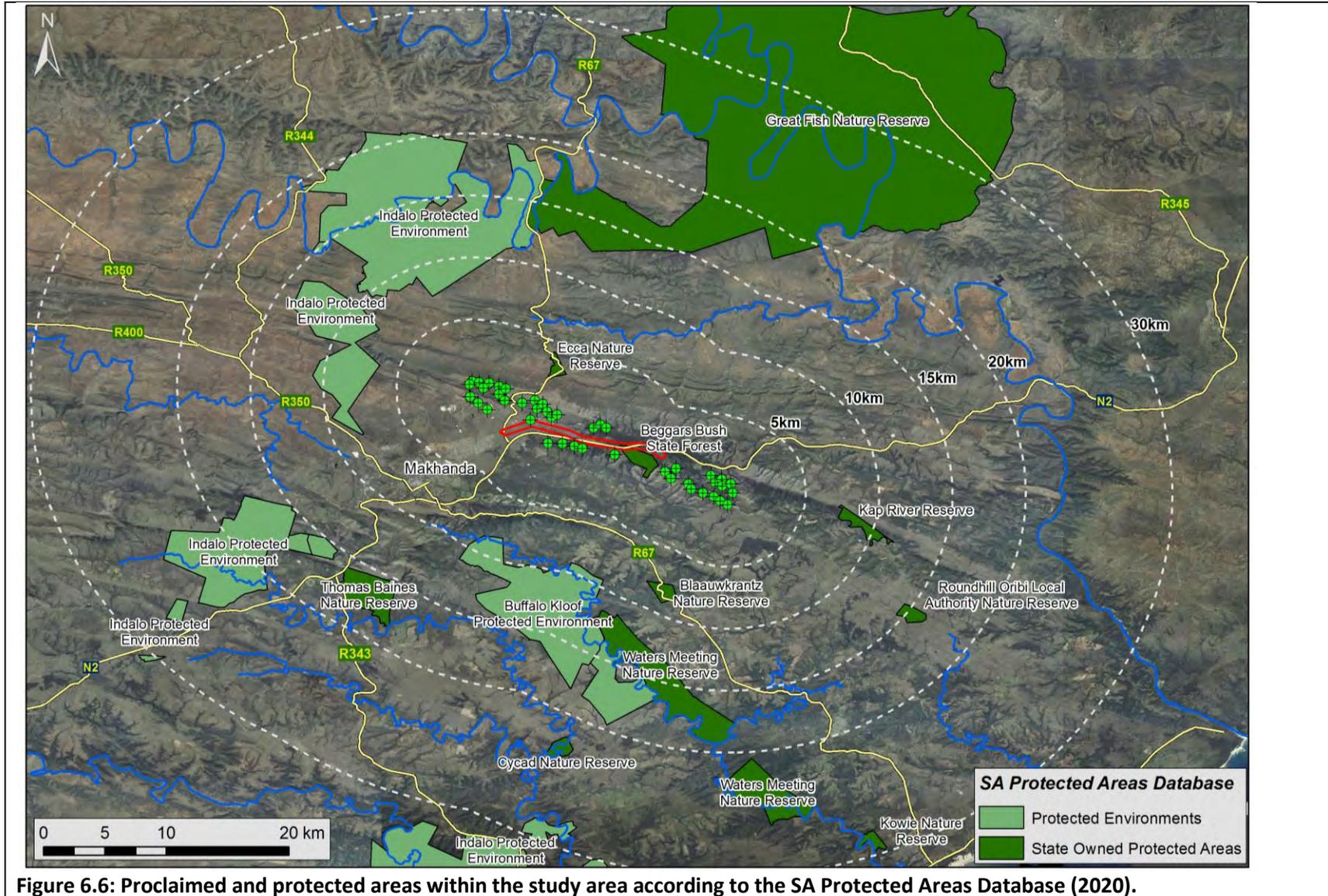
Type of conservation area	Protected Status or zoning	Location relative to project area
<b>Provincial Nature Reserves</b>		
Ecca Nature Reserve	Proclaimed	Within 5 km north
Thomas Baines Nature Reserve	Proclaimed	More than 20 km south west
Waters Meeting Nature Reserve	Proclaimed	More than 20 km south east
Roundhill Oribi Local Authority Nature Reserve	Proclaimed	15 km east
Blaauwkrantz Nature Reserve	Proclaimed	More than 5 km south
Kap River Nature Reserve	Proclaimed	10 km east

Type of conservation area	Protected Status or zoning	Location relative to project area
Great Fish River Nature Reserve	Proclaimed	Portions within 13-20 km but vast majority (90%) more than 20 km north
Beggars Bush State Forest	Proclaimed	Immediately adjacent
<b>Private Nature/Game Reserves</b>		
Kwandwe Private Game Reserve North (Indalo)	Protected Environment	10 to 20 km north west
Indalo Protected Environment West	Protected Environment	More than 5 km west
Indalo Protected Environment South West	Protected Environment	More than 15 km south west
Buffalo Kloof Protected Environment	Protected Environment	More than 10 km south
Kwandwe Private Game Reserve North (non Indalo)	Agriculture	Within 5 to 10 km north
Kudu Ridge Private Game Reserve	Agriculture	More than 5 to 10 km north
Bucklands Private Nature Reserve	Agriculture	More than 15 to 20 km north
Salvatore Farms	Agriculture	More than 15 km north
Coleridge Private Game Reserve	Agriculture	More than 5 km south
Huntershoek Lodge	Agriculture	More than 15 to 20 km north east

Figures 6.6 and 6.7 below show the location of the various:

- Proclaimed and protected areas within the study area according to the SA Protected Areas Database (2020).
- Combined proclaimed and not proclaimed public and private nature and game reserves.

Also see at Appendix D for larger Proclaimed and protected areas within the study area according to the SA Protected Areas Database (2020).



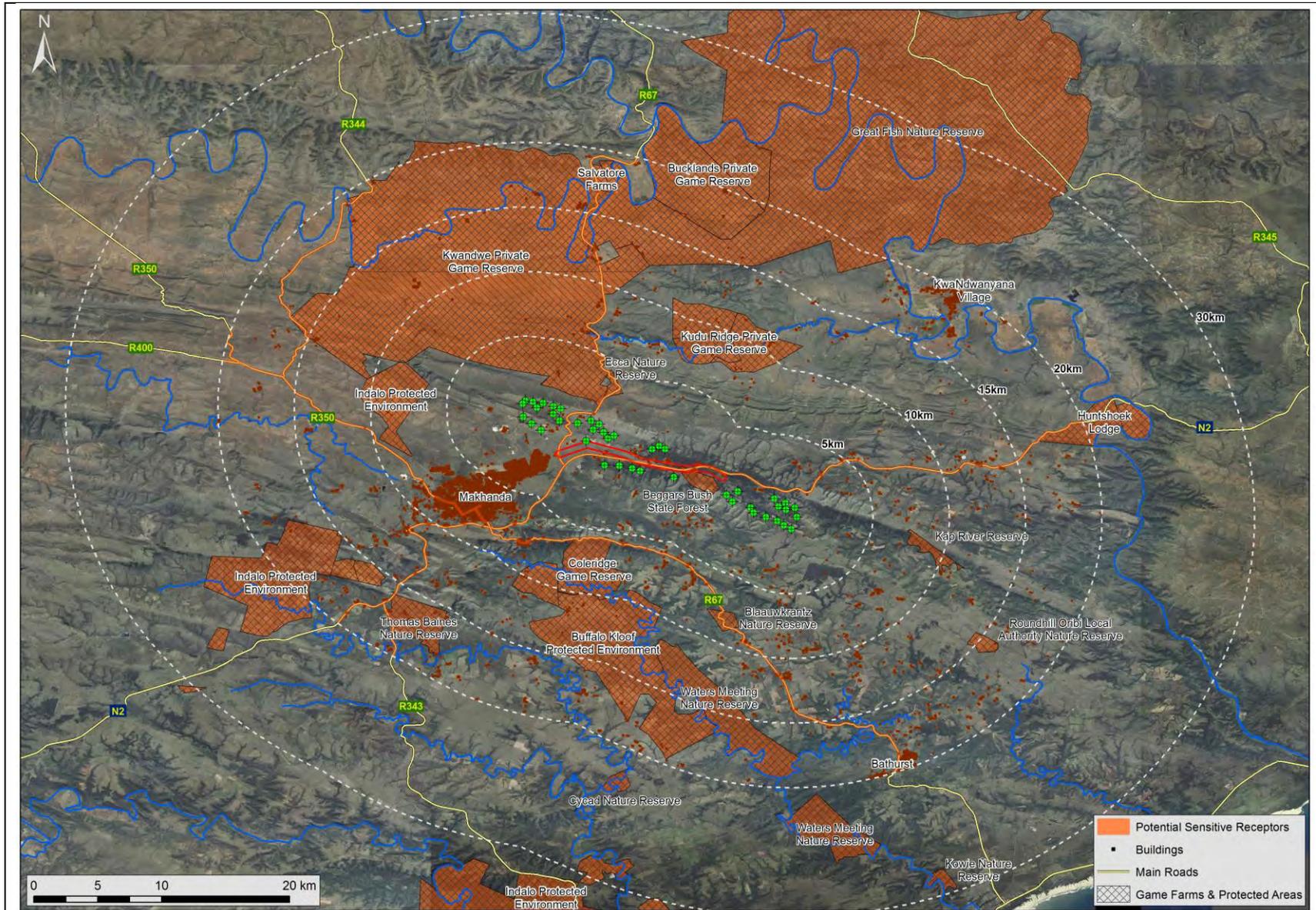
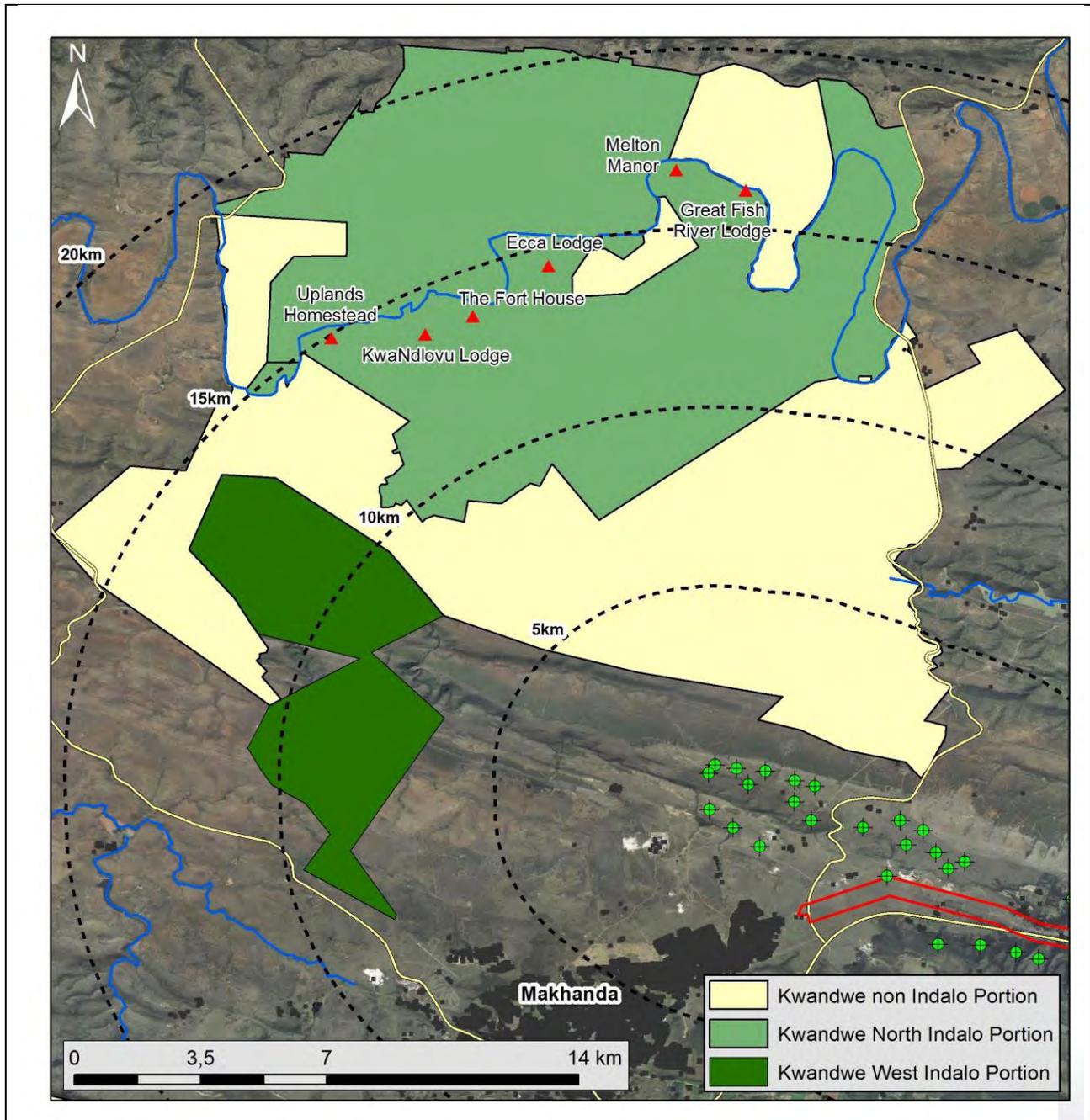


Figure 6.7: Combined proclaimed and not proclaimed public and private nature and game reserves.

**Note Concerning Kwandwe**

Due to the significant size and varying views of the proposed WEF, the viewshed assessment for Kwandwe Private Game Reserve has been assessed under three components (see Figure 6.8 below), namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Kwandwe Private Game Reserve North - none Indalo Protected Environment



**Figure 6.8: Three Kwandwe locations assessed separately in the current VIA.**

**6.1.2. Geology and Landforms**

The geology has a primary influence on landforms, and the character of the landscape, or 'sense of place'. The proposed Albany WEF and grid infrastructure sites are underlain by lithologies of the Witteberg Group and the Grahamstown Formation. The surrounding lithologies include the Dwyka Group and the Eccca Group.

The main structural control in the area are the south-east trending Cape Fold Mountain rock formations. To the far east of this formation (current WEF project area), these formations are classified as hills rather than mountains.

The landscape within the wider study area is very varied within a 20 km radius of the project site with high hills to mountains and deep, steep river valleys. Most rivers tend to follow the main fabric of the landscape and form parallel drainage basins which empty out into the Indian Ocean to the south-east.

The proposed wind farm site is located on locally elevated land between Kowie and Great Fish river systems. The effect of these rivers and their tributaries is clearly visible in the topographic profiles (Figure 6.9).

The topography within about a 10 km radius of the project site will provide some visual screening, particularly from the lower lying land Fish River Valley to the north of the project site.

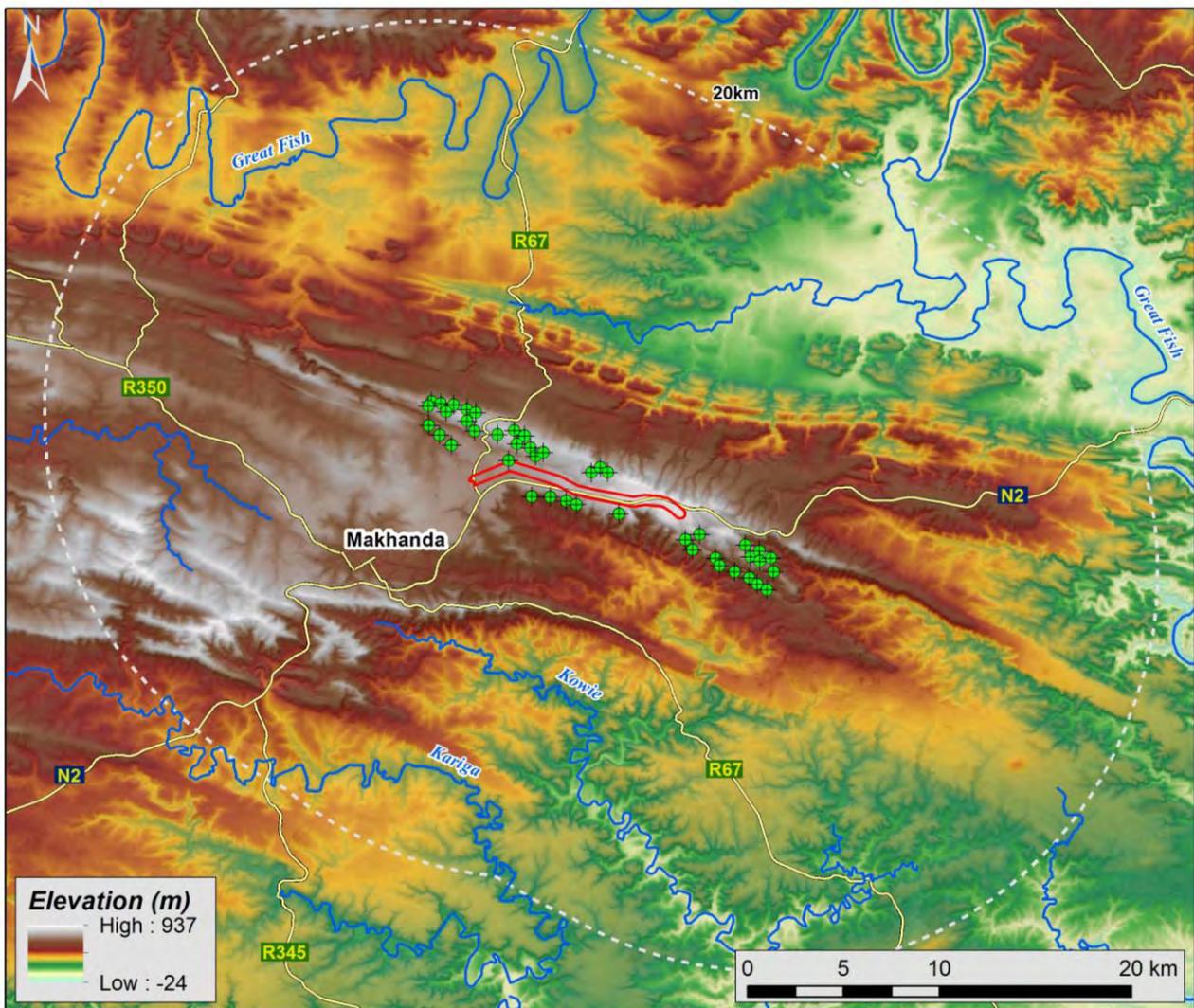


Figure 6.9: Topography of the study area.

The images in Figure 6.10 below show some of the typical topography of the study area along the R67 from the Great Fish River towards Makhanda and the project site.

The topography generally in the study area is, therefore, considered to have a LOW to MODERATE screening potential. However, topographical screening potential may be HIGH in the region of the Ecca Ridge.

Figure 6.10 a-j: Various images showing the topography along the R67 from the Great Fish River to the project site.

<p>View along R67 from Salvatore Farm looking south toward proposed WEF about 20 km away.</p>	<p>View along R67 from close to the Great Fish River looking south toward proposed WEF about 215 km away.</p>
<p>View of entrances to Kwandwe and Great Fish River Nature Reserve along the R67.</p>	<p>View along R67 from close to the Great Fish River looking south toward proposed WEF about 15 km away.</p>
<p>View of valley near the Glen Mellville Dam is located about 6km north of the project site.</p>	<p>View of variable topography along the R67 in the Ecca Pass area.</p>



**6.1.3. Vegetation**

**Study area**

According to National Vegetation Map (Mucina and Rutherford 2018), there are four Biomes, comprising of 16 vegetation types that occur within the broader study area (see Table 6.3 and Figure 6.11 below). From a VIA perspective, the most important features of the vegetation are its height and density as these determine its screening potential.

**Table 6.3: Vegetation (Mucina & Rutherford 2018) within the study area.**

BIOME	VEGETATION TYPE	DESCRIPTION OF VEGETATION HEIGHT
Albany Thicket Biome	Grahamstown Grassland Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of short (0.1 - 1 m) grassland vegetation.
	Albany Arid Thicket	A low thicket (2 m), with occasional trees and emergent succulent trees.
	Albany Bontveld	A mosaic of low thicket (2 m) consisting of bush clumps in a matrix of low shrubland.
	Albany Mesic Thicket	Tall (3-5 m) thickets dominated by trees and woody shrubs.
	Albany Valley Thicket	Medium-sized to tall (3-5 m) thicket dominated by small trees and woody shrubs.
	Crossroads Grassland Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of short (0.1 - 1), grassland.
	Fish Arid Thicket	Low to medium sized (2 - 3 m) succulent thicket intermixed with bush clumps comprising small trees and woody shrubs. The grass component is well developed.
	Fish Meseic Thicket	Tall (3 - 5 m), dense thickets dominated by trees and woody shrubs.

BIOME	VEGETATION TYPE	DESCRIPTION OF VEGETATION HEIGHT
	Fish Valley Thicket	Medium-sized (3 - 4 m) thicket comprising dense stands of <i>Portulacaria afra</i> , small trees and woody shrubs. Leaf- and stemsucculent shrubs are abundant, while the grass component is poorly developed.
	Nanaga Savanna Thicket	A mosaic of low thicket (2 - 3 m) consisting of small bush clumps in a matrix of predominantly savanna vegetation.
	Saltire Karroid Thicket	A mosaic of low thicket (2 - 3 m) consisting of bush clumps in a matrix of karroid shrubland in which the grass component is well developed.
Savanna Biome	South Eastern Coastal Thornveld	Short grassland with scattered bush clumps, dominated by small trees and woody shrubs.
	Bhisho Thornveld	Open savannah characterised by small trees to <i>Acacia natalitia</i> with short to medium, dense, sour grassy understorey.
Afrotemperate, Subtropical and Azonal Forests	Southern Mistbelt Forest	On the great escarpment these forests are tall (15-20m) and multi-layered. The forests found on low-altitude scarps are low (in places having a character of a shrub forest).
Fynbos Biome	Suurberg Shale Fynbos	Low to medium high, closed, ericoid shrubland or grassland, with closed restioid and/or grassland understorey. Graminoid fynbos, with localised patches of dense proteoid fynbos, also occurs.
	Suurberg Quartzite Fynbos	Low to medium high, closed, ericoid shrubland or grassland, with closed restioid and/or grass understorey. Grassy fynbos is the most typical structural type, with localised patches of dense proteoid and ericaceous fynbos.

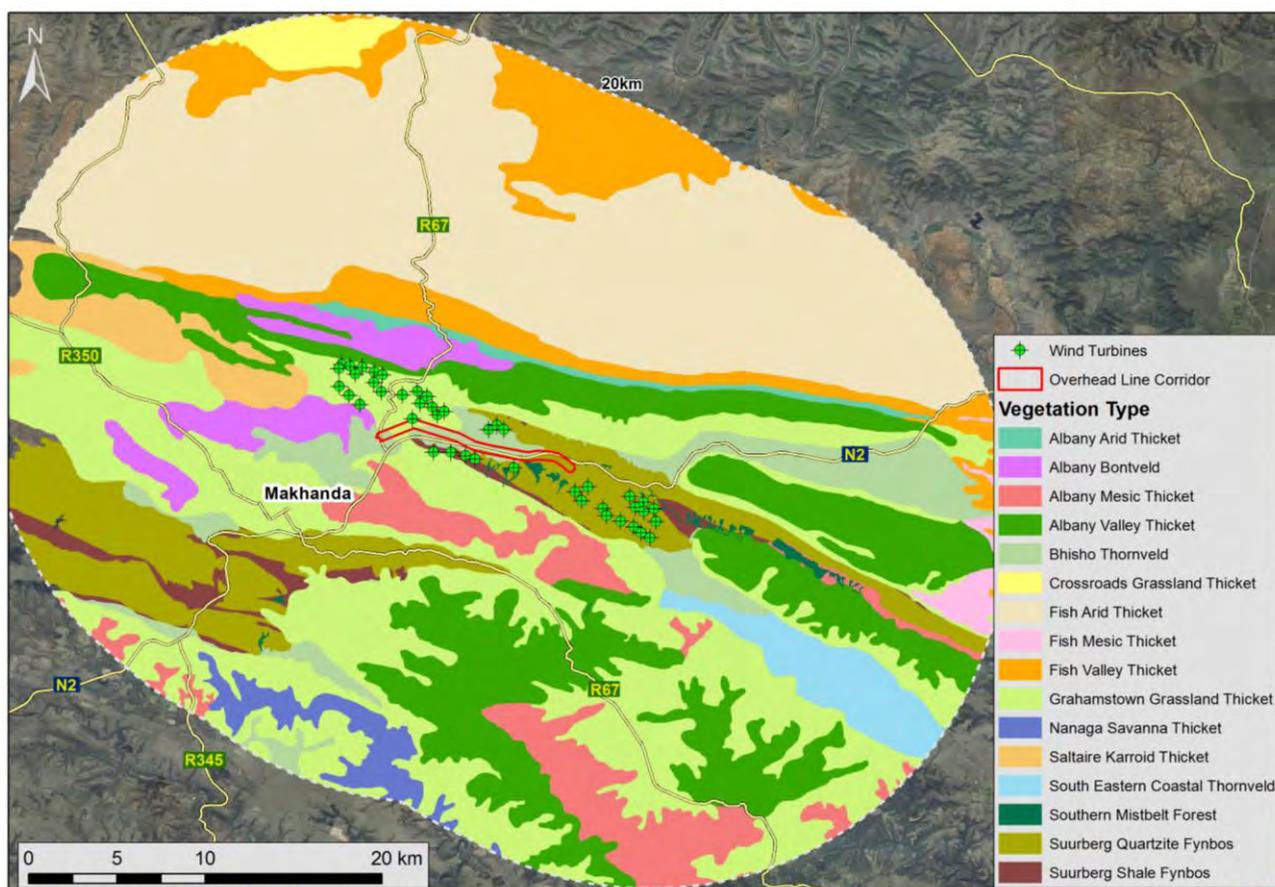


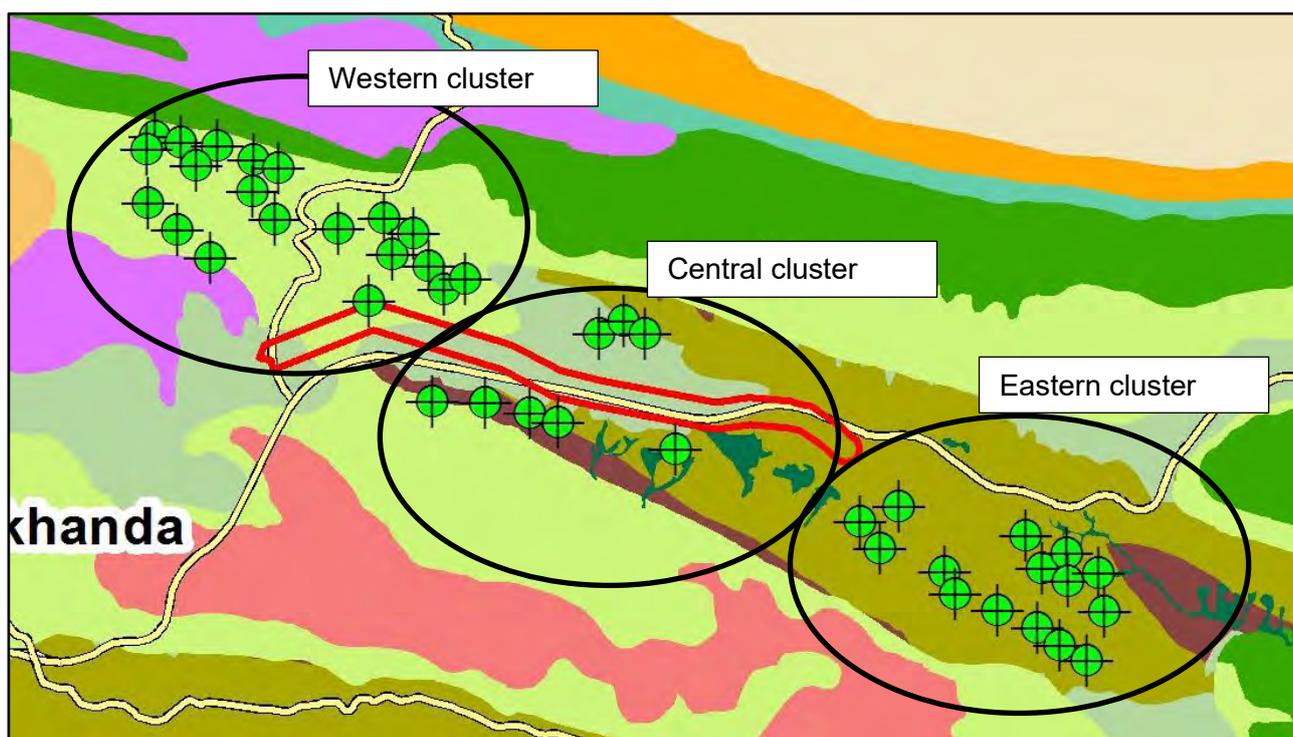
Figure 6.11: Vegetation (Mucina & Rutherford 2018) with in the study area.

The height of the vegetation seldom exceeds three metres. Taller trees and thicket patches are generally restricted to valleys. Furthermore, large portions of the project area have been transformed and/or degraded by agricultural activities. The vegetation generally in the study area is, therefore, considered to have a LOW to MODERATE screening potential.

**Project area**

Figure 6.12 below shows the vegetation types located in the project area itself. The three broad WEF turbine clusters are generally associated with four vegetation types:

Turbine cluster	Vegetation type	Conservation Status
Western	Grahamstown Grassland Thicket	Least Concern
Central	Bhisho Thorveld and Southern Mistbelt Forest	Least Concern
Eastern	Suurberg Quartzite Fynboss	Least Concern



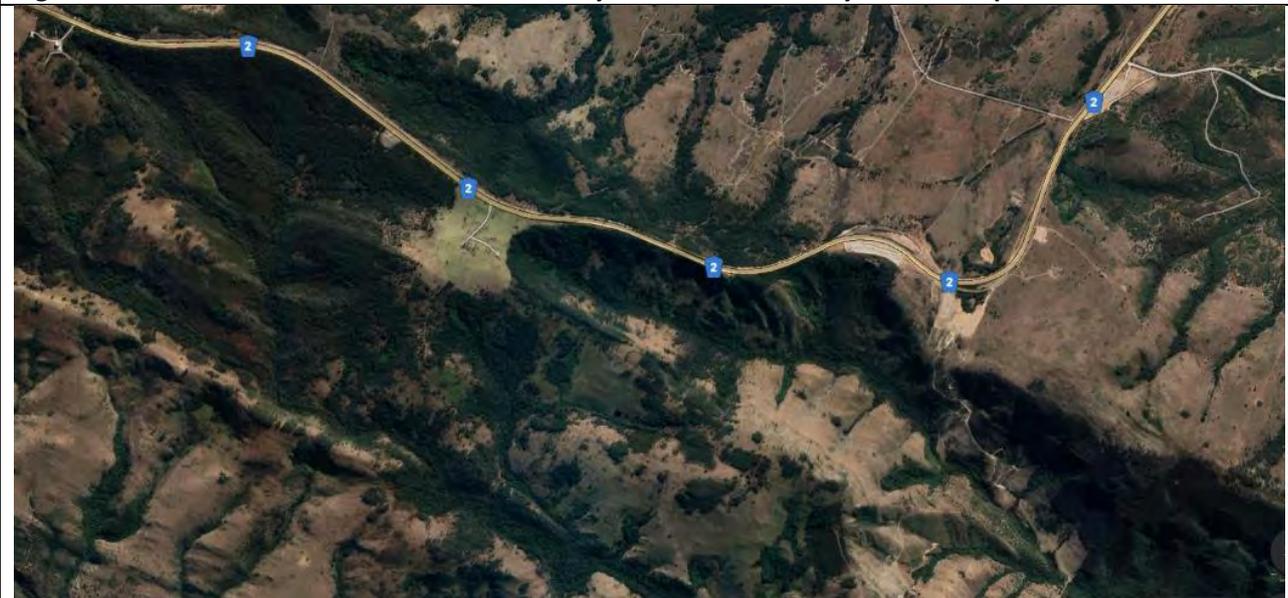
**Figure 6.12: Vegetation (Mucina & Rutherford 2018) with in the project site.**

It should be noted, however, that the Bhisho Thorveld and Southern Mistbelt Forest vegetation of the central cluster (Figure 6.13) and the Suurberg Quartzite Fynboss vegetation of the eastern cluster (Figure 6.14), has been significantly transformed on both sides of the N2 due to:

- Cultivation and historic and current commercial forestry; and
- Runaway infestation with Black Wattle trees and other alien tree species.



**Figure 6.13: Central turbine area transformed by cultivation, forestry and alien species infestation.**



**Figure 6.14: Eastern turbine area transformed by cultivation, forestry and alien species infestation.**

From a vegetation screening potential, the mixed alien tree species woodlots will provide some screening potential for commuters on the N2. However, the low Grahamstown Grassland Thicket of the western turbine cluster offers almost no screening potential.

#### **6.1.4. Built environment**

Within the study area, there are three main settlements. These include:

- Makhanda (previously known as Grahamstown) located approximately 5km south west;
- Bathurst located 15km south east; and
- KwaNdwanyana located 18km north east.

Apart from these settlements, the region is relatively sparsely populated with homesteads spread out according to the pattern of farms.

Major roads dissecting the study area are the N2 connecting Port Elizabeth with Makhanda and East London, the R67 north between Makhanda and Fort Beaufort, and the R67 south from Makhanda to Port Alfred.

The N2 is an important commuter route within the study area.

High-voltage Eskom power lines roughly follow the N2 between Makhanda and Peddie, and a new line is being built between Makhanda and Port Alfred with a large Eskom substation located south of the R67 near the WEF western cluster.

There are also a number of clay mining operations both within the study area and project site along Botha's Ridge.

## **6.2. Renewable Energy Development Zones (REDZ)**

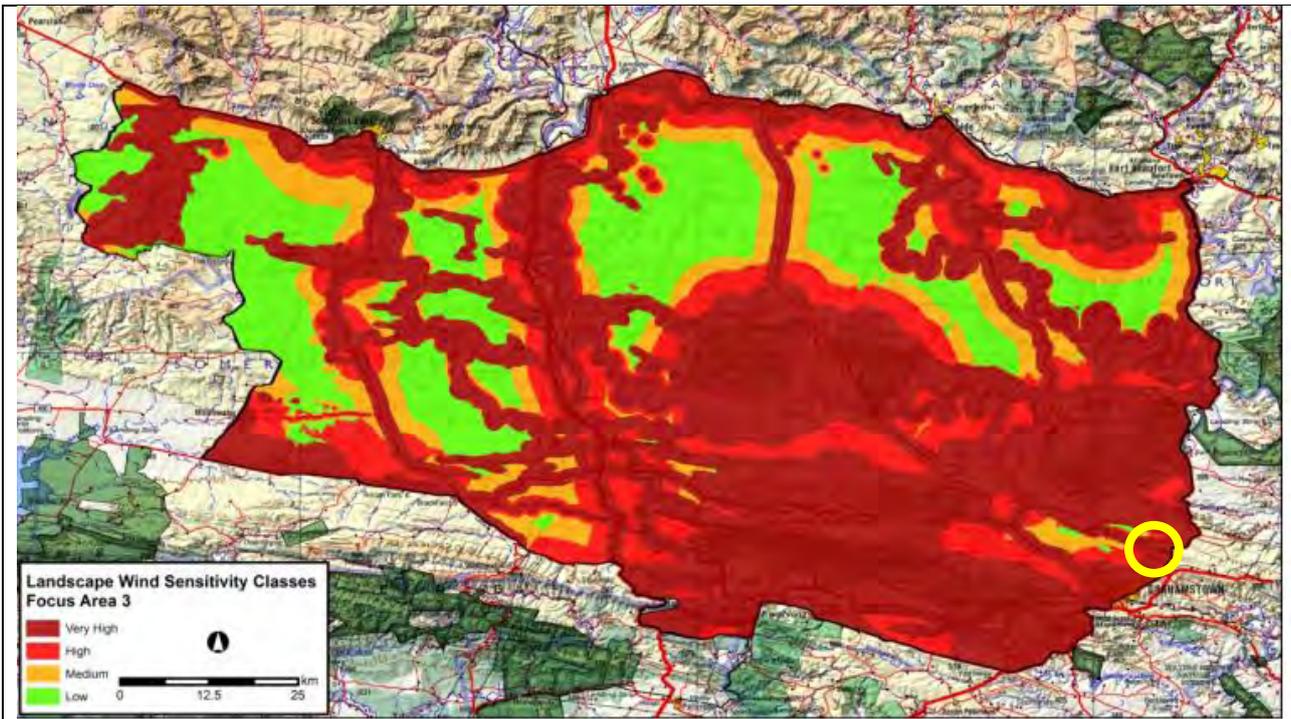
The National Development Plan (NDP) and the National Infrastructure Plan (NIP) are both part of the South African Government's long term strategy to address economic growth and broaden socio-economic transformation in the Country. DEFF initiated a Strategic Environmental Assessment (SEA) to identify processes that streamline the regulatory environmental requirements for certain Strategic Integrated Projects (SIPs) linked to the NDP and NIP, while also safeguarding the environment. The wind and solar photovoltaic (PV) SEA (2015) was commissioned in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. The SEA identified REDZ areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the natural environment, while yielding the highest possible socio-economic benefits to the Country.

The REDZs have been identified through an integrated spatial analysis and wide stakeholder engagement based on energy resource potentials, infrastructure availability, environmental suitability and socio-economic needs. The REDZ are identified as geographical areas in which large scale wind and solar PV development projects are considered most appropriate from a National strategic perspective.

The impact of renewable energy projects on the landscape was one of the aspects that was investigated as part of the SEA, in addition to other environmental criteria.

### **Landscape Sensitivity Mapping**

Landscape sensitivity was determined as part of the REDZ SEA (2015) through the identification of natural, scenic and cultural resources which have aesthetic and economic value to the local community, the region, and society as a whole. The resources considered in the specialist landscape scoping report, included features of topographic, geological or cultural interest, together with landscape grain or complexity.



**Figure 6.15: Cookhouse REDZ landscape sensitivity classes for wind energy (REDZ SEA, 2015) showing the location of 12 Albany WEF turbines in the south east (circled in yellow).**

With respect to the Cookhouse REDZ, which is located to the north west of the Albany WEF (see Figure 6.15 above), the following overall suitability was concluded.

Site	Overall Suitability	Comment
Cookhouse focus area 3	Most of the landscape constraints are located in the southern and far eastern portions of the focus area, including the Swartwatersberg and Fish River Rand areas, and should generally be avoided. The northern and western portions on the other hand have fewer constraints, and therefore less visual sensitivity.	The southern and eastern portions <b>should possibly be excluded</b> from the focus area because of their visual and scenic sensitivity.

Twelve (12) turbines of the western cluster of proposed Albany WEF are located in a small south easterly portion of the Cookhouse Renewable Energy Development Zone (REDZ) which the Landscape Scoping Report suggests the possible exclusion of this area from the REDZ (although it still remains included in the REDZ per the SEA).

Table 6.4 below provides the landscape sensitivity features adopted by the SEA and the Landscape Scoping Report, that are potentially relevant to the current Albany WEF:

**Table 6.4: Landscape sensitivity features adopted by the SEA and the Landscape Scoping Report.**

Sensitivity feature	Potential sensitivity mapping application to wind farms
Ridgelines, scarps, prominent elevations and geological features.	Very high sensitivity – identified areas only.
Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.	Very high sensitivity – within 3 km viewshed.
	High sensitivity – between 3 and 5 km viewshed.
	Medium sensitivity – between 5 and 10 km viewshed.
Private reserves and game farms	Very high sensitivity – within 2 km viewshed.
	High sensitivity – between 2 and 5 km viewshed.

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	Medium sensitivity – between 5 and 7 km viewshed.
Towns, villages and settlements	Very high sensitivity – within 2 km viewshed.
	High sensitivity – between 2 and 5 km viewshed.
	Medium sensitivity – between 5 and 7 km viewshed.
National roads	Very high sensitivity – within 1 km viewshed.
	High sensitivity – between 1 and 3 km viewshed.
	Medium sensitivity – between 3 and 5 km viewshed.
Scenic routes, passes and ports.	Very high sensitivity – within 1 km viewshed.
	High sensitivity – between 1 and 3 km viewshed.
	Medium sensitivity – between 3 and 5 km viewshed.
Provincial and arterial roads.	Very high sensitivity – within 1 km viewshed.
	Medium sensitivity – between 1 and 3 km viewshed.

**6.3. Distance and visual impact**

While developments such as a wind farms can have significant visual impacts on potential sensitive receptors, these impacts will decline with an increase of the distance of the receptor from the wind farm.

- According to the Scottish Natural Heritage Guideline (as referenced from the REDZ SEA, 2015), the visual impact of a wind farm depends on the distance from which it is viewed, weather conditions, turbine siting and the landscape context. Several guidance documents have provided generic categories for the degrees of visibility and visual impact related to distance. Table 6.5 below from the Scottish Planning Advice Note 45 provides some general guidance on the effect of distance on the perception of a wind farm in an open landscape. The distance is limited to 30km since beyond this, visual impacts of are generally considered to be of LOW impact.

**Table 6.5: General perception of wind farm in an open landscape.**

Distance from turbine	Perception
< 2 km	Likely to be a prominent feature
2-5 km	Relatively prominent
5-15 km	Only prominent in clear visibility – seen as part of the wider landscape
15-30 km	Only seen in very clear visibility – a minor element in the landscape

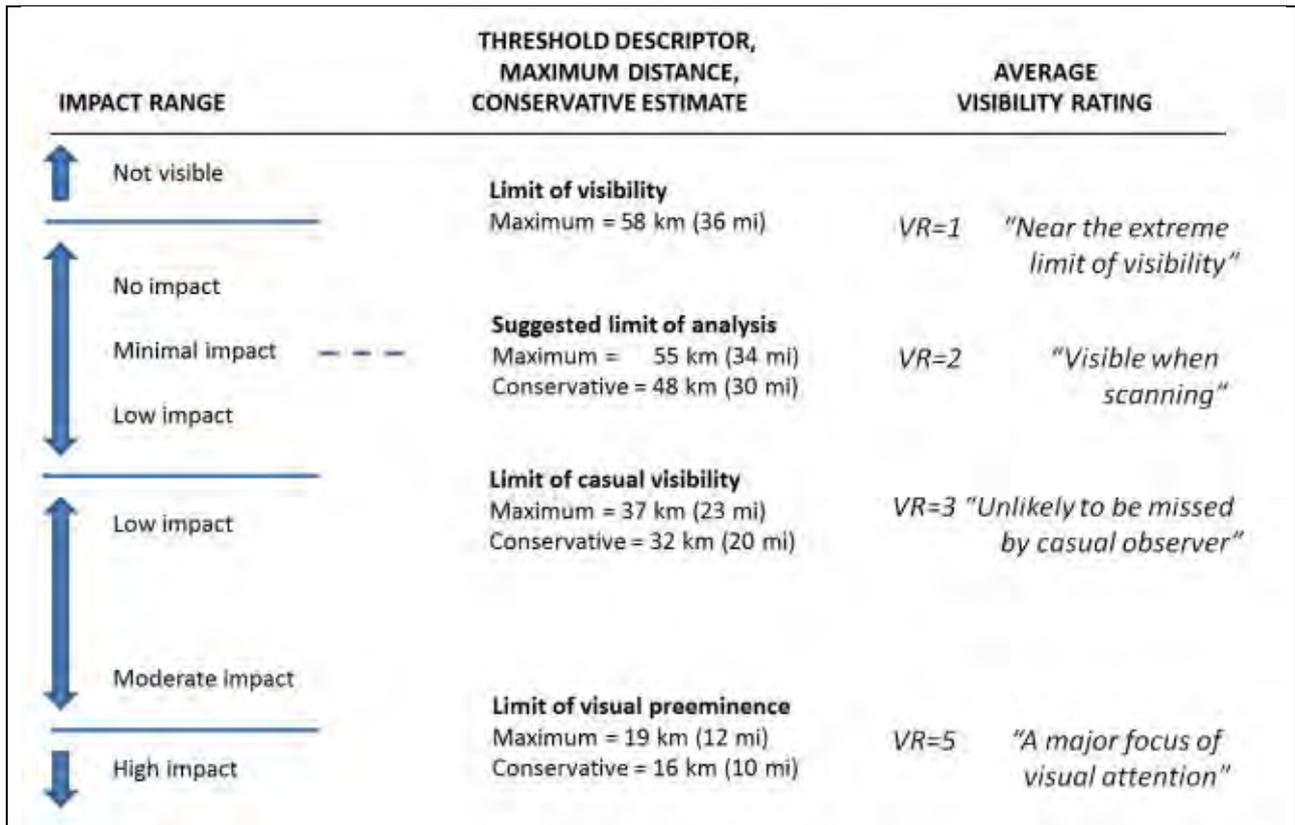
*Source: Scottish Planning Advice Note 45 (revised 2002): Renewable Energy Technologies*

According to the REDZ SEA, although the document does not clearly specify the turbine size the table refers to, the document mentions turbines with tower heights of more than 70 metres (m) and rotor diameters of more than 80 m. Turbines have since increased in size and can now reach hub heights of 120 m and rotor diameters of 130 m, resulting in a wind farm in some conditions being visible from a distance of up to 50 kilometres (km) away. Even though the table considers smaller turbines than is generally proposed in South Africa, it still places the potential visual impacts of wind farms into perspective.

The cumulative impacts of renewable energy development on the landscape are of specific concern. According to the Scottish Natural Heritage Guideline<sup>1</sup>, cumulative impacts may be perceived when more than one facility is visible from one viewpoint, when several facilities are seen during a single journey, and when there is a gradual increase in the number or size of facilities over time. The same guidelines suggest that SEAs such as this one may show that some degree of development clustering in strategic areas (such as the Renewable Energy Development Zones) is preferable to a more widely distributed pattern.

A study by Sullivan et al (2012) on Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes, involved observations of five wind facilities in Wyoming and Colorado in the USA under various lighting and weather conditions. The following main observations were made:

- The wind facilities were visible to the unaided eye at >58 km under optimal viewing conditions, with turbine blade movement often visible at 39 km;
- Under favourable viewing conditions, the wind facilities were judged to be major foci of visual attention at up to 19 km and likely to be noticed by casual observers at >37 km;
- A conservative interpretation suggests that for such facilities, an appropriate radius for visual impact analyses would be 48 km;
- Facilities would be unlikely to be missed by casual observers at up to 32 km; and
- Facilities could be major sources of visual contrast at up to 16 km.



**Figure 6.16: Proposed impact threshold distances for utility scale wind facilities (after Sullivan et al 2012).**

**Cautions on the use of the suggested impact thresholds**

The following cautions are appropriate to consider in using the suggested impact thresholds for analytical purposes:

- The facilities studied had between 75 and 100 wind turbines visible in most views. For wind facilities with substantially fewer turbines in view, the appropriate threshold distances might be shorter. Viewshed analyses should be used to determine the number of turbines likely to be in view.
- The turbine models in the observed facilities ranged from ~90 to 120 m in height. For wind facilities with substantially larger or small turbine models, adjustments to the impact threshold distances may be required.
- Observations that form the bulk of the analysis in this study, are located on a low mesa (flat landscape) settings. This is a common siting situation in much of the western U.S., but may tend to focus views on the facility, and make it less subject to topographic, vegetative, or structural screening. Where facilities are sited on valley floors or subject to partial screening, threshold distances might be slightly smaller. In this study, partial screening of facilities depressed visibility ratings substantially.

A comprehensive study conducted by the University of Newcastle Study (2002) commissioned by Scottish Natural Heritage (based on their assessment of the eight wind farms) recommended a height/distance relationship for Zone of Visual Influence (ZVI) as shown in the Table 6.6 below.

**Table 6.6: Recommendations for Zone of Visual Influence (ZVI) (University of Newcastle 2002).**

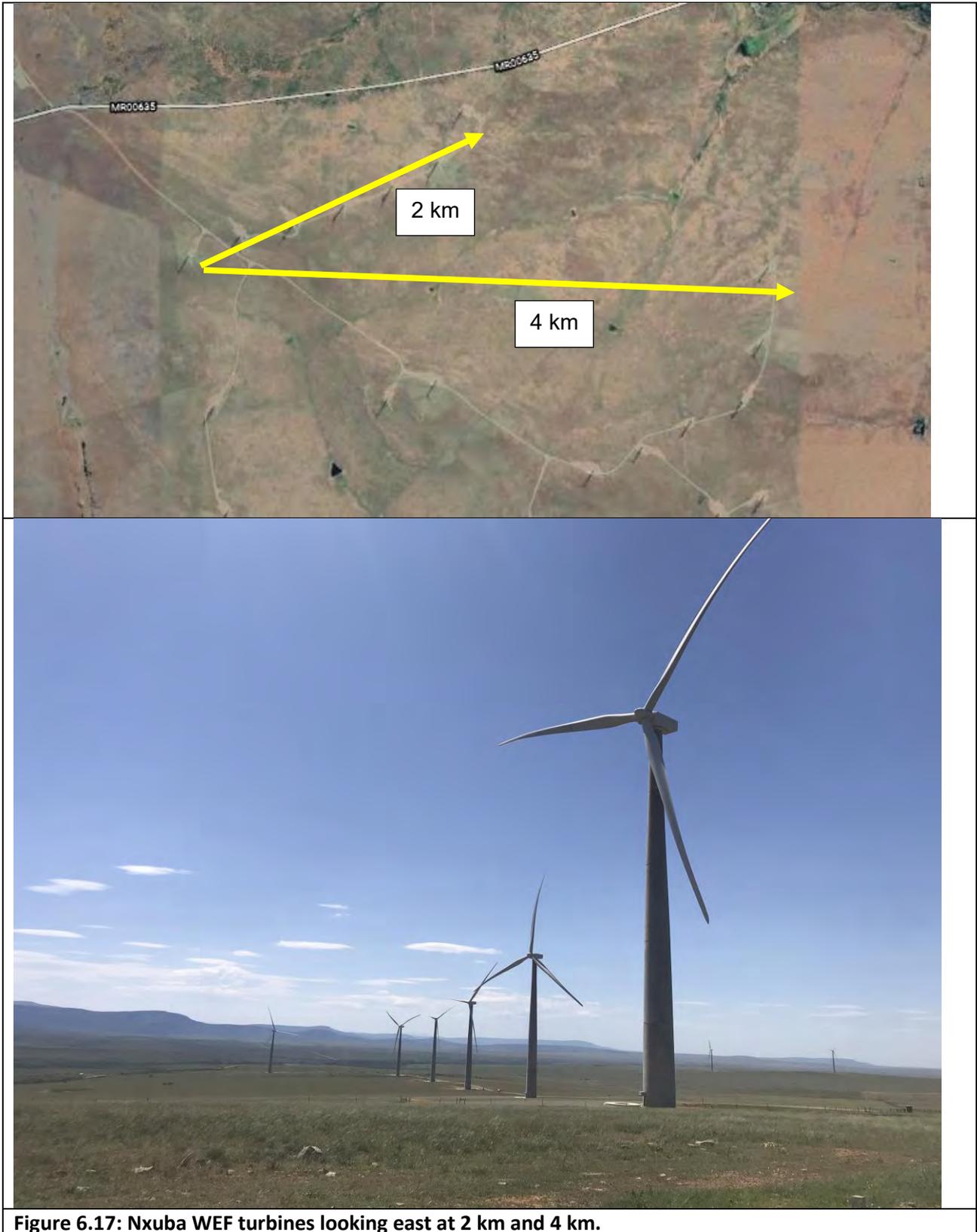
Height of turbines (total including rotors) (m)	Recommended ZVI distance (km)
50	15
70	20
85	25
100	30

The study indicates that the figures in Table 6.6 above are approximate and suggests they should be adjusted either upwards or downwards to suit local circumstances and in the context of local or regional landscape character and landscape or visual sensitivity.

The study further indicates that despite the trend towards larger and taller structures, it is unclear what ultimate limits might exist, since optimum tower height depends on an integration of economic, meteorological, technological and environmental factors. The recommendations in Table 6.6 would need to increase for heights greater than 100m, although at distances much greater than 30 km, the limit of visibility to the human eye is being approached.

CES has also been involved during the construction of a number of wind farms over the past 10 years. Figures 6.16 and 6.17 below are based on our involvement in the recently constructed Nxuba Wind Farm near Bedford. Where the following is apparent:

Viewpoint	Observation
Figure 6.15: Nxuba WEF turbines looking east at 2 km and 4 km.	<ul style="list-style-type: none"> <li>• Turbines diminish in size almost 6 fold at a distance of 2 km.</li> <li>• Turbines diminish in size more than 10 fold at a distance of 4 km.</li> </ul>
Figure 6.16: Nxuba WEF turbines looking north west toward the Cookhouse WEF at 4 km and 8 km.	<ul style="list-style-type: none"> <li>• The Nxuba turbines are clearly recognizable but diminished in size at a distance of 4 km.</li> <li>• The Cookhouse turbines in the distance, are significantly diminished in size and barely distinguishable at a distance of 8 km.</li> </ul>



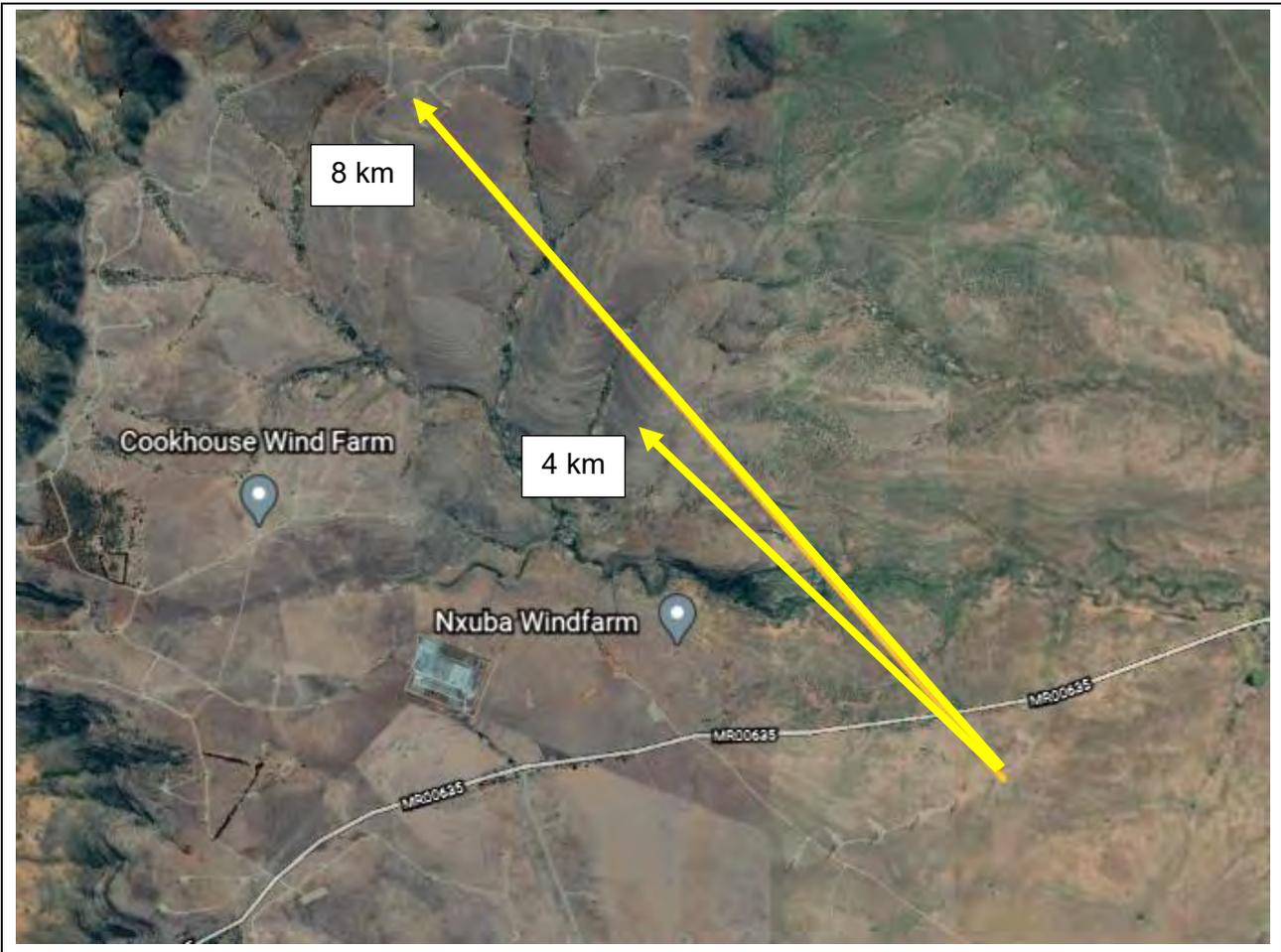


Figure 6.18: Nxuba WEF turbines looking north west toward the Cookhouse WEF at 4 km and 8 km.

## 7. IDENTIFICATION OF POTENTIAL SENSITIVE RECEPTORS

Visually sensitive receptors are locations or areas where people may have a significantly increased visual sensitivity or exposure to changes in the surrounding environment. Figure 7.1 below shows all the identified potential visual receptors within a 30 km radius of the proposed 43 Albany WEF turbines based on the sensitivity features used in the REDZ SEA Landscape Sensitivity Analysis Report (2015) described above.

Table 7.1 provides an assessment of the likely sensitivity of the identified receptors. Certain identified receptors were eliminated due to a combination of low sensitivity features such as:

- No or very low turbine visibility; and
- Long distance from the WEF.

Generally, all public nature and private game reserves within a 30 km radius of the WEF have been classified as sensitive.

**Table 7.1: The main Albany WEF visual receptors based on the sensitivity features used in the REDZ SEA Landscape Sensitivity Analysis Report (2015).**

SENSITIVITY FEATURE	VISUAL RECEPTORS	LOCATION	SENSITIVE RECEPTOR	ASSESSMENT METHOD
Ridgelines, scarps, prominent elevations and geological features.	Ecca Valley Pass (adjacent to the Ecca Nature Reserve)	R67 entering Makhanda from the north	YES	Observation
	Blaauwkrantz Pass	R67 entering Makhanda from the east	NO – valley with few turbines visible	NA
	Ridge north of Makhanda along N2 towards Peddie	Ridge along N2 near eastern turbine cluster	YES	Observation
Other officially protected landscapes (other than National Parks) included in the SA Protected Area Database (SAPAD), including nature reserves.	<b>Provincial Nature Reserves</b>			
	Ecca Nature Reserve	Within 5 km north	YES	Viewshed
	Thomas Baines Nature Reserve	More than 20 km south west	NO – no turbine hubs and few blades visible and at over 15 km away, blades will not be readily noticeable.	NA
	Waters Meeting Nature Reserve	More than 20 km south east	YES	Viewshed
	Roundhill Oribi Local Authority Nature Reserve	15 km east	YES	Viewshed
	Blaauwkrantz Nature Reserve	More than 5 km south	NO – valley with few turbines visible	NA
	Kap River Nature Reserve	10 km east	YES	Viewshed
	Great Fish River Nature Reserve	More than 20 km north	YES	Viewshed and 3D simulation
	Beggars Bush State Forest	Immediately adjacent	YES	Viewshed
	<b>Private Protected Environment</b>			
	Kwandwe Private Game Reserve North (Indalo)	10 to 20 km north west	YES	Viewshed and 3D simulation
	Indalo Protected Environment West	More than 5 km west	YES	Viewshed and 3D simulation

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	Indalo Protected Environment South West	More than 15 km south west	NO – no turbine hubs or blades visible for the vast majority of the reserve (over 95%) and over 15 km away.	NA
	Buffalo Kloof Protected Environment	More than 10 km south	YES	Viewshed and 3D simulation
Private reserves and game farms	Kwandwe Private Game Reserve North (none Indalo)	Within 5 to 10 km north	YES	Viewshed and 3D simulation
	Kudu Ridge Private Game Reserve	More than 5 to 10 km north	YES	Viewshed and 3D simulation
	Bucklands Private Nature Reserve	More than 15 to 20 km north	YES	Viewshed
	Salvatore Farms	More than 15 km north	YES	Viewshed
	Coleridge Private Game Reserve	More than 5 km south	YES	Viewshed and 3D simulation
	Huntershoek Lodge	More than 15 to 20 km north east	YES	Viewshed
Towns, villages and settlements	Makhana	Within 5 km to the south	YES	Observation
	Bathurst	20 km to the south east	YES	Observation
	KwaNdwanyana	20 km to the north east	YES	Observation
National roads	N2 to Peddie	N2 running through the project area.	YES	3D simulation
Scenic routes, passes and ports.	Ecce Pass	R67 entering Makhanda from the north	YES	Observation
	N2	N2 along Botha Hill ridge	YES	3D simulation and observation
	Blaauwkrantz Pass	R67 towards Port Alfred	NO	NA
Provincial and arterial roads.	R67 to Fort Beaufort	Mobile receptor	YES	Observation

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	R67 to Port Alfred	Mobile receptor	YES	Observation
	Dirt road to Committees Drift about 3-4 km north	Mobile receptor	YES	Observation

It should be noted that with respect to the Kwandwe Private Game Reserve, due to the significant size, the visual impacts are assessed at three (3) distinct locations or areas, namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment;
- Kwandwe - West - Indalo Protected Environment; and
- Kwandwe Private Game Reserve North - none Indalo Protected Environment.

Refer to Figure 6.8 for layout of the three Kwandwe reserves.

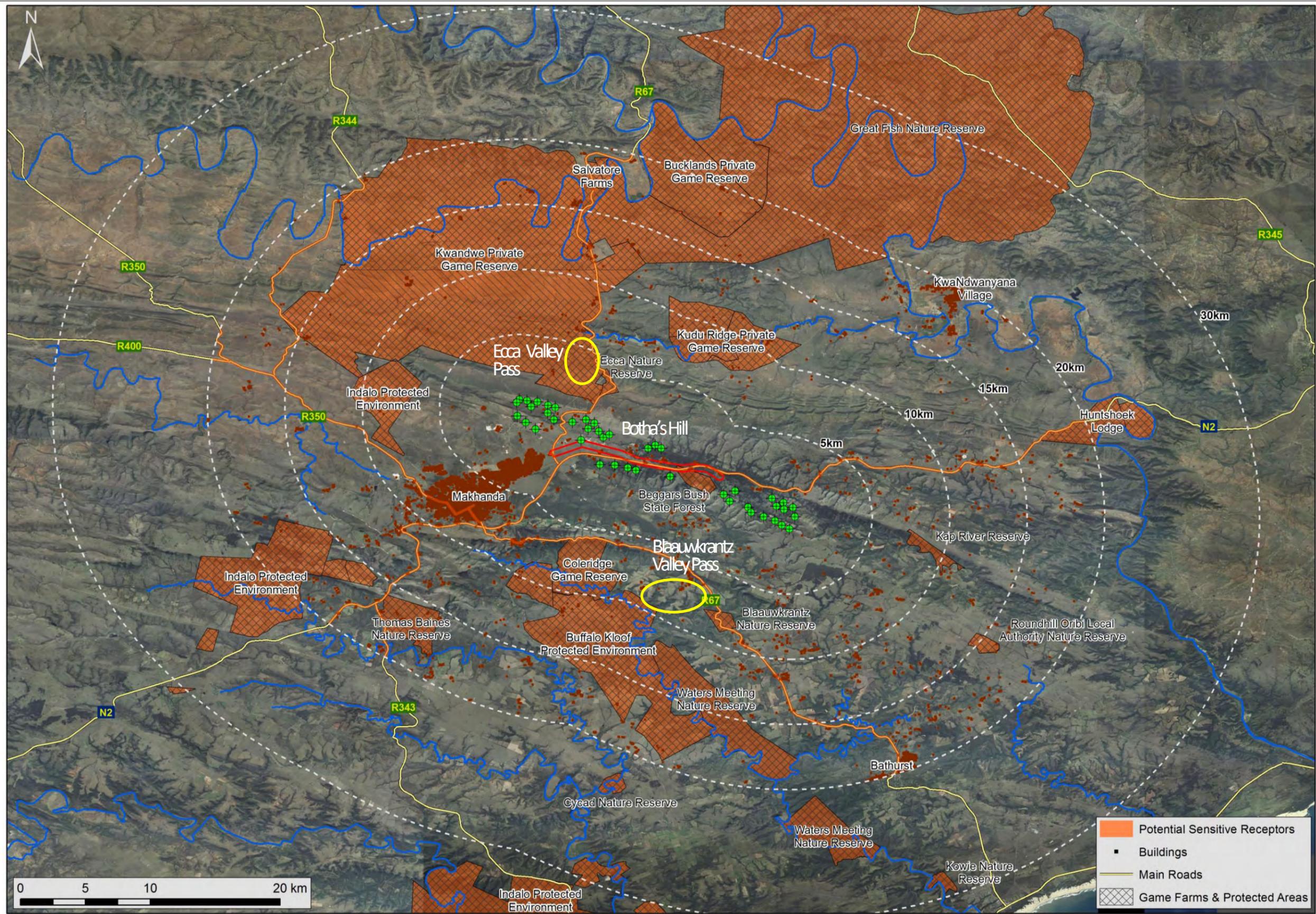


Figure 7.1: Possible Visually Sensitive Receptors.

## 8. DESCRIPTION OF ALTERNATIVES

Integral to the EIA process is the consideration and evaluation of alternatives to a proposed development plan. This is also applicable when conducting specialist studies including VIAs. A detailed description of the process involved in the identification and evaluation of reasonable and feasible alternatives associated with the Albany WEF proposal and the identification of the preferred alternative, is provided in the Environmental Impact Assessment Report (EIAR) for this project. For the purposes of this VIA, the following identified **preferred alternative** is assessed.

Type of Alternatives Considered	Description of the Preferred Alternative relating to the Albany Wind Farm
Location alternative	Only the project area described in this report has been considered. This proposed site has very good wind resources as indicated in the SA Wind Atlas. This is also based on the experiences of Waainek WEF to the south of Albany WEF. Wind resources have also been measured using 60 m and 120m masts. Proximity to the Eskom substation and existing overhead powerlines are also key factor on identifying the proposed site.
Technology alternatives	Only the development of a wind energy facility is considered since the proponent is a wind energy developer.
Turbine layout alternatives	One turbine layout of 43 positions has been assessed. This is a reduction of 23 turbines from the 66 turbines assessed in the draft VIA.
Powerline Alternatives	One powerline corridor has been assessed.
On-site substation location alternatives	One on-site IPP substation and two collector substations have been proposed. The viewshed of these substations has not been considered as they will be “swallowed” by the much more significant viewshed of the turbines.
No-go alternative	The “No-go” alternative entails maintaining the status quo. In other words, the proposed construction of the Albany WEF would not go ahead, and current land uses would continue as before.

## 9. VIEWSHED ANALYSIS OF SELECTED SENSITIVE RECEPTORS

The current section provides an analysis of viewsheds for selected potentially sensitive visual receptors.

### 9.1. Viewshed analysis of the study area

Figures 9.1 and 9.2 below provide the viewshed analyses with respect to visible turbine hubs and turbine tips, respectively within a 30 km radius of the project site (see more detailed maps at Appendix B).

Overall, the Albany WEF will have a HIGH degree of visibility within the study area. The visual sensitivity of the study area will vary according to distance and variability in topography. Generally, a greater number of turbines will be visible on elevated land located at greater distances and beyond 10 km from the WEF. Lower numbers of turbines will be visible within a 10 km radius of the WEF due to the more variable topography closer to the WEF.

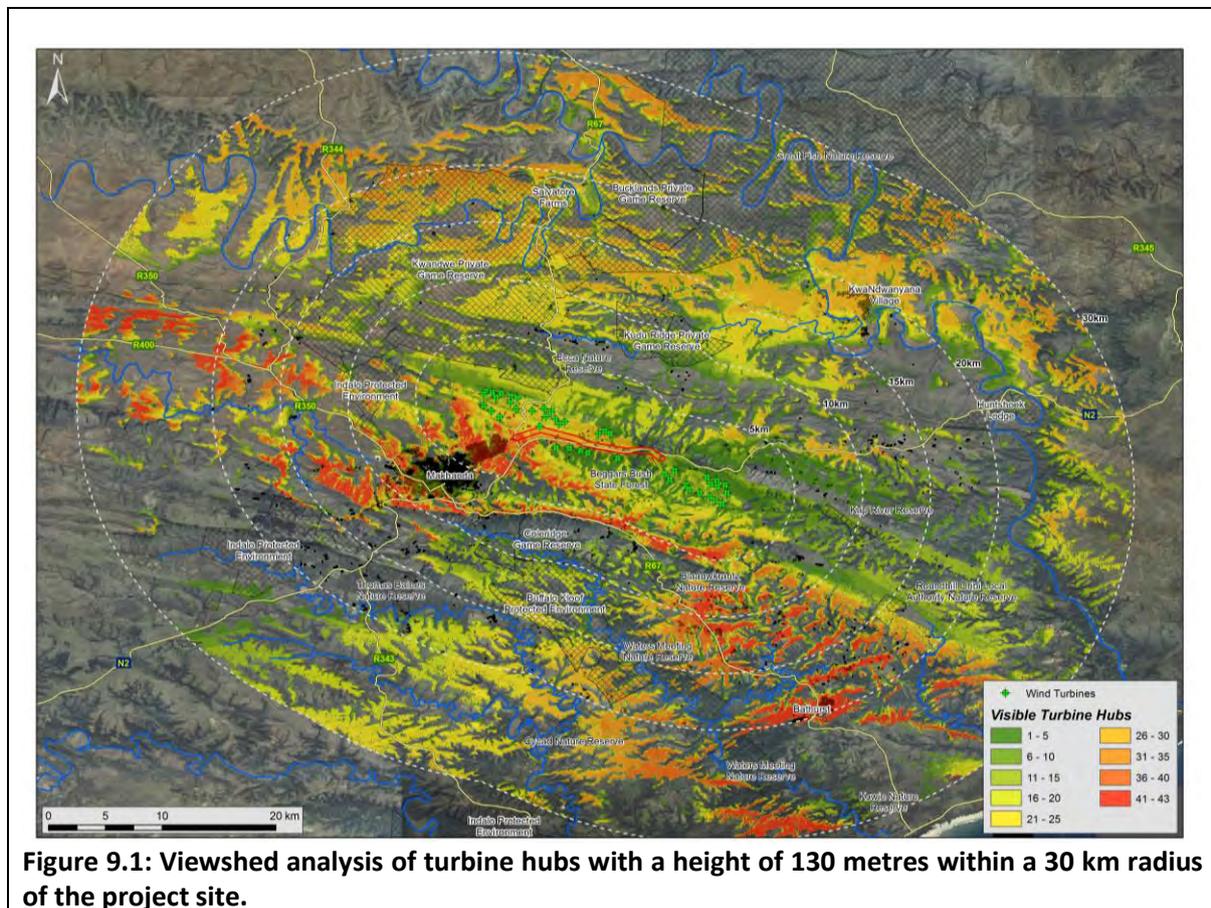


Figure 9.1: Viewshed analysis of turbine hubs with a height of 130 metres within a 30 km radius of the project site.

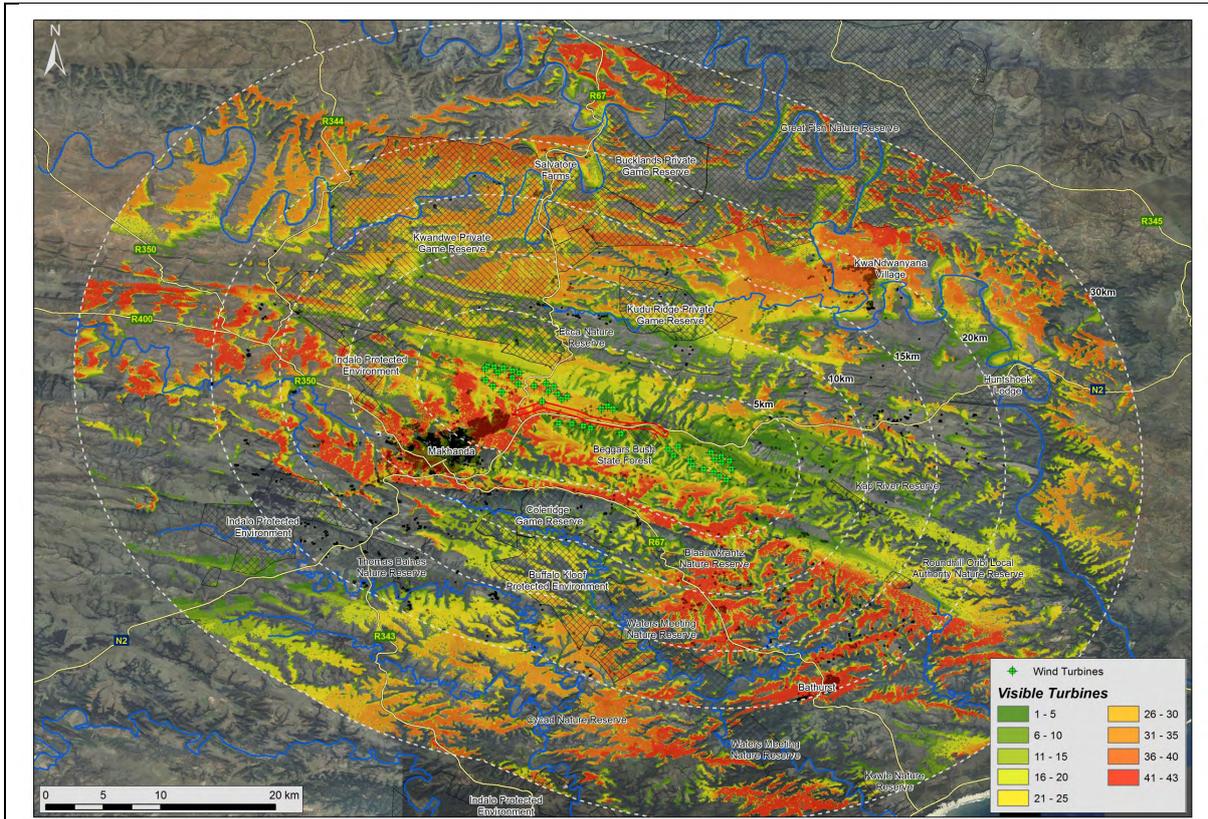


Figure 9.2: Viewshed analysis of turbine tips to a height of 215 metres within a 30 km radius of the project site.

## 9.2. Viewshed analysis of selected sensitive receptor locations

The following provides a more detailed viewshed assessment of 15 selected public nature reserves and private game reserves determined to be potentially sensitive to the visual impacts from the proposed Albany WEF based on the analysis in Table 7.1.

<b>Public proclaimed reserves</b>
<ul style="list-style-type: none"> <li>• Ecca Nature Reserve (Local Authority)</li> <li>• Waters Meeting Nature Reserve (EC Parks)</li> <li>• Roundhill Oribi Nature Reserve (Local Authority)</li> <li>• Kap River Reserve (Local Authority)</li> <li>• Great Fish Nature Reserve (EC Parks)</li> <li>• Beggar's Bush State Forest</li> </ul>
<b>Private Protected Environment</b>
<ul style="list-style-type: none"> <li>• <b>Kwandwe Private Game Reserve North - Indalo Protected Environment</b></li> <li>• <b>Kwandwe Private Game Reserve West - Indalo Protected Environment</b></li> <li>• Buffalo Kloof Protected Environment</li> </ul>
<b>Private un-protected reserves</b>
<ul style="list-style-type: none"> <li>• <b>Kwandwe Private Game Reserve North - none Indalo Protected Environment</b></li> <li>• Kudu Ridge Private Game Reserve</li> <li>• Bucklands Private Nature Reserve</li> <li>• Salvatore Farms</li> <li>• Coleridge Private Game Reserve</li> <li>• Hunters Hoek Lodge</li> </ul>

### Note Concerning Kwandwe

As indicated in Section 6 of this VIA (Figure 6.8), due to the significant size and varying views of the proposed WEF, the viewshed assessment for Kwandwe Private Game Reserve has been assessed under three components, namely:

- Kwandwe Private Game Reserve North - Indalo Protected Environment
- Kwandwe Private Game Reserve West - Indalo Protected Environment
- Kwandwe Private Game Reserve North - none Indalo Protected Environment

The detailed viewshed analyses for the 15 sensitive receptors, are provided below.

**ECCA NATURE RESERVE**

The proclaimed Eccca River Nature Reserve is a municipal nature reserve located north of the proposed WEF along the Eccca Pass and adjacent to the most south eastern extremity of the Non-Indalo portion of the Kwandwe Private Game Reserve.

**Observations:**

- The Eccca River Nature Reserve ranges in a distance of about 4-5 km north of the proposed WEF site.
- Up to 15 turbine hubs will be visible for approximately 50% of the Reserve (mostly the western cluster).
- Up to 35 turbine blades will be visible for approximately 50% of the Reserve (mostly the western cluster).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.3a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.3b).
- The exposure to the WEF is **HIGH** due to the 4-5 km distance from the WEF.
- The landscape sensitivity of the receptor is **HIGH** due to a proclaimed reserve being within 3-5 km away from the WEF.

Figure 9.3a: Viewshed for 130 metre turbine hubs – Eccca Nature Reserve.

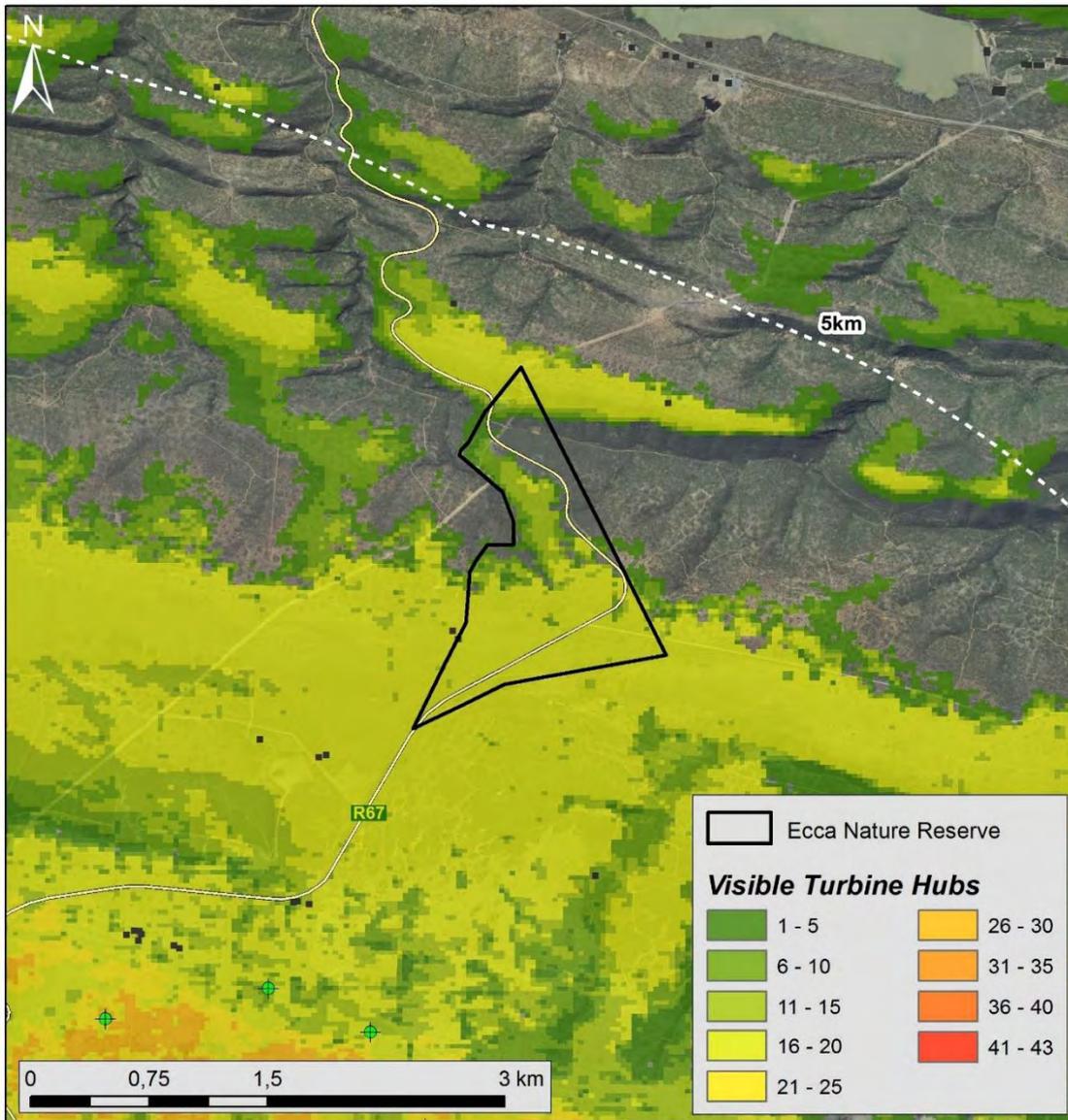
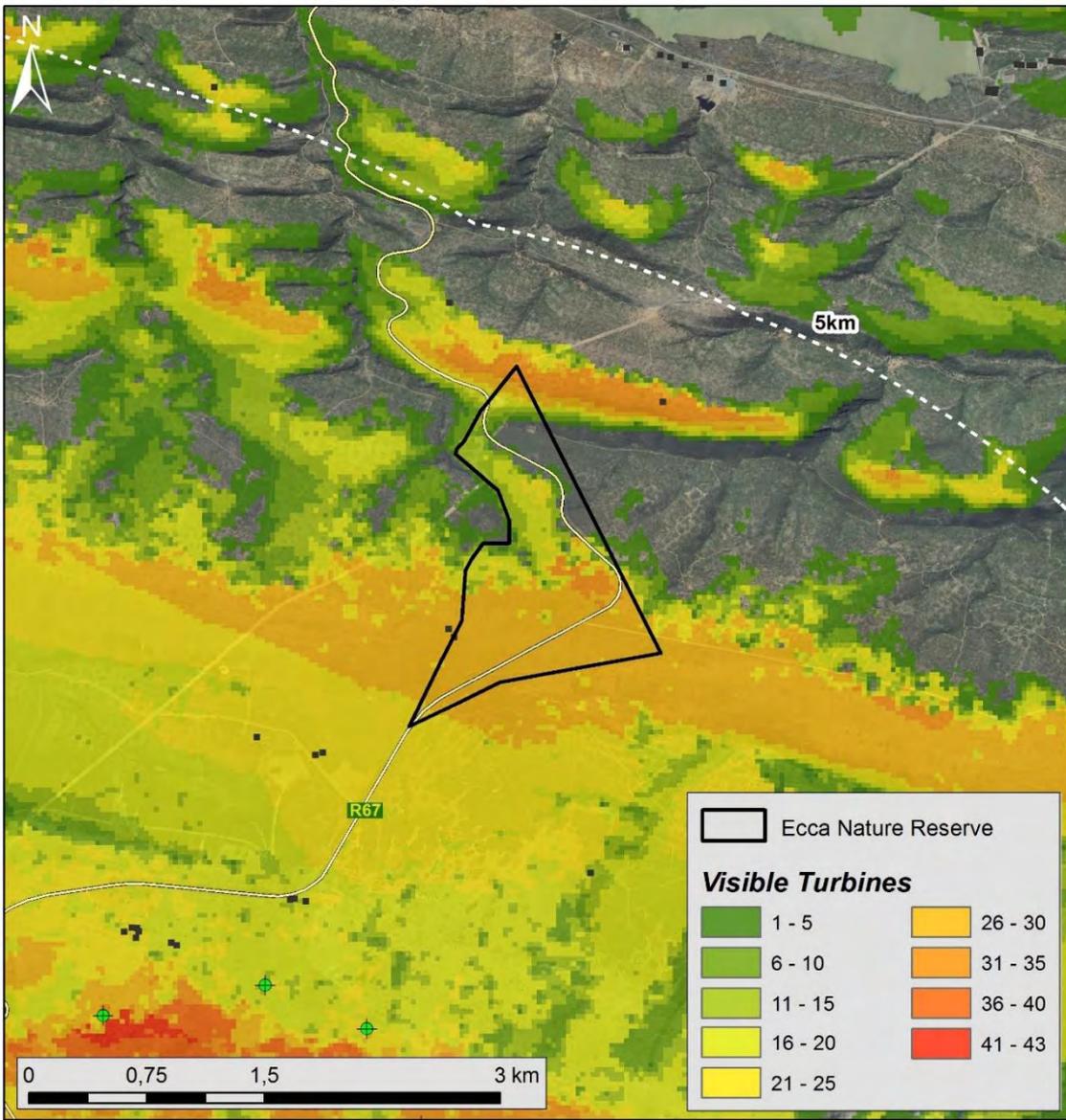


Figure 9.3b: Viewshed for 215 metre turbine blades – Ecca Nature Reserve.



**WATERS MEETING NATURE RESERVE**

Waters Meeting Nature Reserve is a proclaimed reserve that is operated by the ECPTA. The reserve was originally established as a forest reserve in 1897 and was declared a nature reserve in 1952 and 1985. It consists of two discontinuous reserves situated on the Kowie River in the vicinity of Bathurst namely Waters Meeting I (198ha) and Waters Meeting II (3 261ha). The reserve offers various accommodation and hiking trails.

**Observations:**

- The Waters Meeting Nature Reserve ranges in a distance of about 12-25 km south east of the proposed WEF site.
- Turbine hubs and blades will not be visible for the vast majority of the reserve (probably over 90% of the reserve).
- A large number of turbines (up to 40) will only be visible from limited elevated locations within the 12-20 km distance from the proposed WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.4a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.4b).
- The exposure to the WEF is **MODERATE to LOW** due to the 12-25 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve being > 10km away from the WEF.

Figure 9.4a: Viewshed for 130 metre turbine hubs – Waters Meeting Nature Reserve.

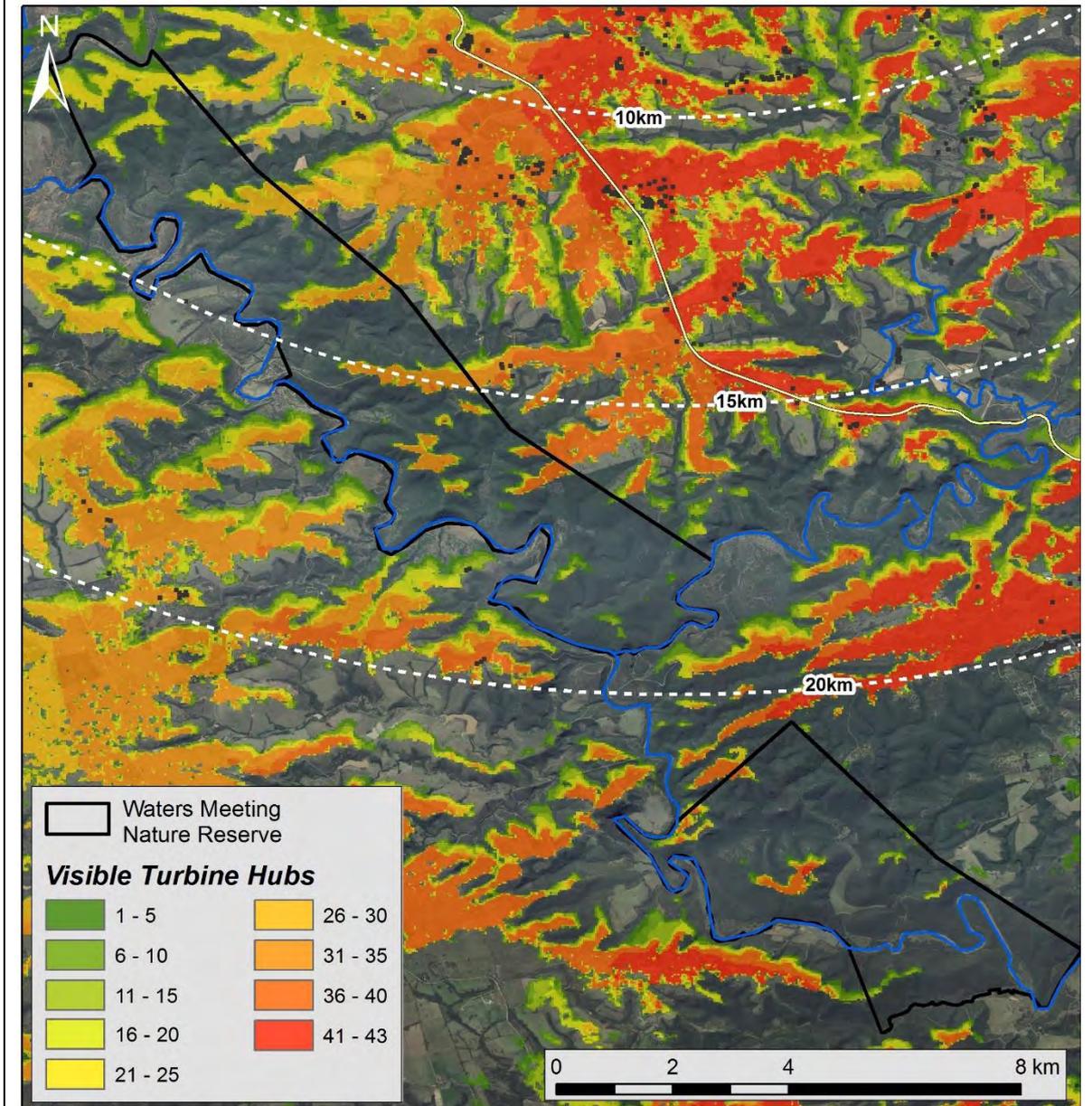
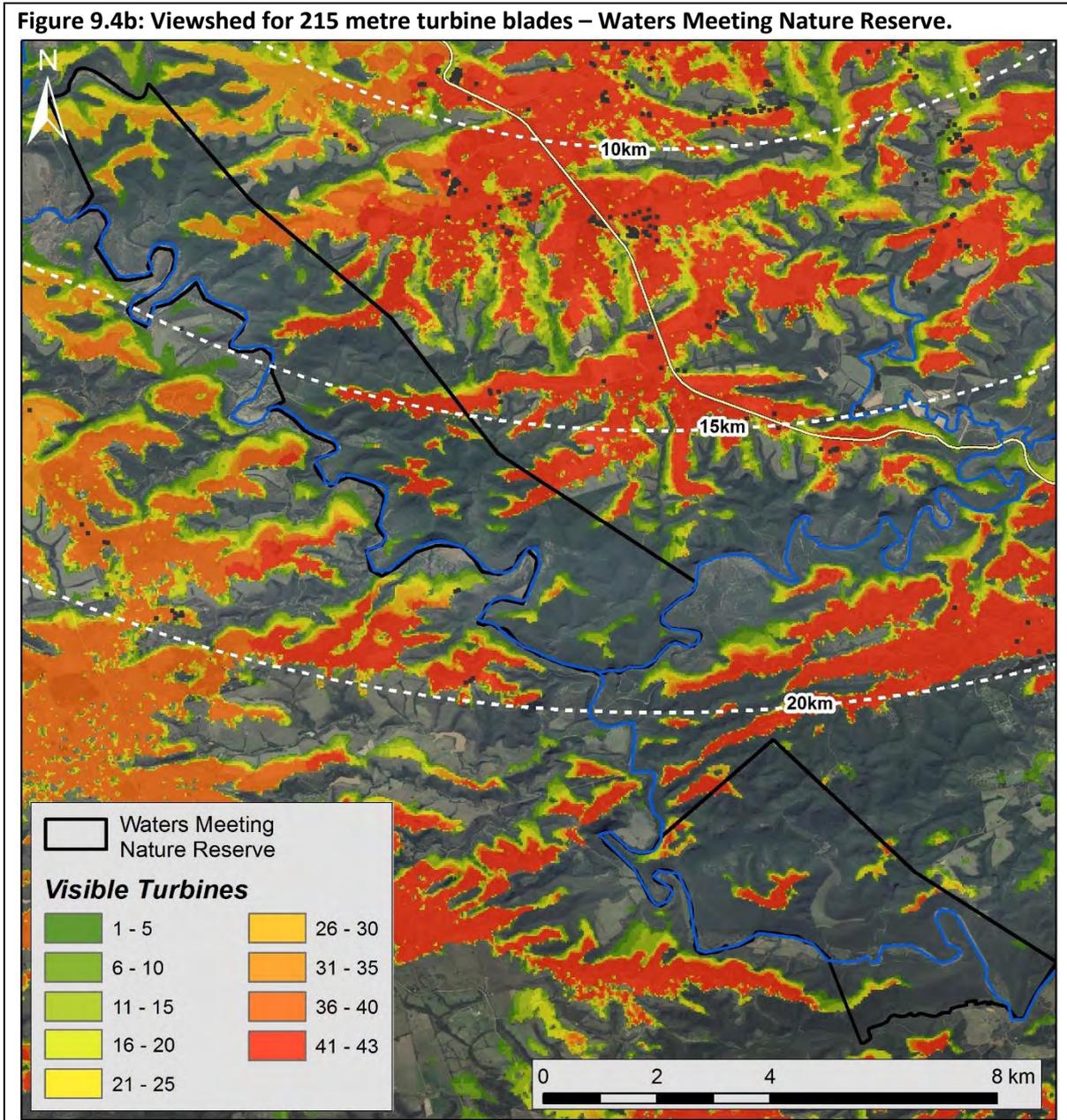


Figure 9.4b: Viewshed for 215 metre turbine blades – Waters Meeting Nature Reserve.



**ROUNDHILL ORIBI NATURE RESERVE**

The proclaimed Roundhill Oribi Nature Reserve is a small reserve located about 10km north of Bathurst and is owned and Managed by the Ndlambe Municipality.

**Observations:**

- The Roundhill Oribi Nature Reserve is located about 14-16 km south east of the proposed WEF site.
- Up to about 15 turbine hubs will be visible for the vast majority of the reserve (approximately 90% of the reserve).
- Up to 40 turbine blades will be visible from elevated locations (approximately 30% of the reserve).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.5a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.5b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 14-16 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve being > 10km away from the WEF.

Figure 9.5a: Viewshed for 130 metre turbine hubs – Roundhill Oribi Nature Reserve.

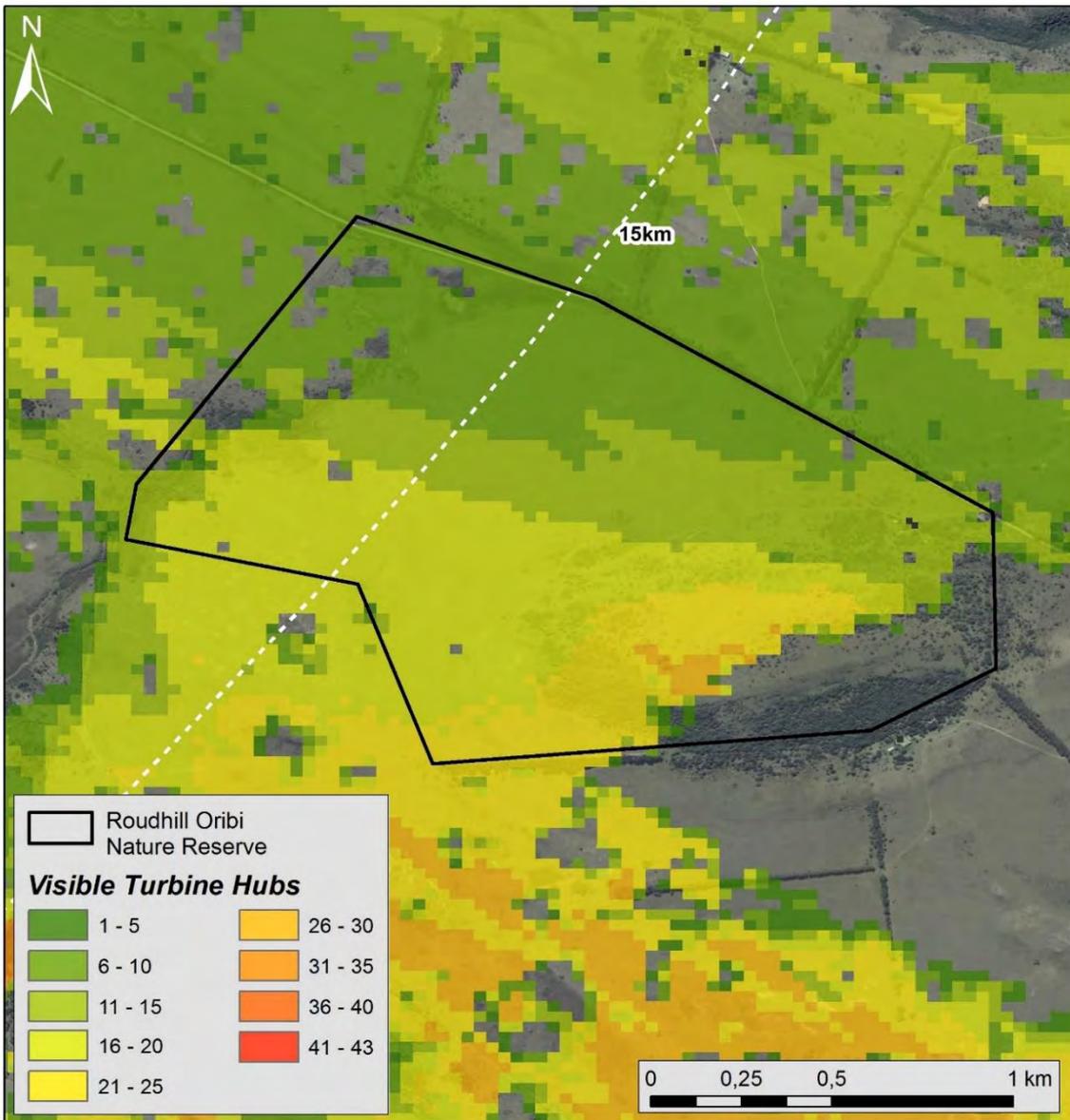
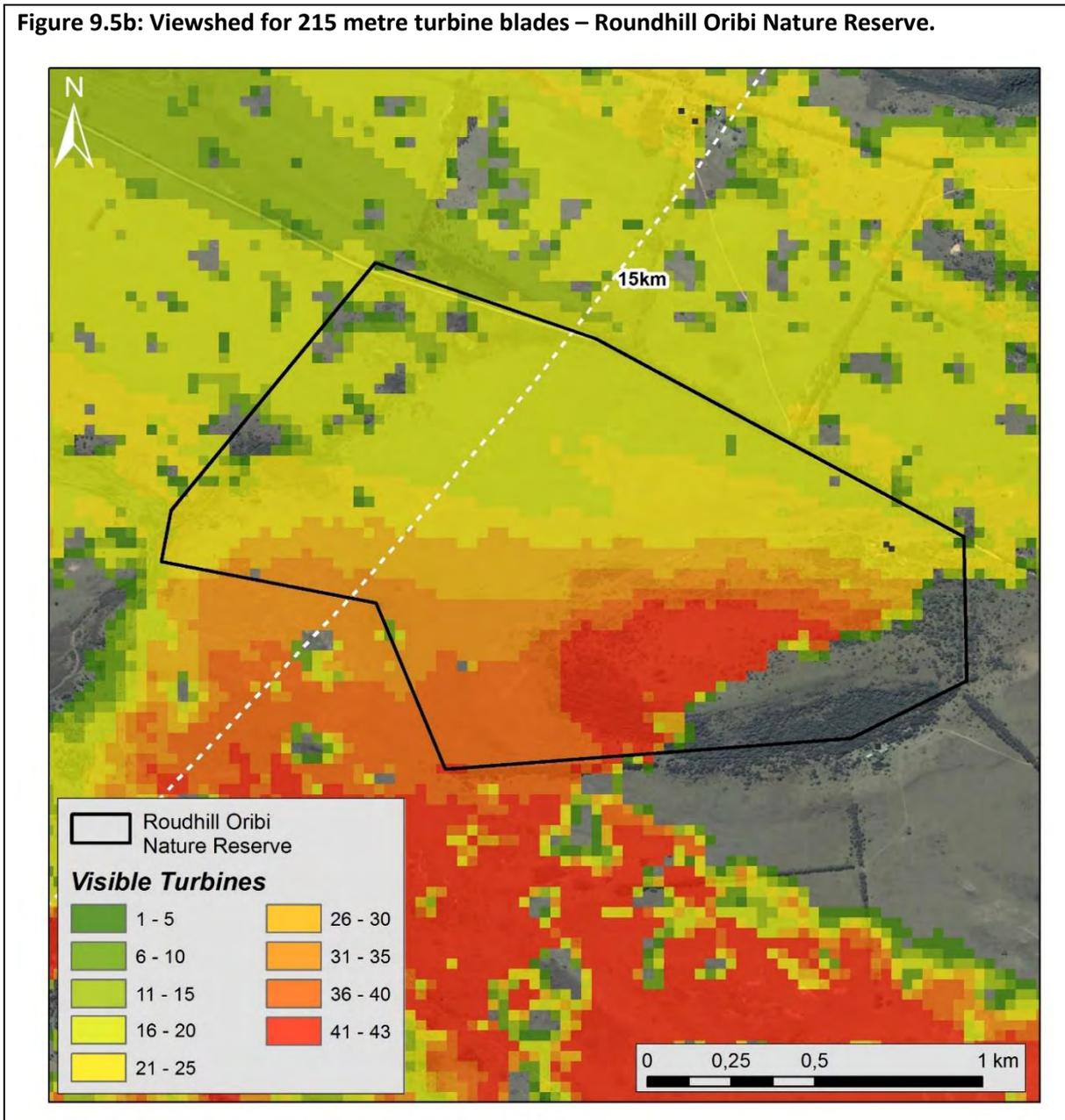


Figure 9.5b: Viewshed for 215 metre turbine blades – Roundhill Oribi Nature Reserve.



**KAP RIVER NATURE RESERVE**

The Kap River Nature Reserve is a proclaimed reserve that covers an area of 670 ha and is located 28 km East of Port Alfred. The reserve offers birding, hiking, mountain biking and canoeing. Features include sub-tropical vegetation, forests, two rivers, natural diversity, birds and wild animals.

**Observations:**

- The Kap River Nature Reserve ranges in a distance of about 7-12 km east of the proposed WEF site.
- Up to 15 turbine hubs will be visible for the vast majority of the reserve (probably over 90% of the reserve).
- Up to 20 turbine blades will be visible for the vast majority of the reserve (probably over 90% of the reserve).

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.6a).
- The visibility of the WEF blades is **MODERATE** – 25% (11) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.6b).
- The exposure to the WEF is **MODERATE** due to the 7-12 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE** to **LOW** due to a proclaimed reserve 5 km to > 10 km away from the WEF.

Figure 9.6a: Viewshed for 130 metre turbine hubs – Kap River Nature Reserve.

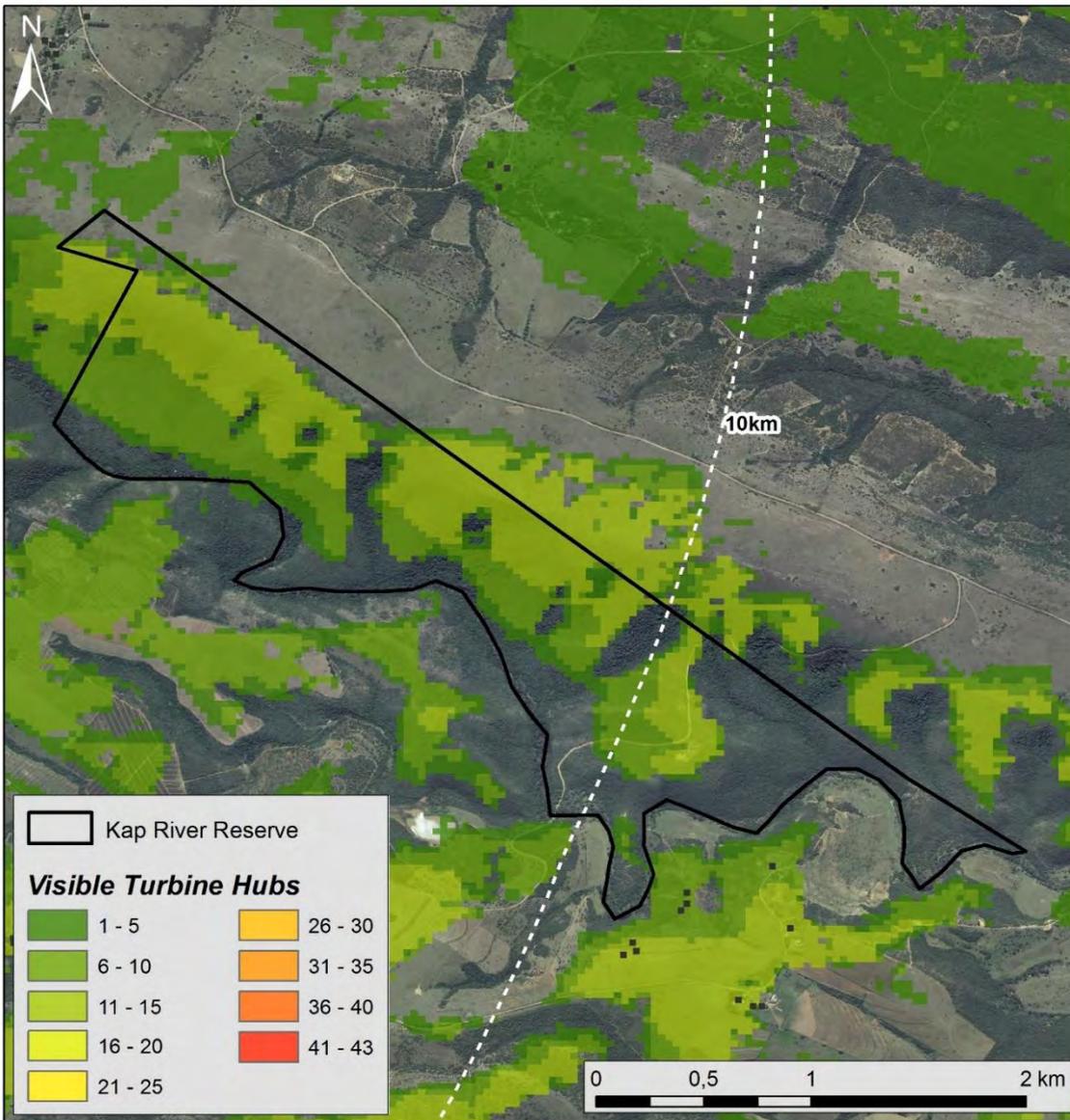
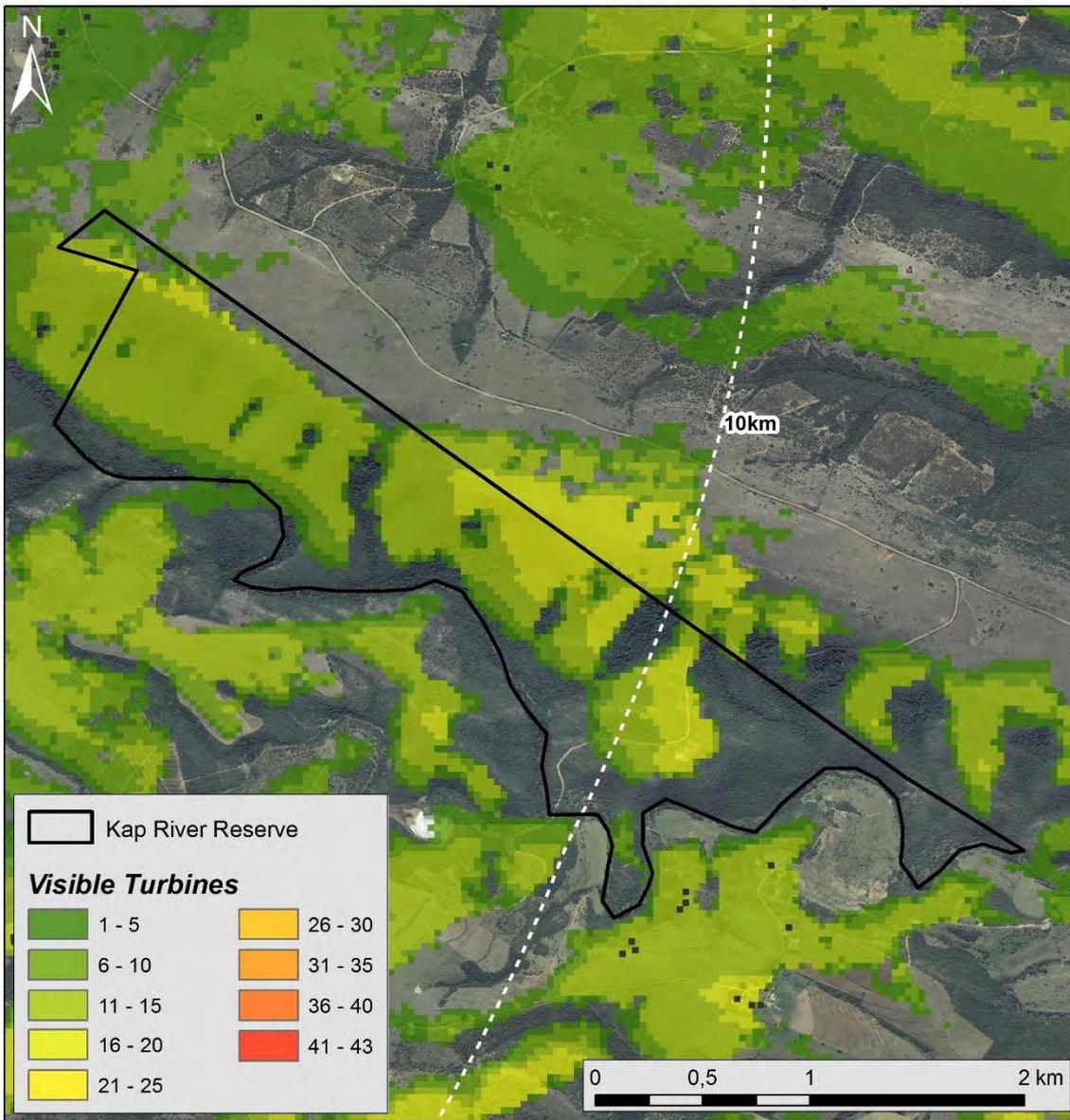


Figure 9.6b: Viewshed for 215 metre turbine blades – Kap River Nature Reserve.



**GREAT FISH RIVER NATURE RESERVE**

The Great Fish RIVER Nature Reserve is a proclaimed reserve that is over 45 000ha in extent. The reserve is operated by the ECPTA and includes the Andries Vosloo Kudu Reserve, Double Drift Nature Reserve and Sam Knott Nature Reserve, is hosts significant plant biodiversity, ranging from sub-tropical thicket to savannah and grassland. It's a birder's paradise with 245 bird sightings. The Adam's Krantz viewpoint over the twisting Fish River canyon is considered to be one of the most iconic Eastern Cape vistas. The reserve has a wide variety of accommodation lodges and activities including hiking and game viewing.

**Observations:**

- The Great Fish River Nature Reserve ranges in a distance of about 13 km to well over 50 km north to north west of the proposed WEF. The extent of the reserve relative to distance from the WEF can be summarised as follows:
  - About 10% of the reserve is located between 13 to 20 km from the WEF.
  - About 40% of the reserve is located between 20 to 30 km from the WEF.
  - About 50% of the reserve is located between 30 to 50 km from the WEF.
- There are many lower lying locations within the Reserve, particularly along the Great Fish River valley, where none or few turbine hubs or blades will be visible, particularly within the 20 to 50 km distance from the proposed WEF.
- A higher number of turbine hubs (up to 35) and blades (up to 43) will be visible from elevated ridges to the south of the reserve within a distance of about 13 to 20 km from the WEF.
- Sensitive viewing locations such as Adam's Krantz are located over 30 km from the proposed WEF.
- The research station is located about 15 km form the proposed WEF.

The following overall conclusions are made:

**At 13 to 20 km**

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.7a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.7b).
- The exposure to the WEF is **LOW** due to the 13-20 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE to LOW** due to a proclaimed reserve 5 km to > 10 km away from the WEF.

**At 20 km or further**

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.7a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.7b).
- The exposure to the WEF is **LOW** due to the > 20 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a proclaimed reserve > 10 km away from the WEF.

Figure 9.7a: Viewshed for 130 metre turbine hubs – Great Fish River Nature Reserve.

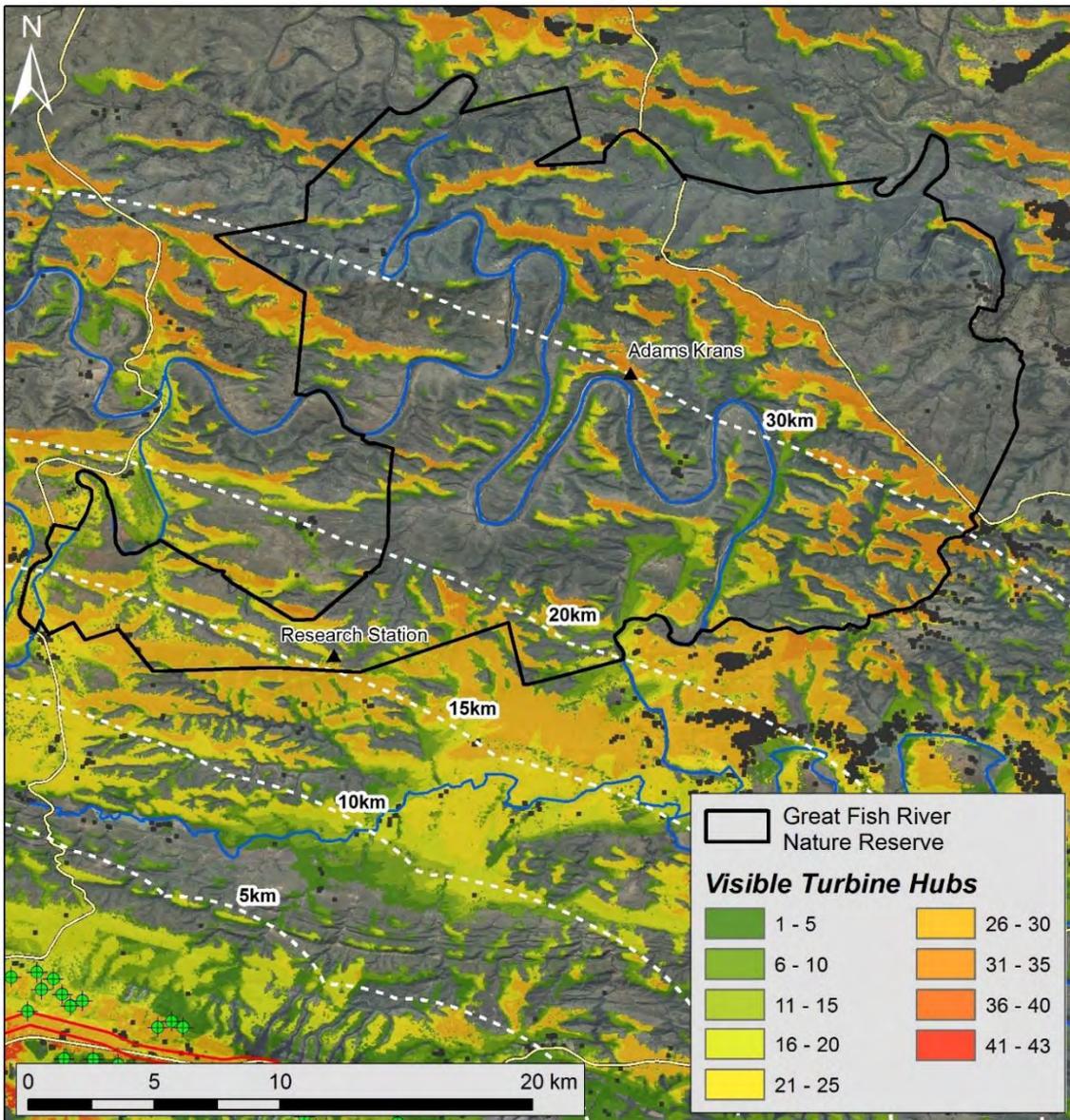
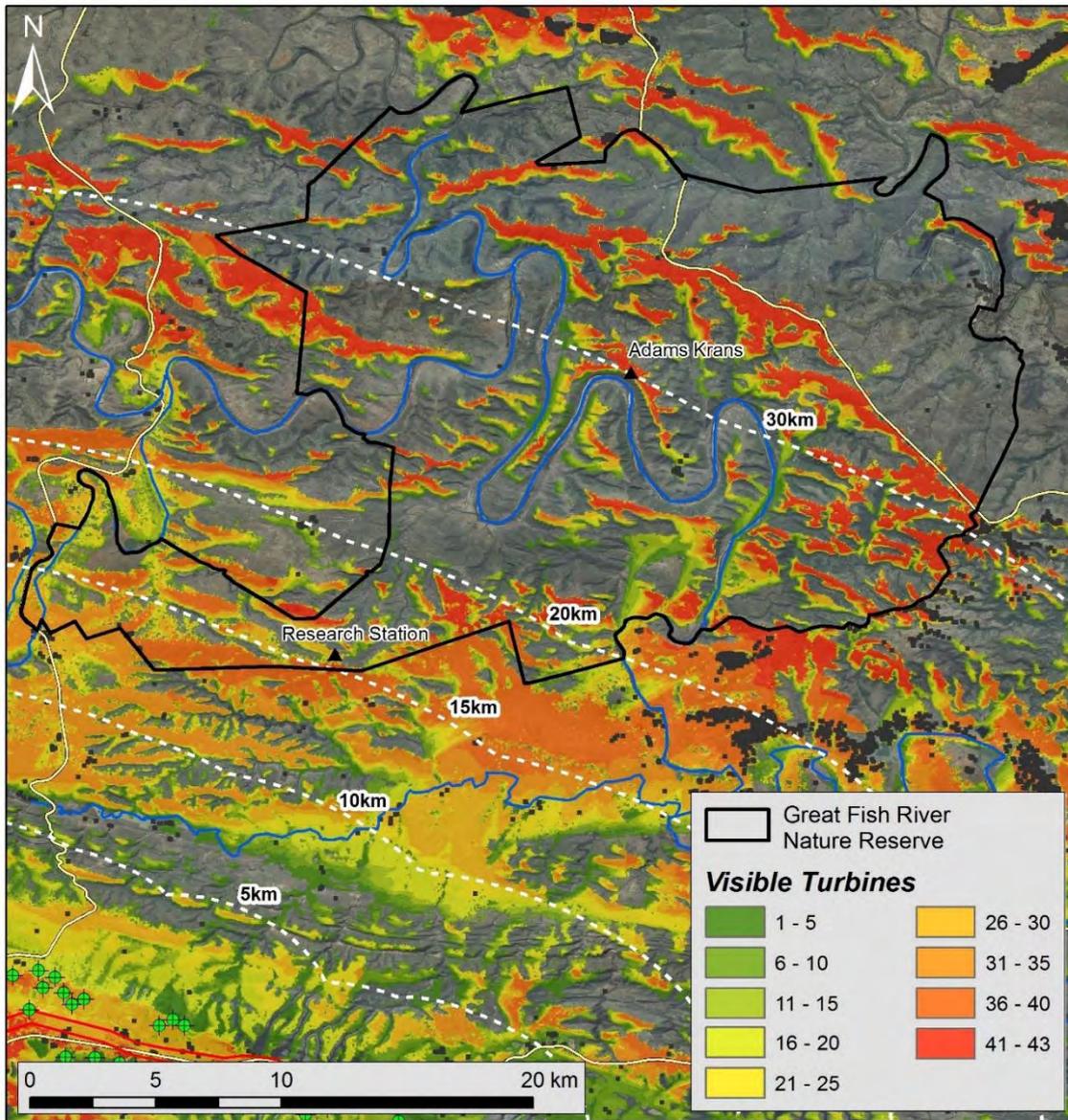


Figure 9.7b: Viewshed for 215 metre turbine blades – Great Fish River Nature Reserve.



**BEGGAR'S BUSH STATE FOREST**

Beggar's Bush is a proclaimed state-owned forest area located south of the N2 north east of Makhanda.

**Observations:**

- The Beggar's Bush State Forest is located almost immediately adjacent (0.5 – 1 km) to and south of the proposed WEF site.
- The forest area is located in low lying valleys where none or few turbines will be visible.

The following overall conclusions are made:

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.8a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.8b).
- The exposure to the WEF is **HIGH** due to 0.5 – 1 km distance from the WEF.
- The landscape sensitivity of the receptor is **VERY HIGH** due to proclaimed reserve < 3 km from the WEF.

Figure 9.8a: Viewshed for 130 metre turbine hubs – Beggar's Bush State Forest.

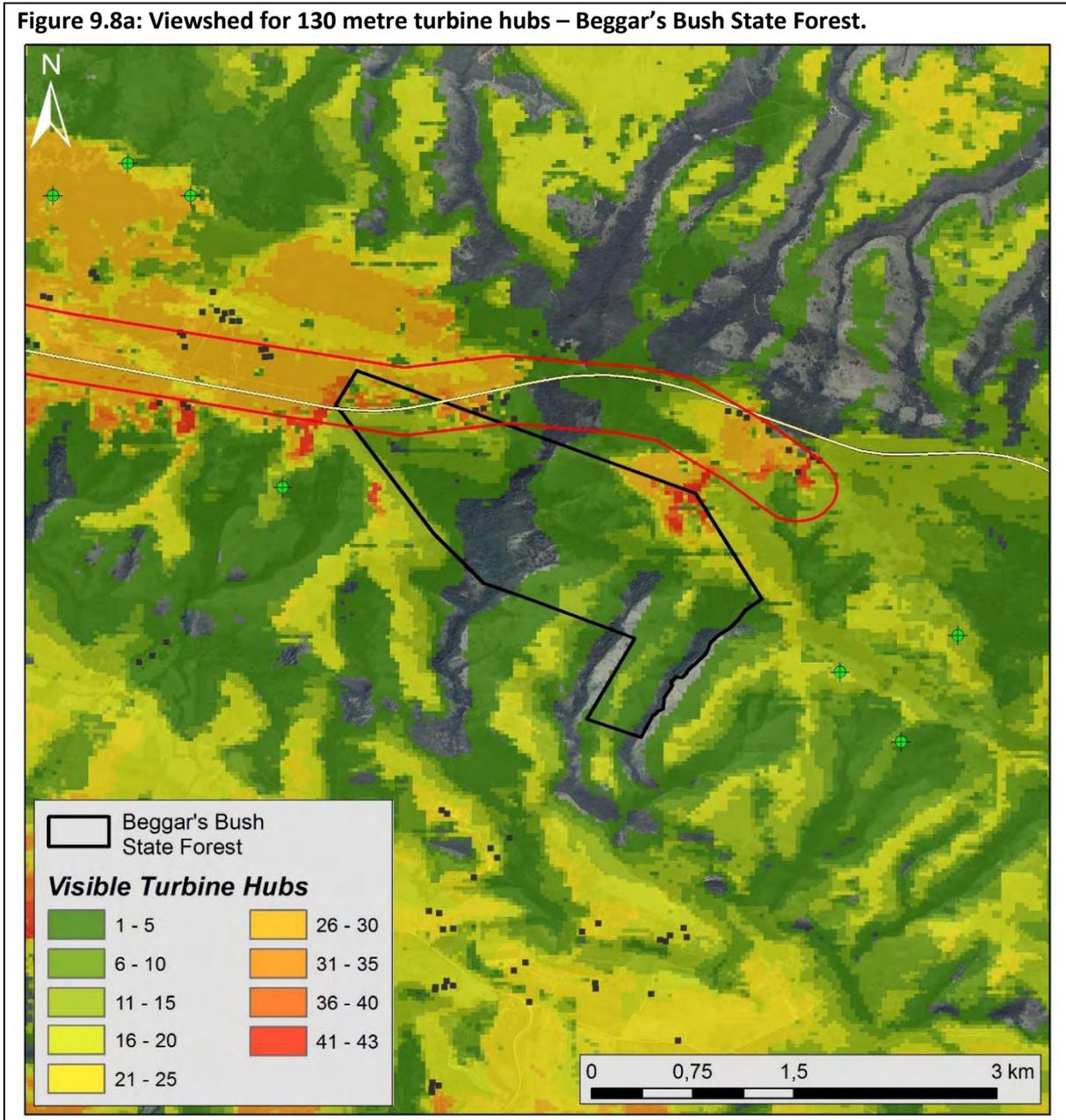
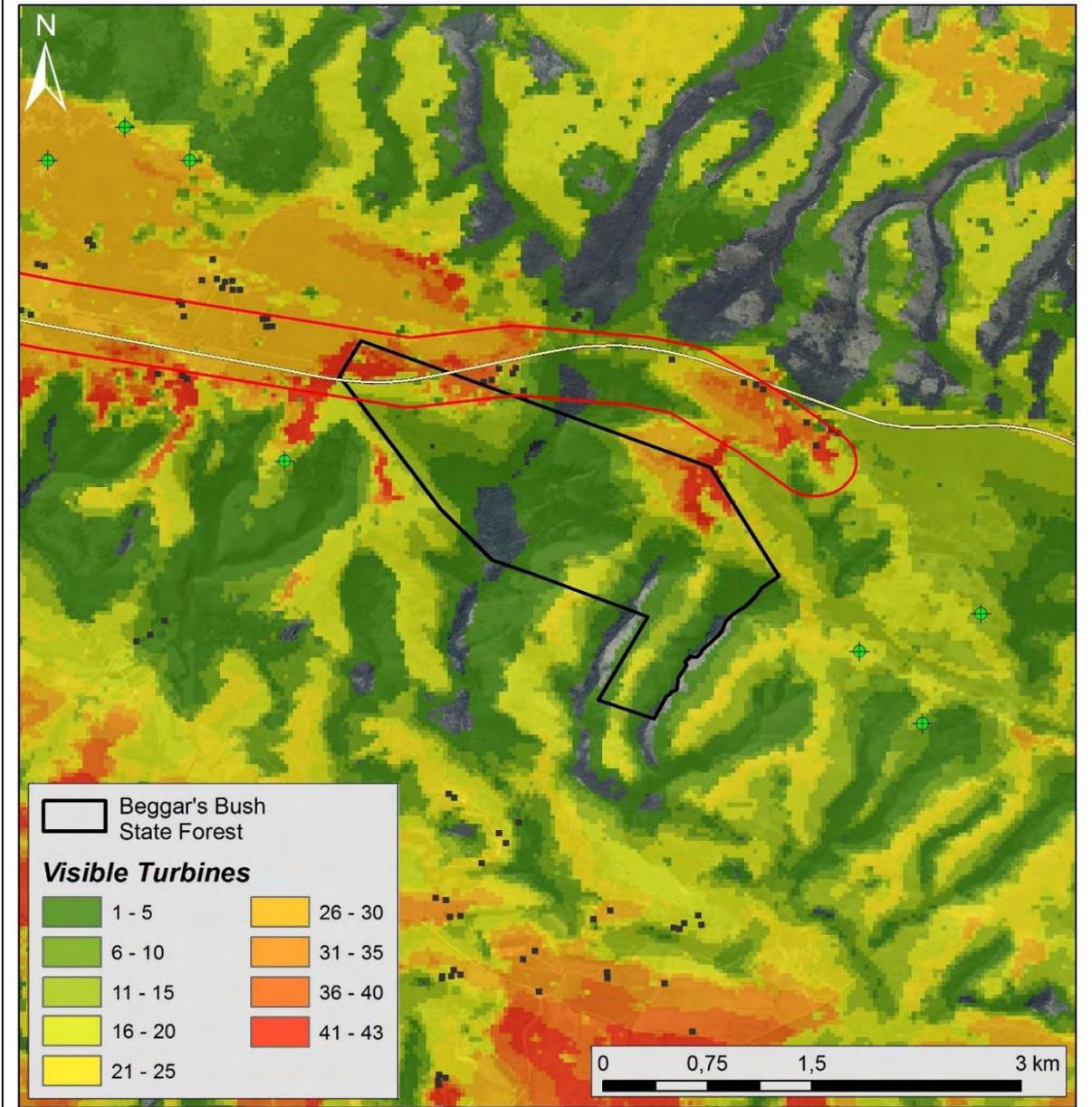


Figure 9.8b: Viewshed for 215 metre turbine blades – Beggar's Bush State Forest.



**KWANDWE PRIVATE GAME RESERVE NORTH – INDALO PROTECTED ENVIRONMENT**

The Kwandwe Private Game Reserve covers an area of over 22,000 ha, almost divided in half by the Great Fish River.

- A larger portion of Kwandwe about 19,000 ha, is part of the proclaimed Indalo Protected Environment.
- A smaller portion of Kwandwe is NOT part of the proclaimed Indalo Protected Environment and is located closer to the WEF.

Accommodation on offer at the reserve includes five safari lodges and a homestead.

**Observations: Kwandwe North Indalo portion**

- The Kwandwe Indalo Protected Environment portion is located about 8 – 20 km away from the western cluster of the WEF.
- Up to 35 turbine hubs will be visible from elevated ridges within the Indalo portion of the reserve where but these are generally beyond a distance of about 10 km from the WEF.
- Up to 43 turbine hubs will be visible from elevated locations within the Indalo portion of the reserve at about 15 km to beyond 20 km distance from the proposed WEF.
- Turbine blades will be visible from large areas of the Indalo portion particularly between the 10 and 20 km radii of the WEF.
- Lodges within the Indalo portion of Kwandwe are all located close to and south of the Great Fish River at the following distances from the WEF:
  - Melton Manor – 17 km
  - Great Fish River Lodge – 17 km
  - Ecca Lodge – 15 km
  - Uplands Homestead – 15 km
  - The Fort House – 14 km
  - KwaNdlovu Lodge – 14 km

It is also expected that the views from the lodges would mostly be in a north facing direction toward the Great Fish River and not toward the WEF.

The following overall conclusions are split between the Indalo portions of the Kwandwe Reserve:

**Kwandwe North Indalo portion**

The following overall conclusions are made:

- The visibility of the WEF hubs is **VERY HIGH** – 75% (31) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.9a).
- The visibility of the WEF blades is **VERY HIGH** – 75% (31) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.9b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 8-20 km distance from the WEF for the vast majority of the Reserve including lodges.
- The landscape sensitivity of the receptor is **MODERATE** to **LOW** due to a protected reserve 5 km and > 10km away from the WEF.

It should be noted that based on submissions on the draft VIA and EIAr, five (5) turbines almost immediately adjacent to the southern boundary of the un-proclaimed non Indalo portion of Kwandwe game reserve (the western cluster west of the R67), have been removed. An additional seven (7) turbines also located within 2-3 km of the Kwandwe game reserve, have also been removed from the western cluster east of the R67. This amounts to a total of 12 turbines removed from the western cluster.

Figure 9.9a: Viewshed for 130 metre turbine hubs – Kwandwe Private Game Reserve North Indalo Protected Environment.

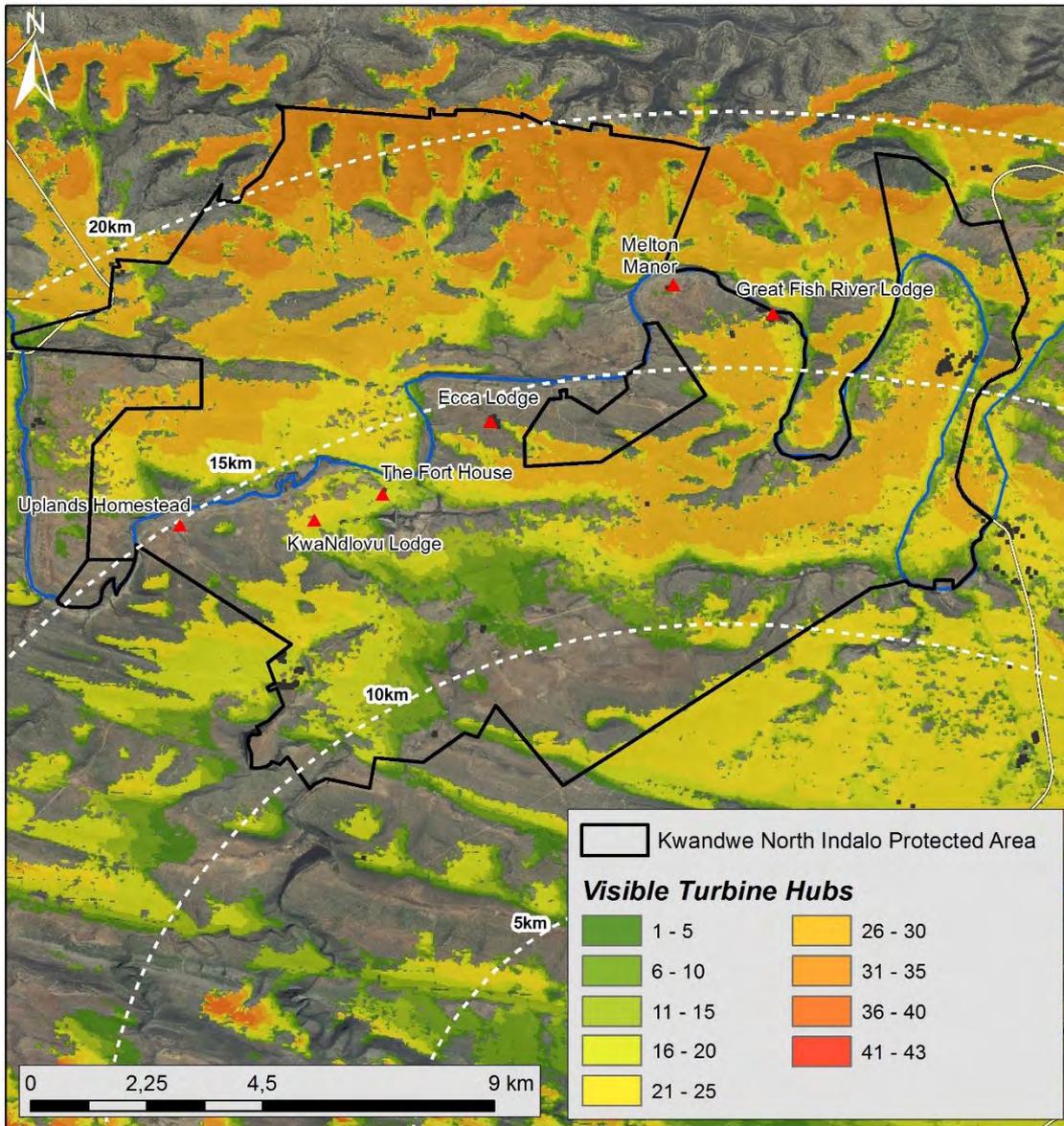
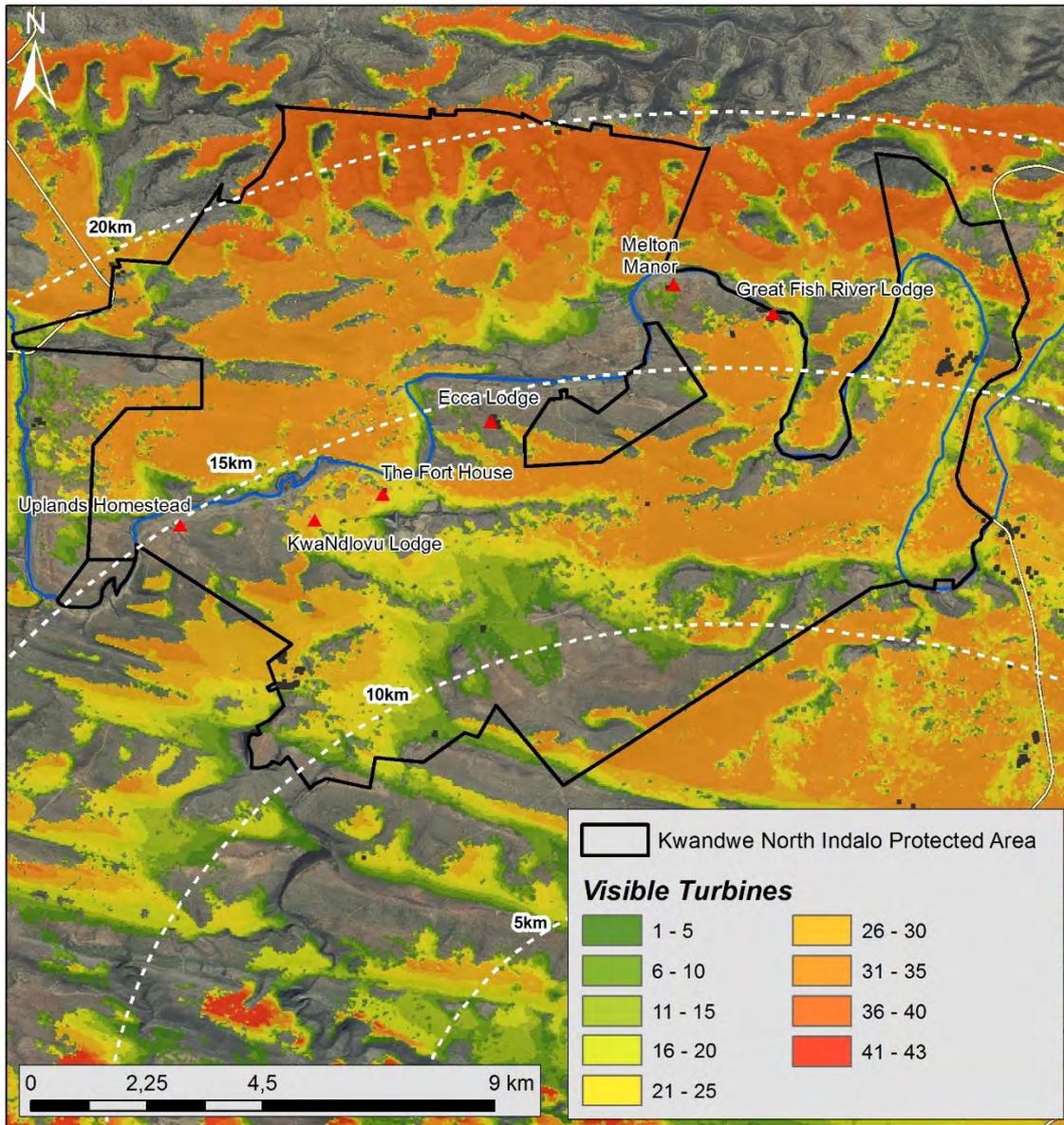


Figure 9.9b: Viewshed for 215 metre turbine blades – Kwandwe Private Game Reserve North Indalo Protected Environment.



**KWANDWE WEST INDALO PROTECTED ENVIRONMENT**

The Kwandwe West portion of the wider Kwandwe Indalo Protected Environment is located south of the main reserve and lies west of the Albany WEF.

**Observations:**

- The Kwandwe West portion of the Indalo Protected Environment ranges in distance from of about 7-10 km west of the western cluster of the proposed WEF site. The central and eastern clusters are located a 15 – 20 km away, respectively.
- There are many lower lying locations within the area where no turbine hubs and blades will be visible.
- A higher number of turbine hubs and blades (up to almost all 43 turbines) will only be visible from limited elevated locations within the 7-10 km distance from the proposed WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.10a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.10b).
- The exposure to the WEF is **MODERATE** to **LOW** due to the 7-10 km distance from the WEF.
- The landscape sensitivity of the receptor is **MODERATE** due to a protected reserve being between 5 – 10 km away from the WEF.

It should again be noted that a total of 12 turbines have been removed from the western cluster of the WEF closest to the reserve.

Figure 9.10a: Viewshed for 130 metre turbine hubs – Kwandwe Indalo West Protected Environment west of project site.

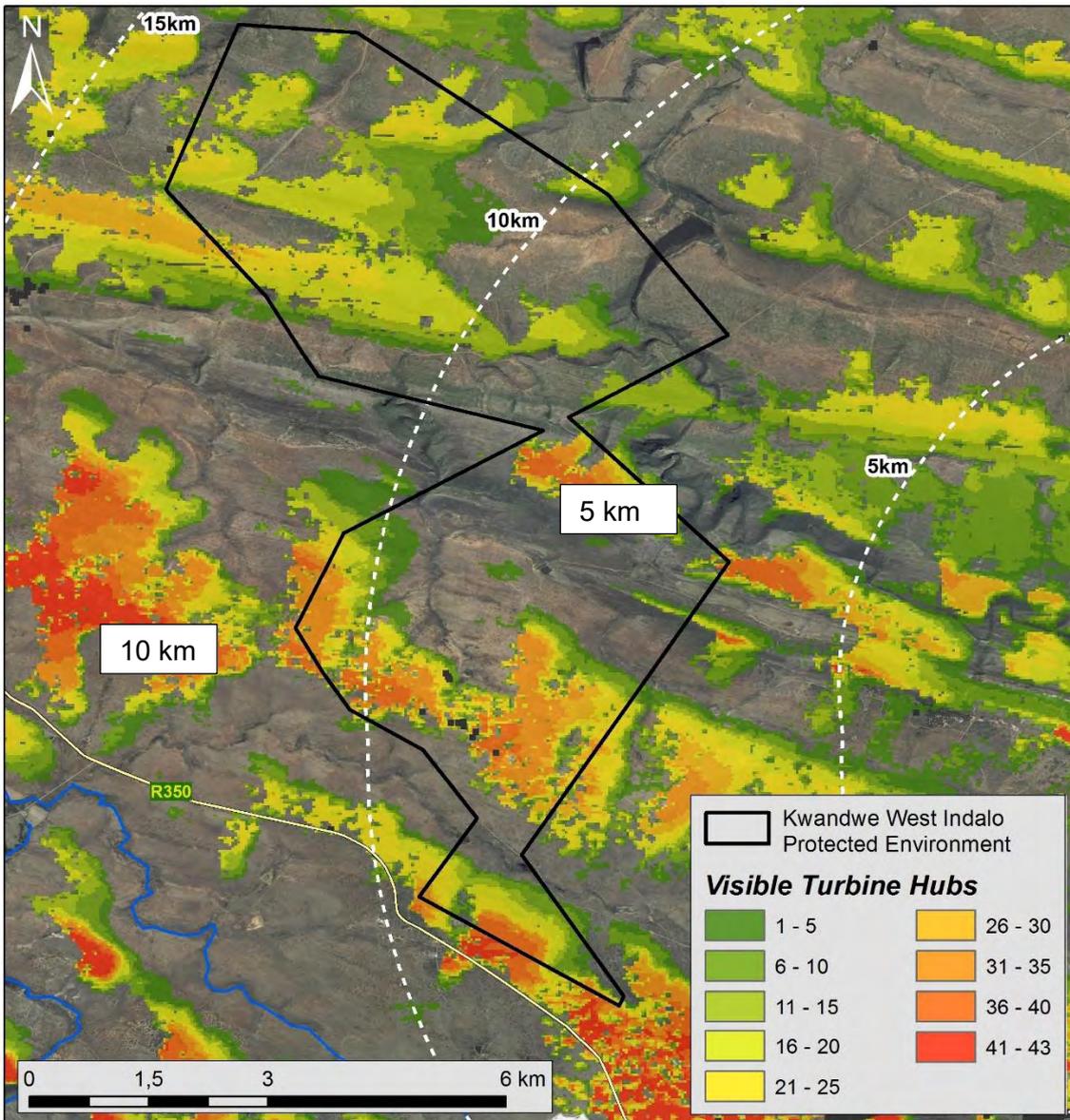
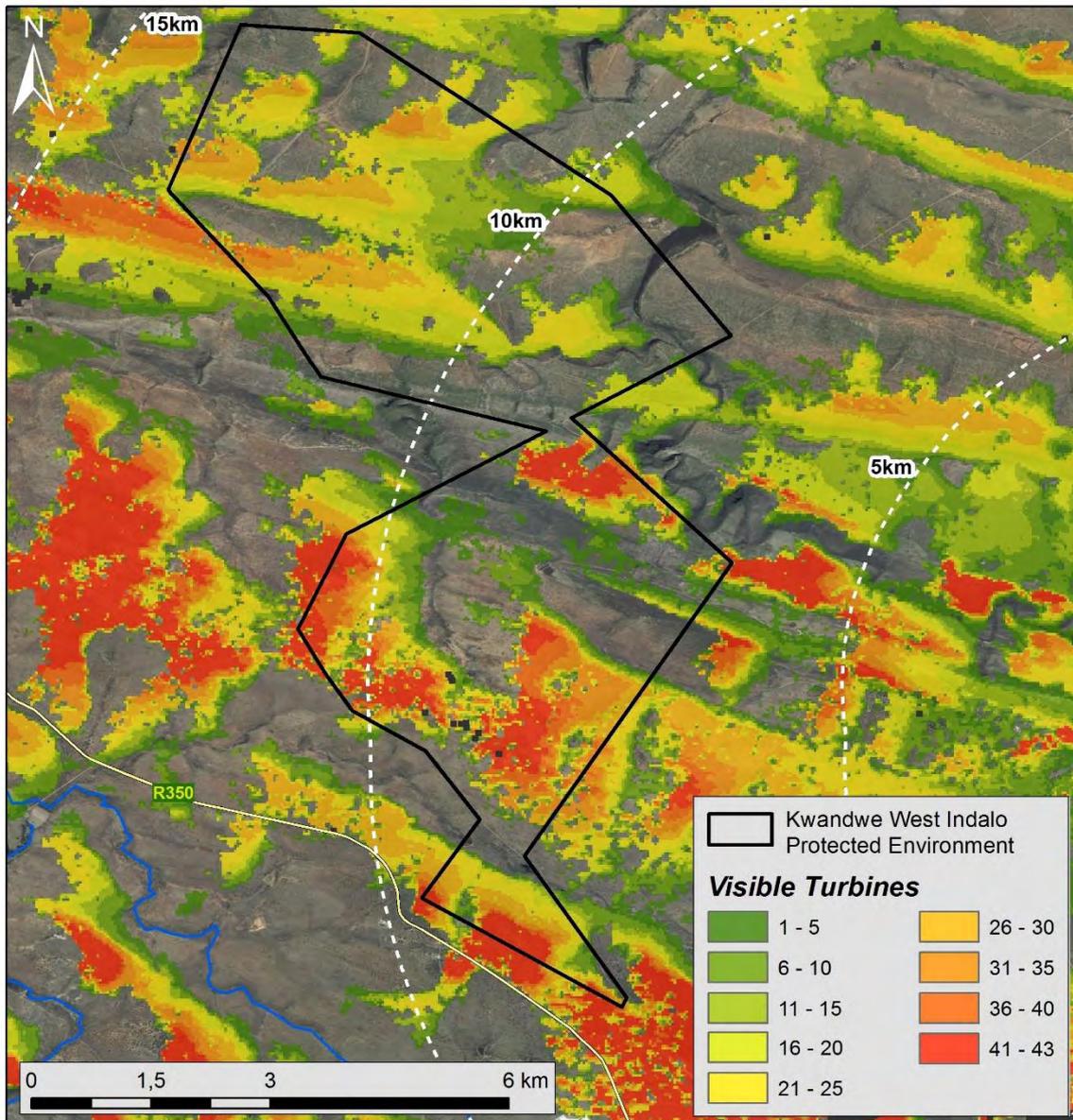


Figure 9.10b: Viewshed for 215 metre turbine blades – Kwandwe Protected Environment west of the project site.



**BUFFALO KLOOF PRIVATE GAME RESERVE**

Buffalo Kloof Private Game Reserve forms part of the Buffalo Kloof Protected Area and is used primarily for Hunting Safari's. Accommodation on offer at the reserve includes the original farm homestead, a 100-year-old sheep shearing shed, that has been restored and renovated, and the Spekboom Camp. It should be noted that although the viewshed indicates that turbines will be visible from the Spekboom Camp, it located approximately 14.5 km from the project site and is built with views over a valley to the south-west. The vegetation surrounding the camp is relatively high and will screen views of the windfarm. Views from the Spekboom Camp are, therefore, unlikely to be affected.

**Observations:**

- The Buffalo Kloof Game Reserve ranges in a distance of about 10-20 km south of the proposed WEF site.
- There are many lower lying locations within the Reserve where no turbines will be visible, particularly within the 10-15 km distance from the proposed WEF. This is mainly due to the Reserve being located in the Blaauwkrantz Valley south of the R67 ridge line which significantly visually shields the reserve from the turbines.
- Up to 20 turbine hubs and blades will only be visible from limited elevated locations within the 10-15 km distance from the proposed WEF.
- Up to 43 turbine hubs and blades will be visible from elevated locations at about 15 km to 20 km distance from the proposed WEF.
- The following lodges are located within the game reserve:
  - Hunter Lodge – 11 km from the WEF.
  - Vetpaw House – 17km from the WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.11a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.11b).
- The exposure to the WEF is **LOW** due to the 10-20 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7km away from the WEF.

Figure 9.11a: Viewshed for 130 metre turbine hubs – Buffalo Kloof Private Game Reserve.

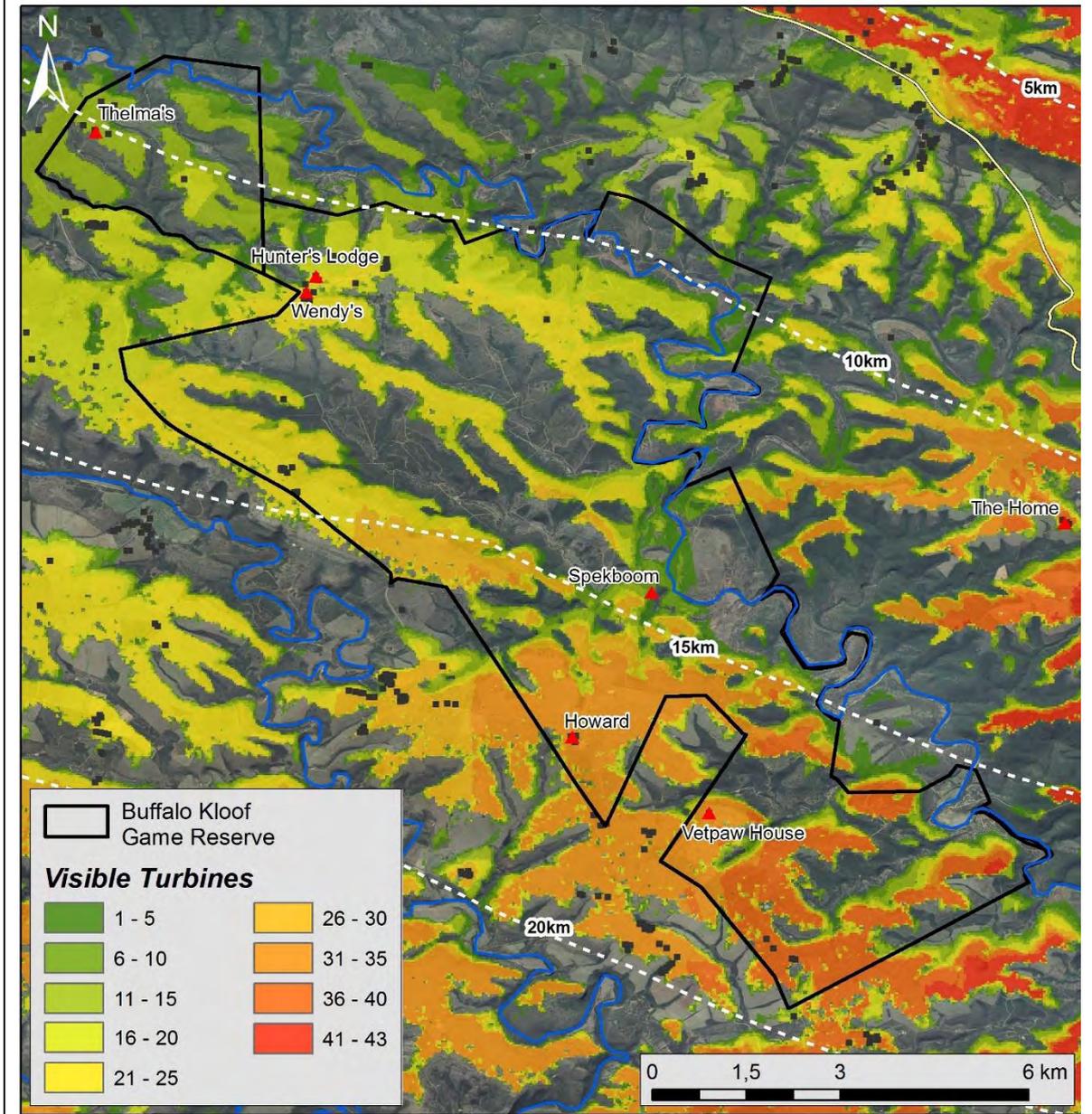
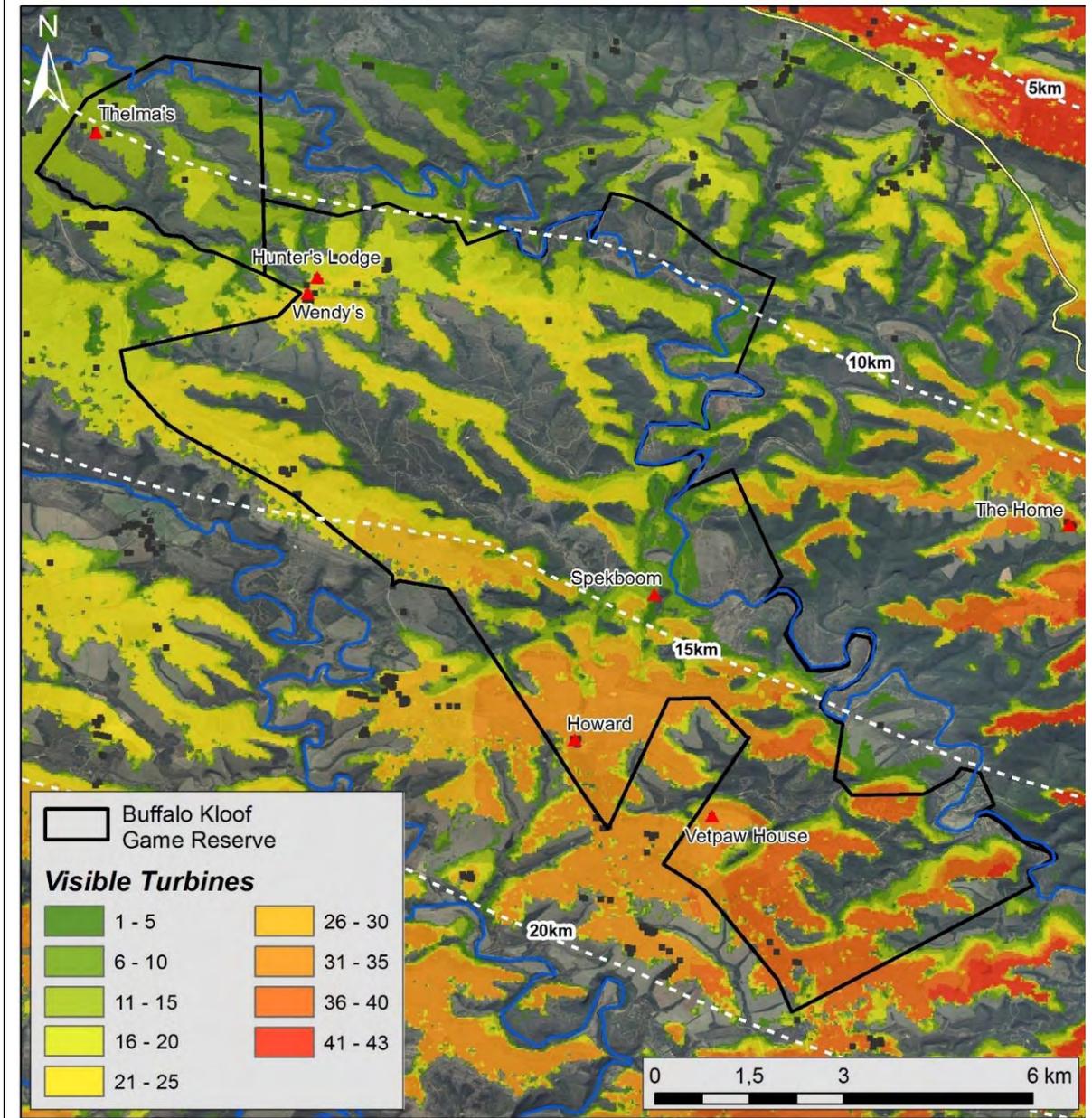


Figure 9.11b: Viewshed for 215 metre turbine blades – Buffalo Kloof Game Reserve.



**KWANDWE PRIVATE GAME RESERVE – NORTH – NONE INDALO PROTECTED ENVIRONMENT**

The Kwandwe Private Game Reserve covers an area of over 22,000 ha, almost divided in half by the Great Fish River.

- A larger portion of Kwandwe about 19,000 ha, is part of the proclaimed Indalo Protected Environment.
- A smaller portion of Kwandwe is NOT part of the proclaimed Indalo Protected Environment and is located closer to the WEF.

**Observations: Kwandwe North none Indalo portion**

- The Kwandwe none Indalo Protected Environment portion is located about 1 – 8 km away from the western cluster of the WEF.
- There are many lower lying locations within the the non Indalo portion where no turbine hubs and blades will be visible, particularly within the 10 km distance from the proposed WEF where the topography is more varied, such as along the Ecce Ridge.
- Within the none Indalo portion, a limited number of turbines located within the western turbine cluster will be visible within a 5 km distance from the proposed WEF due to the irregular terrain (vicinity of Ecce Ridge and Valley).
- A higher number of turbine hubs and blades (up to 20 in the western cluster) will be visible along the southern boundary of the none Indalo portion immediately adjacent to the proposed WEF site (near the Ecce Pass).
- A high number of turbine blades will be visible from large areas of the none Indalo portion particularly within a 7-10 km radius of the WEF.

The following overall conclusions made concerning the none Indalo portions of the Kwandwe Reserve:

**Kwandwe North none Indalo portion**

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.12a).
- The visibility of the WEF blades is **VERY HIGH** – 75% (31) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.12b).
- The exposure to the WEF is **VERY HIGH** due to the 1-8 km distance from the western WEF cluster.
- The landscape sensitivity of the receptor is **MODERATE** to **VERY HIGH** due to un-proclaimed reserve being within 2 km and between 2 – 7 km away from the WEF.

It should be noted that based on submissions on the draft VIA and EIAR, five (5) turbines almost immediately adjacent to the southern boundary of the un-proclaimed none Indalo portion of Kwandwe game reserve (the western cluster west of the R67), have been removed. An additional seven (7) turbines also located within 2-3 km of the Kwandwe game reserve, have also been removed from the western cluster east of the R67. This amounts to a total of 12 turbines removed from the western cluster.

Figure 9.12a: Viewshed for 130 metre turbine hubs – Kwandwe Private Game Reserve North none Indalo Protected Environment.

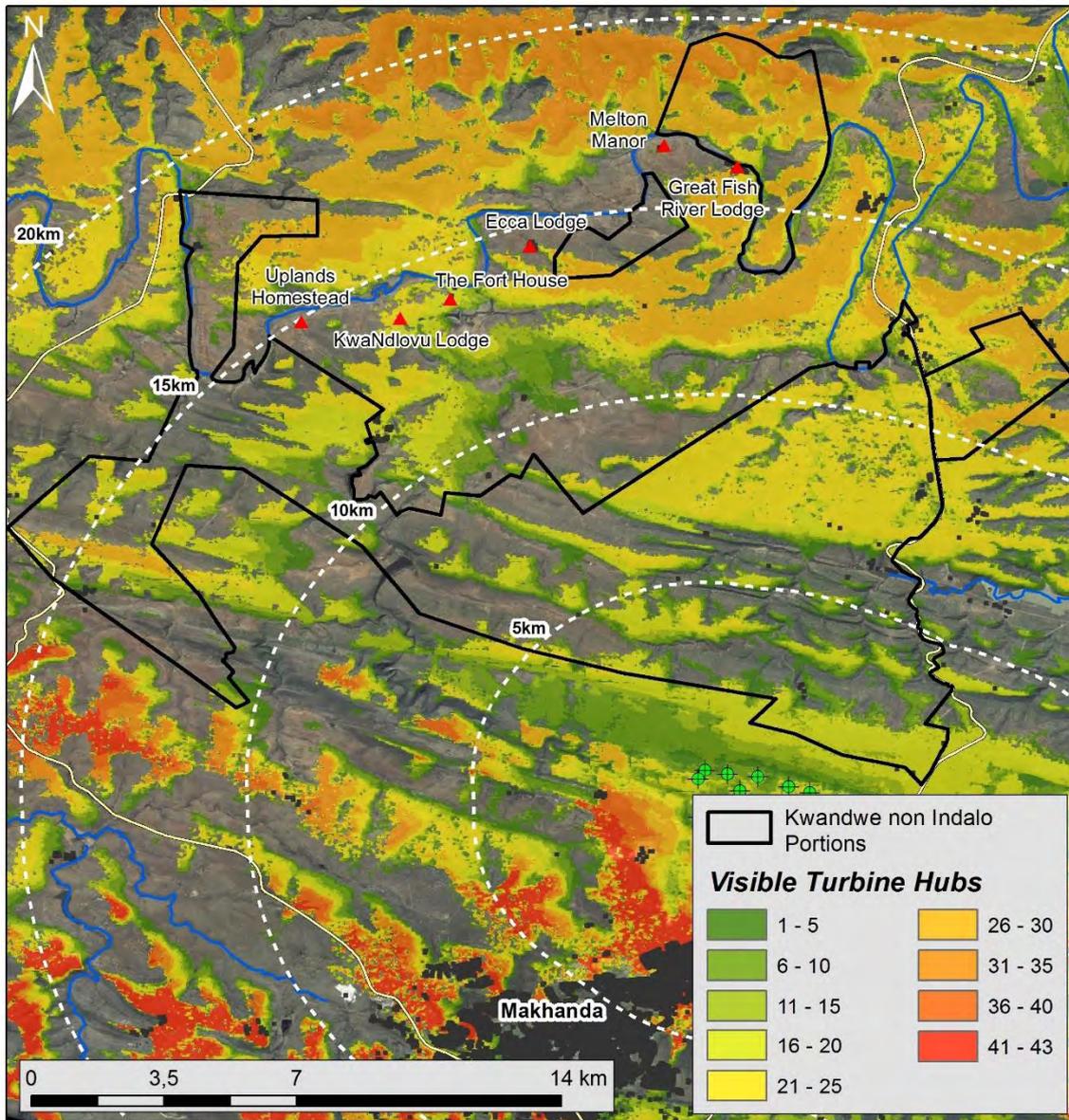
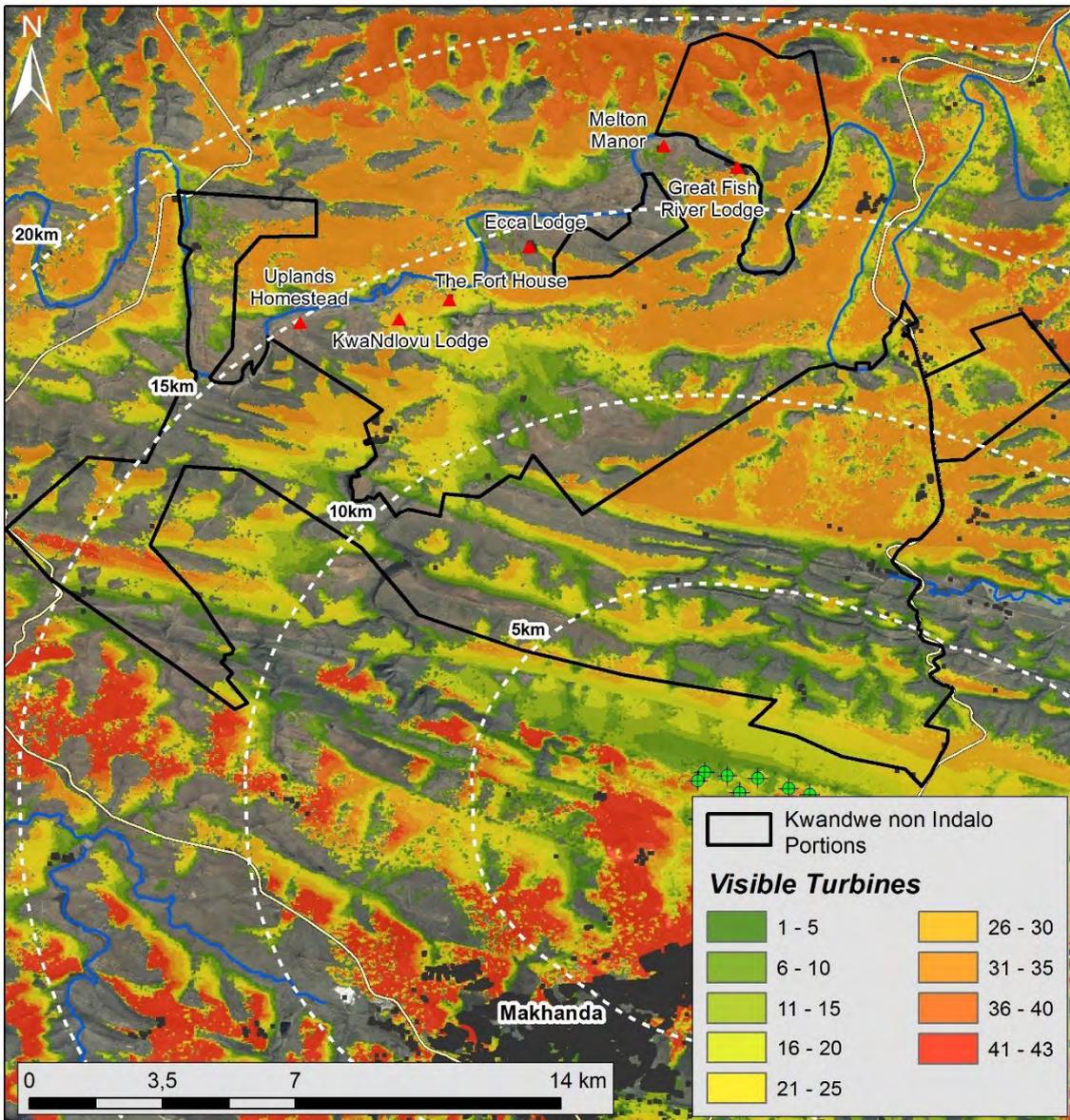


Figure 9.12b: Viewshed for 215 metre turbine blades – Kwandwe Private Game Reserve North none Indalo Protected Environment.



**KUDU RIDGE PRIVATE GAME RESERVE**

Kudu Ridge Private Game Reserve is an un-proclaimed privately owned reserve that primarily used for hunting safari's and accommodation of international hunting clients.

**Observations:**

- The Kudu Ridge Game Reserve ranges in a distance of about 7-12 km north of the project site.
- For the majority of the Reserve, relatively few turbines (1-15) will be visible as the reserve is mostly located within the Fish River valley.
- Up to 30 turbine hubs will be visible from limited elevated locations (1%) at a distance exceeding 10 km from the WEF.
- Up to 43 turbine blades will be visible from limited elevated locations (about 1%) at a distance of 10 km from the WEF.
- Up to 40 turbine blades will be visible from elevated locations (about 10%) at a distance of 8-12 km from the WEF.

The following overall conclusions are made:

- The visibility of the WEF hubs is **MODERATE** – 25% (11) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.13a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.13b).
- The exposure to the WEF is **MODERATE** due to the 7-12 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7 away from the WEF.

Figure 9.13a: Viewshed for 130 metre turbine hubs - Kudu Ridge Game Reserve.

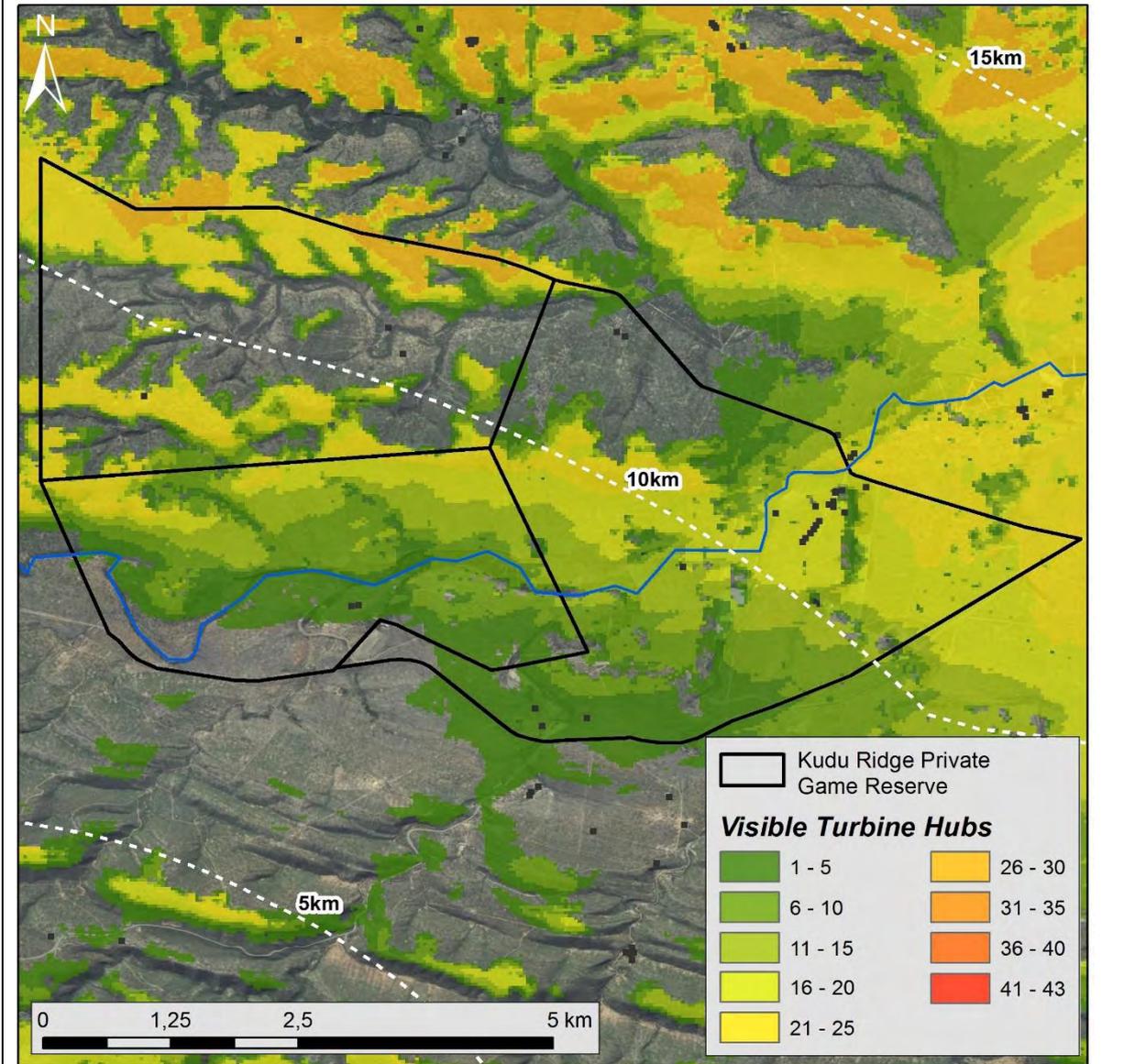
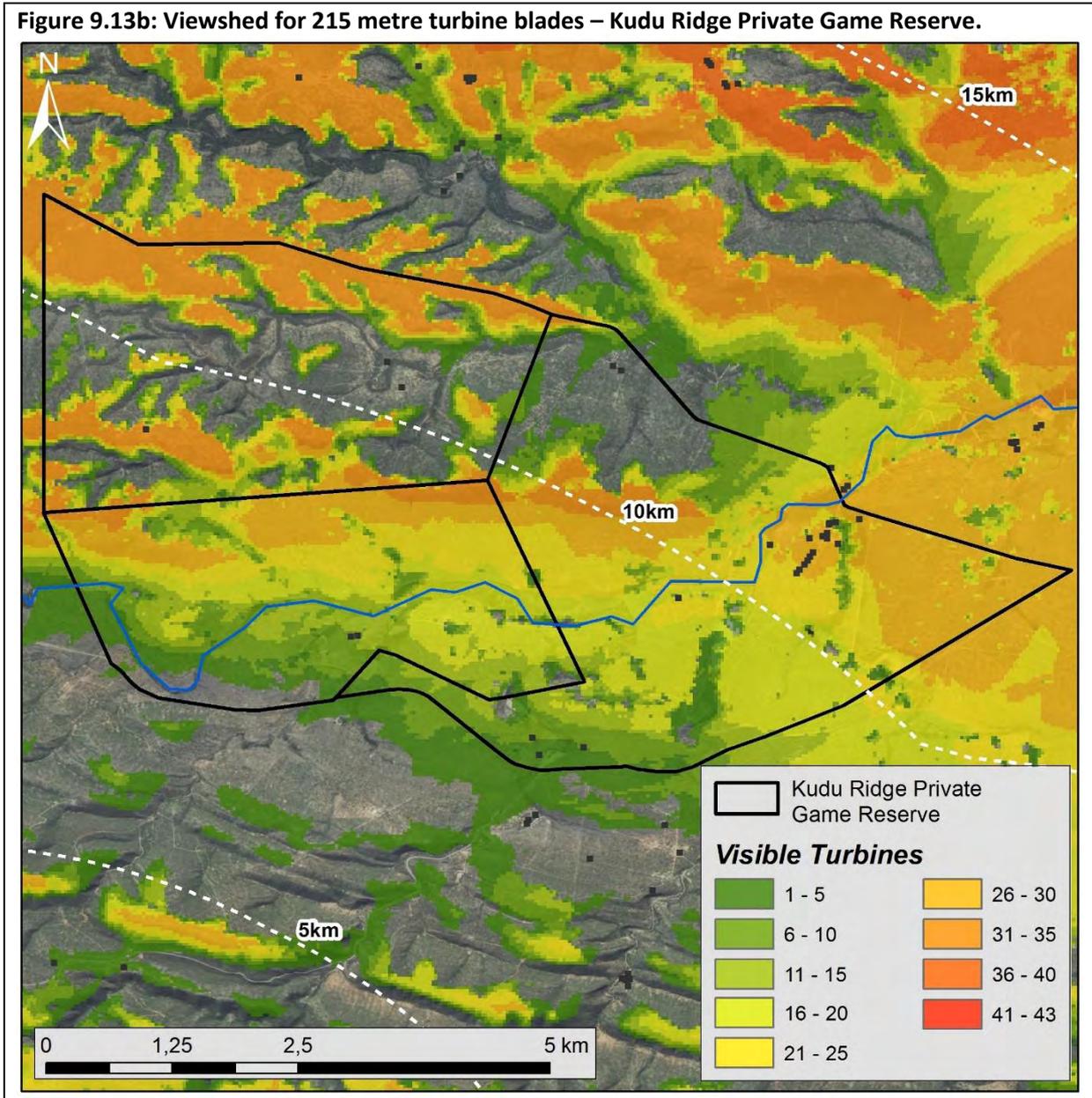


Figure 9.13b: Viewshed for 215 metre turbine blades – Kudu Ridge Private Game Reserve.



**BUCKLANDS PRIVATE GAME RESERVE**

Buckland's Private Game Reserve is an un-proclaimed privately owned reserve offers both self-catering and fully inclusive holidays in both tented camps and a lodge. Activities at the reserve include game drives, guided walks, fishing in the Great Fish River, night drives, quad biking and birdwatching.

**Observations:**

- The Bucklands Game Reserve ranges in a distance of about 17-25 km north of the project site.
- For the majority of the Reserve, no turbines will be visible as the reserve is mostly located mostly within the Fish River valley.
- There are a number of elevated ridges where all 43 turbines will be visible both at about 17 km and beyond 20 km distance.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.14a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.14b).
- The exposure to the WEF is **LOW** due to the 17 – 25 km distance from the WEF for the vast majority of the Reserve.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7 km away from the WEF.

Figure 9.14a: Viewshed for 130 metre turbine hubs – Bucklands Private Game Reserve.

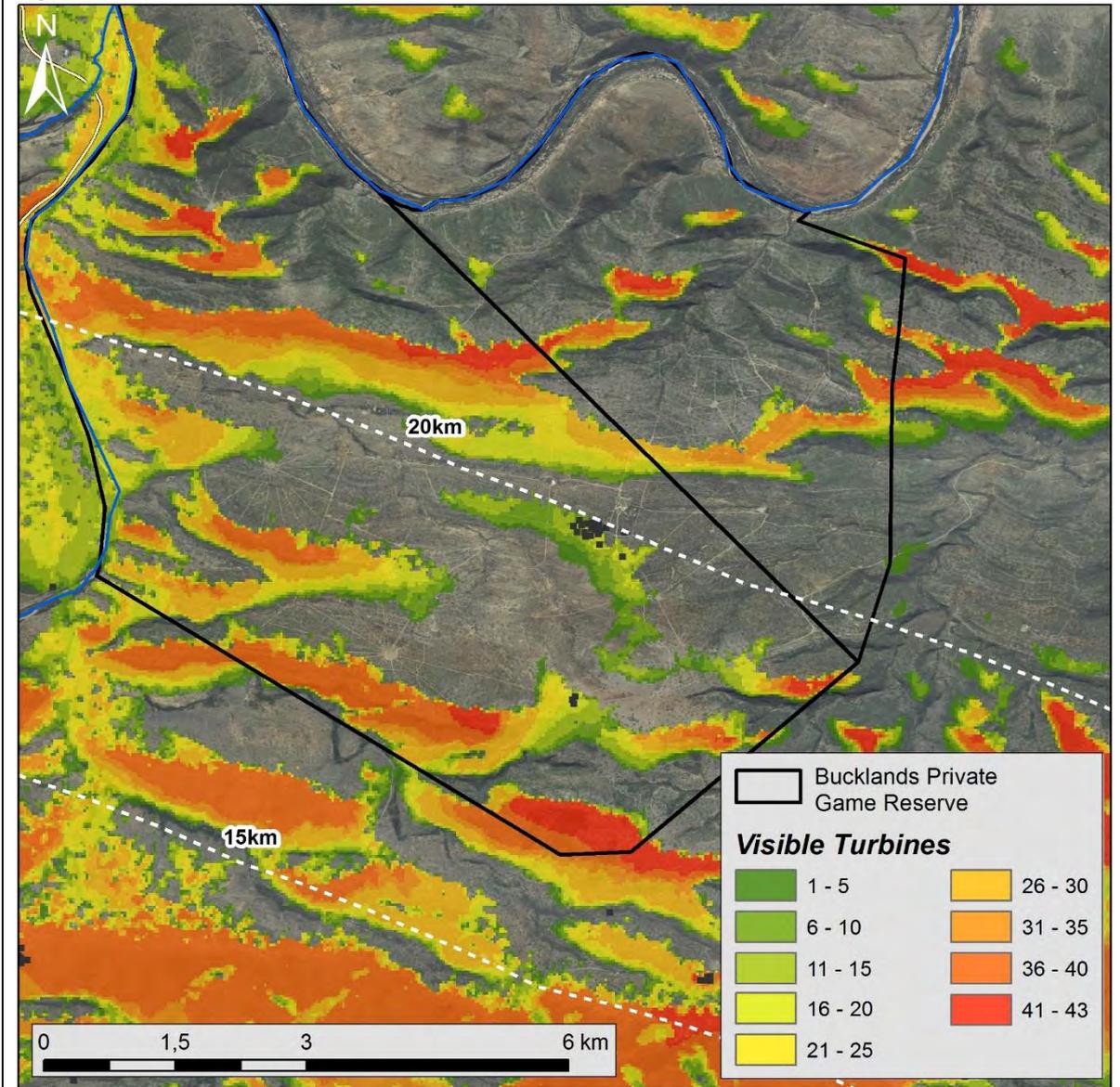
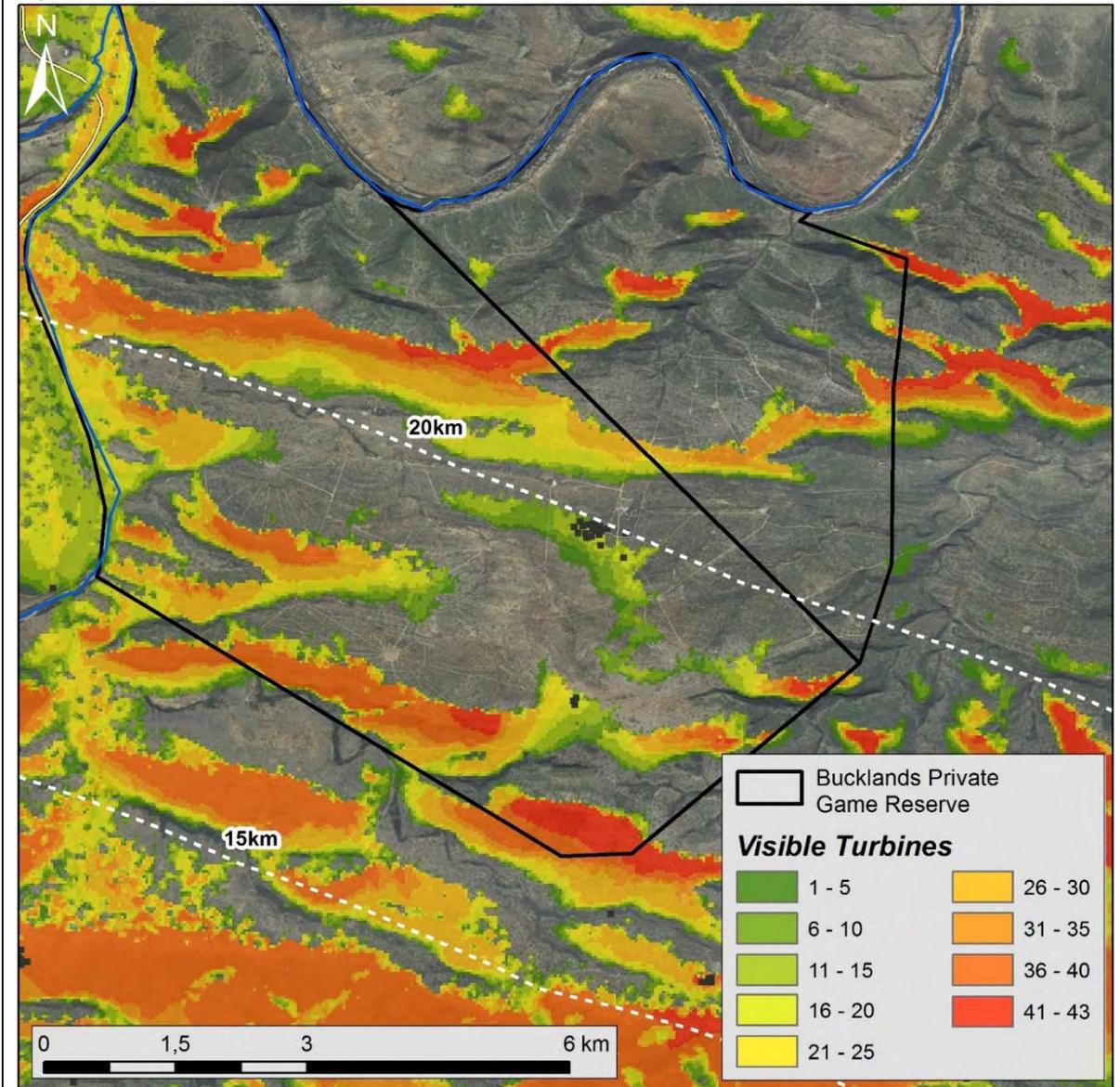


Figure 9.14b: Viewshed for 215 metre turbine blades – Bucklands Private Game Reserve.



**SALVATORE FARMS**

Salvatore Farms are a small un-proclaimed privately owned game farm located close to Bucklands Private Game Reserve along the Great Fish River.

**Observations:**

- The Salvatore Farms range in a distance of about 15-20 km north of the proposed WEF site.

The following overall conclusions are made:

- The visibility of the WEF hubs is **HIGH** – 50% (21) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.15a).
- The visibility of the WEF blades is **HIGH** – 50% (21) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.15b).
- The exposure to the WEF is **LOW** due to the 5– 20 km distance from the WEF for the vast majority of the Reserve.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7 km away from the WEF.

Figure 9.15a: Viewshed for 130 metre turbine hubs – Salvatore Farms.

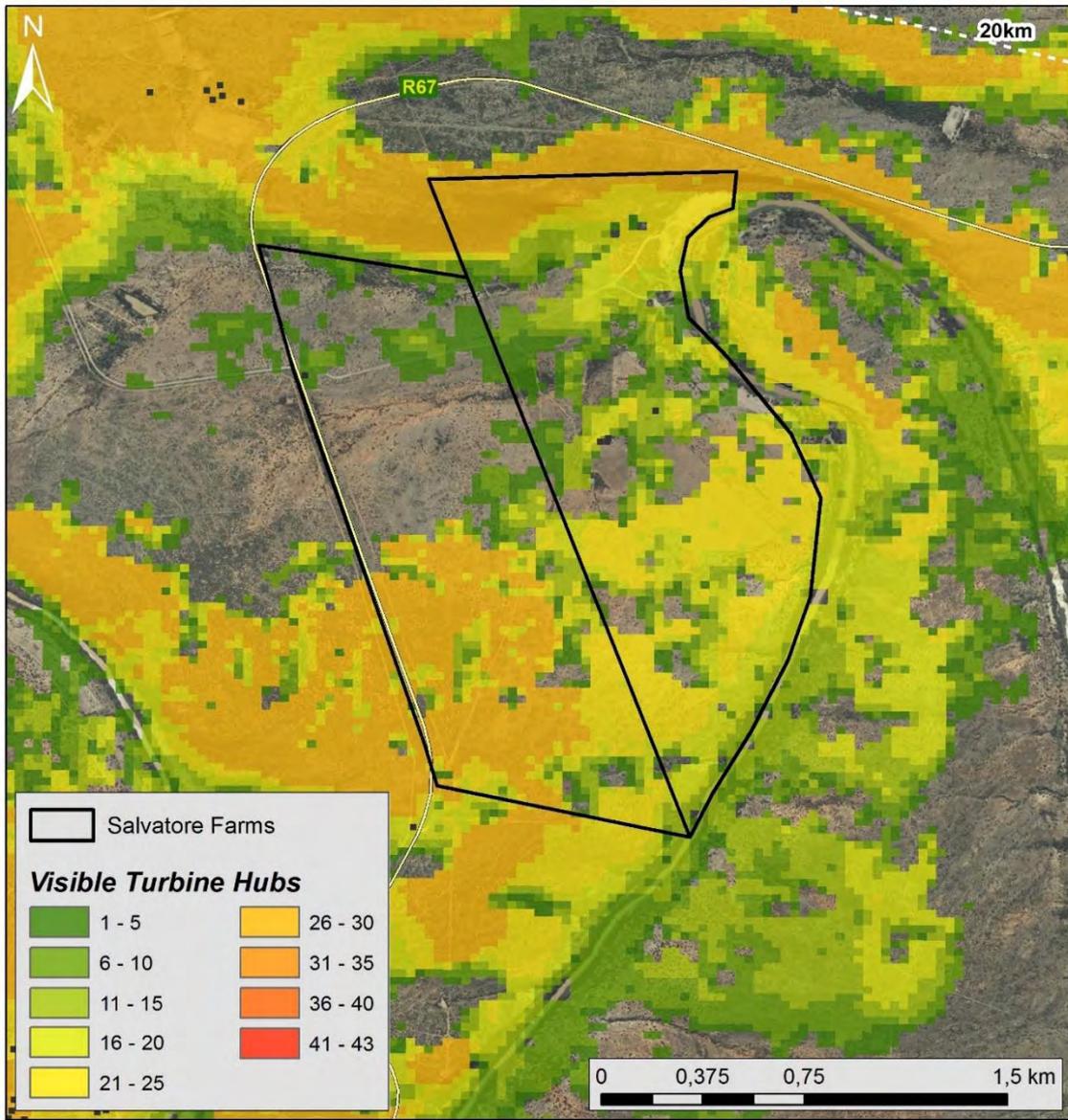
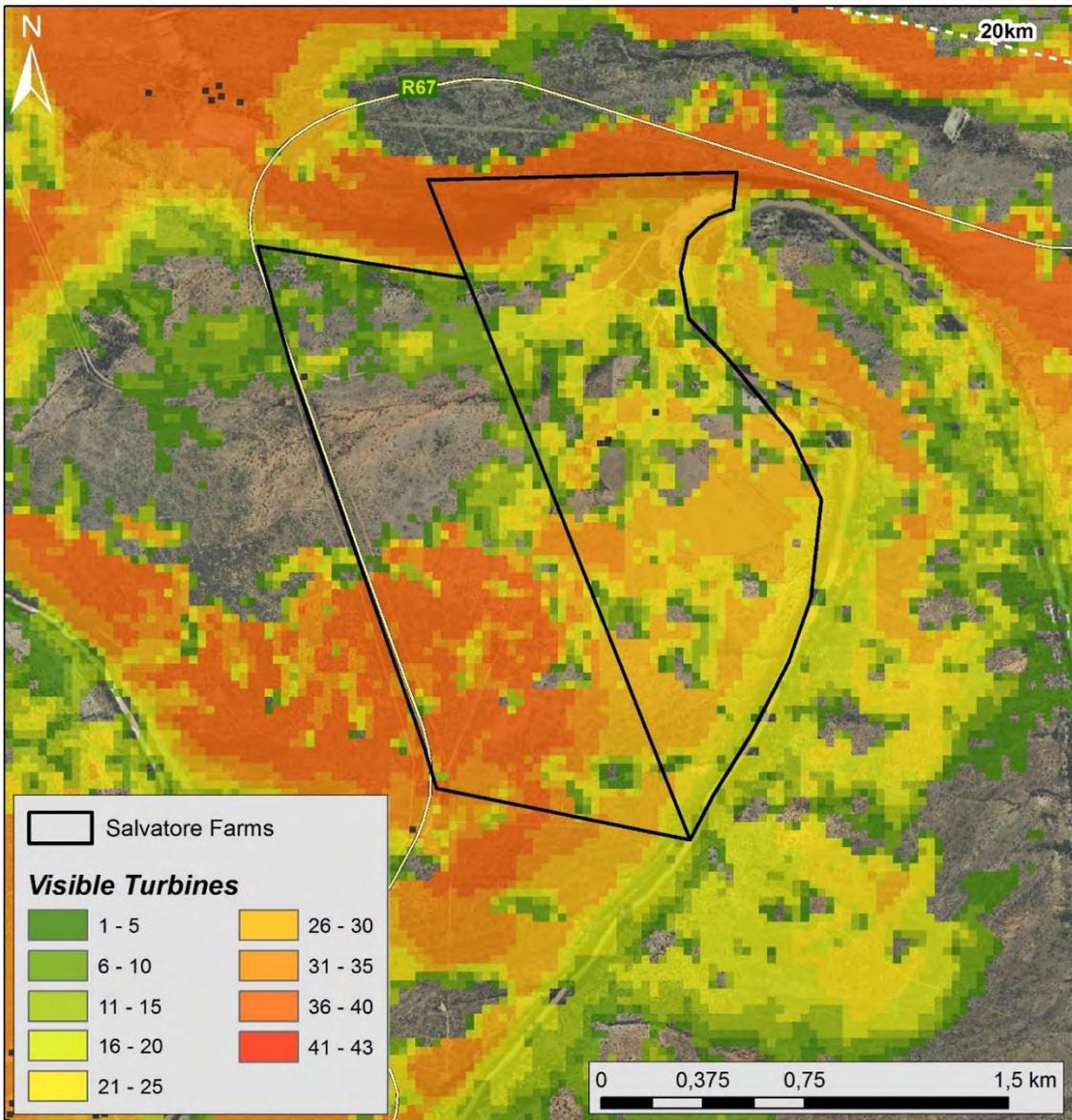


Figure 9.15b: Viewshed for 215 metre turbine blades – Salvatore Farms.



**COLERIDGE PRIVATE GAME RESERVE**

Coleridge Private Game Reserve is an un-proclaimed privately owned reserve located on the northern border of the Buffalo Kloof Nature Reserve. The reserve constitutes a portion of the Buffalo Kloof Conservation Area and is managed, from a conservation perspective, by Buffalo Kloof.

**Observations:**

- The Coleridge Game Reserve ranges in a distance of about 7-10 km south of the proposed WEF site.
- There are significant portions of the Reserve (approximately 90%) where no turbines will be visible. Similar to Buffalo Kloof, this is mainly due to the Reserve also being located in the Blaauwkrantz Valley south of the R67 ridge line which significantly visually shields the reserve.
- A higher number of turbines (1-15) will be visible on elevated locations within about a 7-10 km distance from the proposed WEF.
- There are limited locations along the northern ridge where all 43 turbine hubs and blades will be visible.

The following overall conclusions are made:

- The visibility of the WEF hubs is **LOW** – 1% (1) or more turbine hubs are visible for more than 25% of the receptor area (Figure 9.16a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.16b).
- The exposure to the WEF is **MODERATE** due to the 7 – 10 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7 km from the WEF.

Figure 9.16a: Viewshed for 130 metre turbine hubs – Coleridge Private Game Reserve.

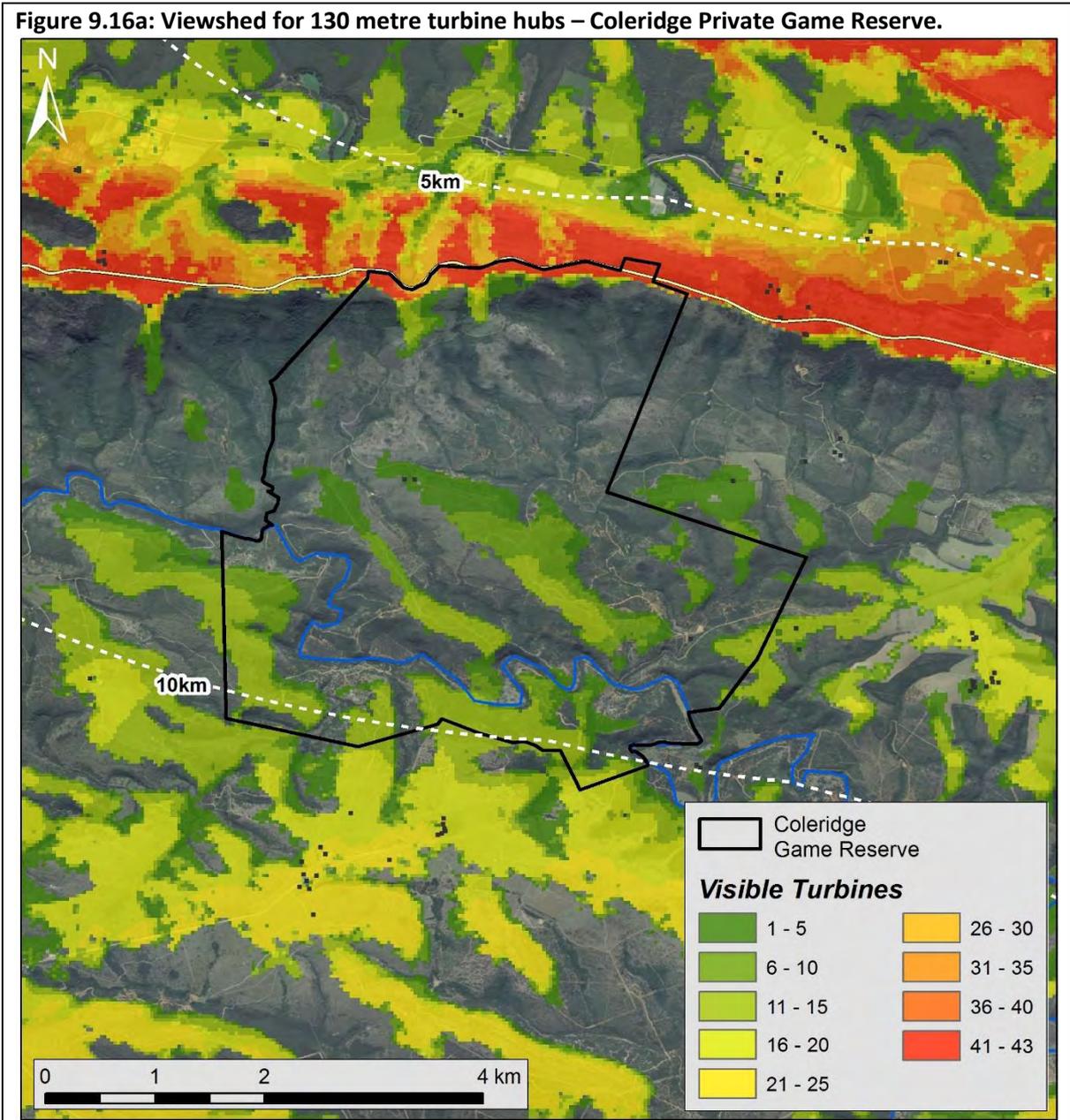
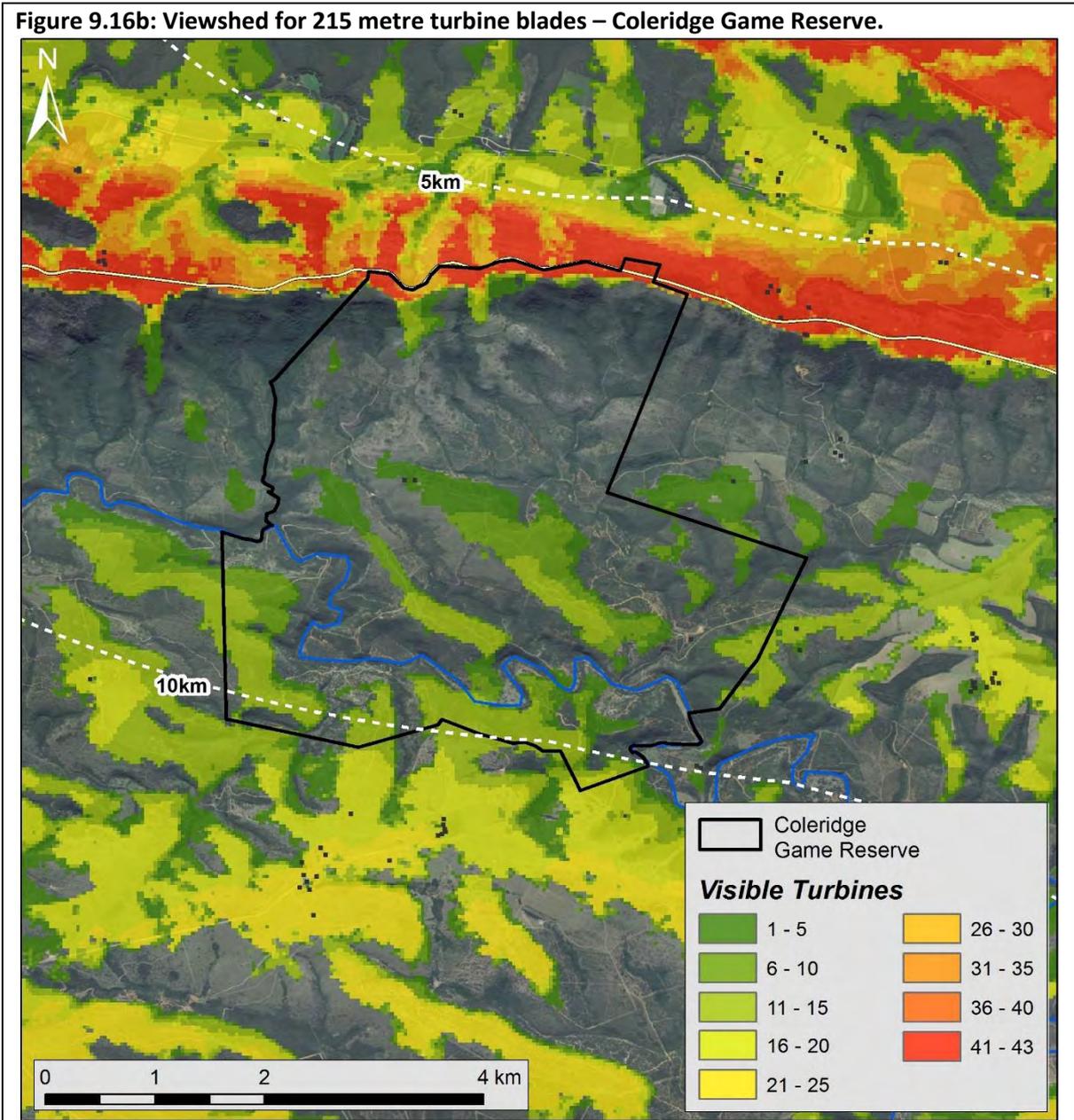


Figure 9.16b: Viewshed for 215 metre turbine blades – Coleridge Game Reserve.



**HUNTERSHOEK LODGE**

Huntershoek Lodge is an un-proclaimed privately owned game farm located along the N2 towards Peddie.

**Observations:**

- Huntershoek Lodge ranges in a distance of about 17-25 km north east of the proposed WEF site.
- No turbine hubs will be visible from the Lodge.
- Turbine blades will be visible from less than 20% of the Lodge.

The following overall conclusions are made:

- The visibility of the WEF hubs is **VERY LOW** – No turbine hubs visible (Figure 9.17a).
- The visibility of the WEF blades is **LOW** – 1% (1) or more turbine blades are visible for more than 50% of the receptor area (Figure 9.17b).
- The exposure to the WEF is **LOW** due to the 17-25 km distance from the WEF.
- The landscape sensitivity of the receptor is **LOW** due to a private reserve being > 7 km from the WEF.

Figure 9.17a: Viewshed for turbine hubs – Huntershoek Lodge.

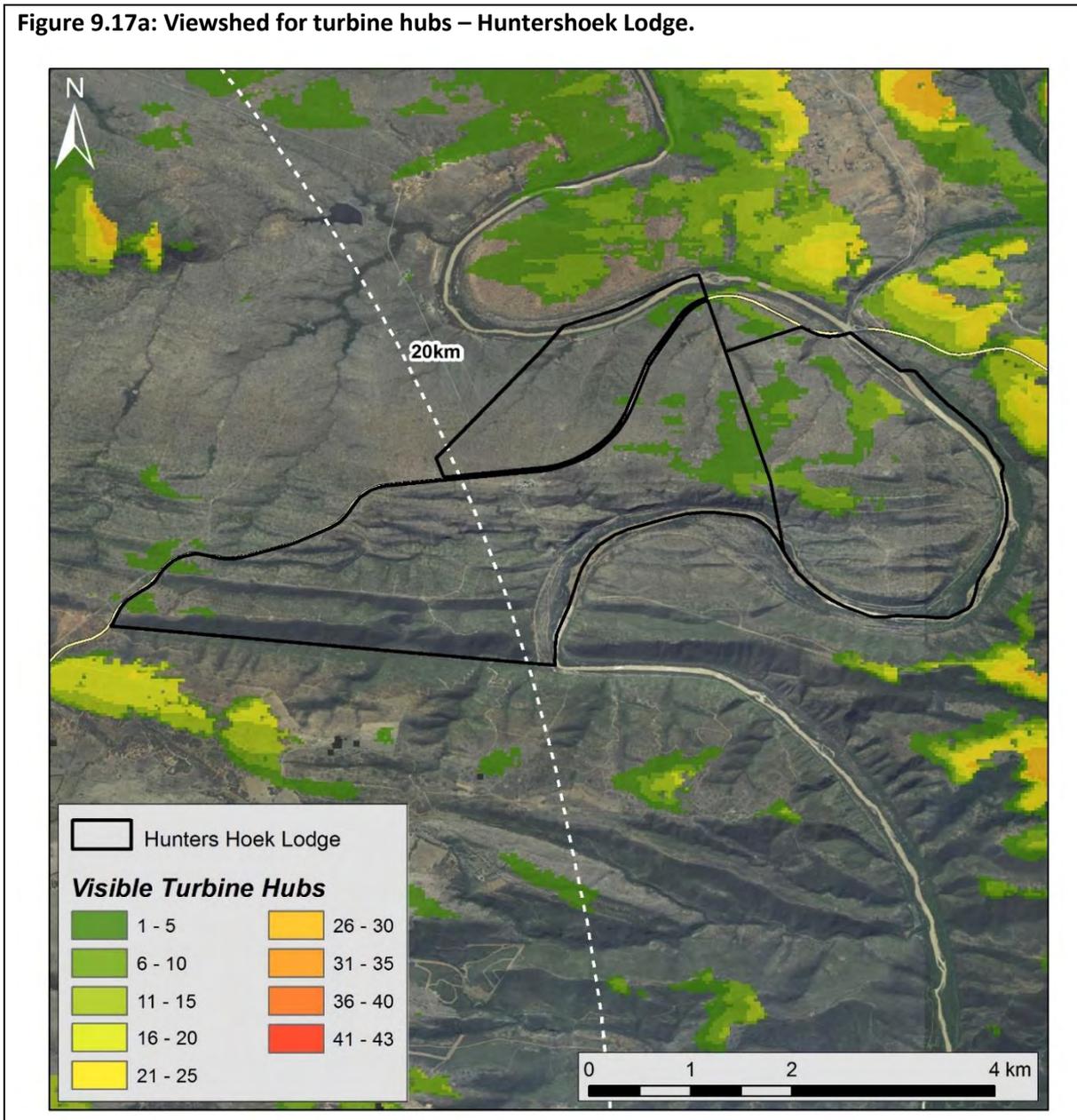
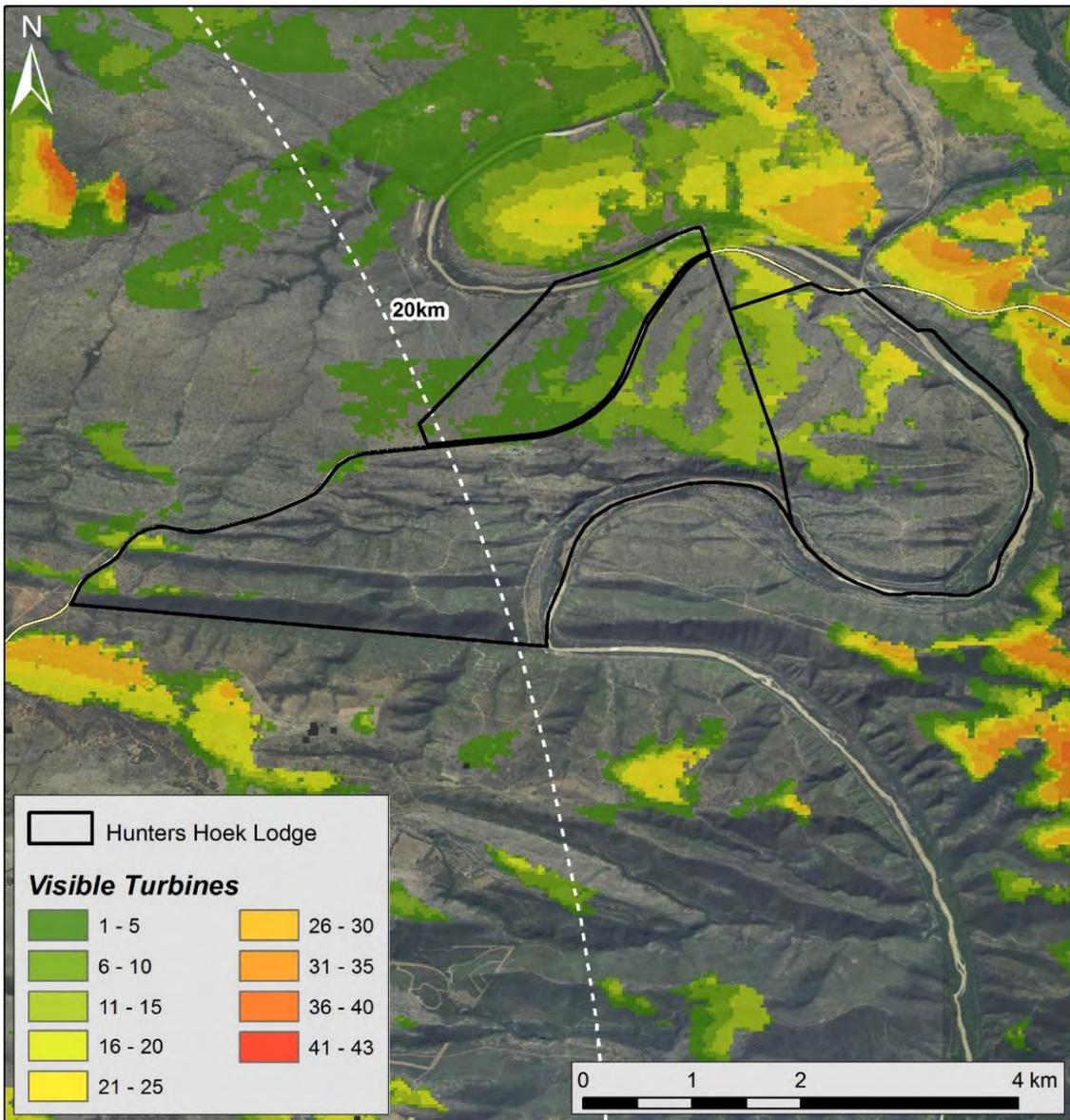


Figure 9.17b: Viewshed for turbine hubs – Huntershoek Lodge.



### 9.3. Summary of detailed viewshed analyses

Table 9.1 provides a summary of the detailed viewshed analyses of sensitive nature reserve and game reserve receptors.

**Table 9.1: Summary of the detailed viewshed analyses of sensitive nature reserve and game reserve receptors.**

RECEPTOR	Visibility of the WEF hubs	Visibility of the WEF blades	Exposure to the WEF	Landscape sensitivity
<b>PUBLIC PROCLAIMED RESERVES</b>				
Ecca Nature Reserve	MODERATE	HIGH	HIGH	HIGH
Waters Meeting Nature Reserve	LOW	LOW	MODERATE/LOW	LOW
Roundhill Oribi Nature Reserve	MODERATE	HIGH	MODERATE/LOW	LOW
Kap River Reserve	MODERATE	MODERATE	MODERATE	MODERATE/LOW
Great Fish River Nature Reserve - <b>13 to 20 km</b>	HIGH	HIGH	LOW	MODERATE/LOW
Great Fish River Nature Reserve - <b>20 to 50 km plus</b>	LOW	LOW	LOW	LOW
Beggar's Bush State Forest	LOW	LOW	HIGH	VERY HIGH
<b>PRIVATE PROTECTED ENVIRONMENT</b>				
Kwandwe Private Game Reserve North West - Indalo Protected Environment	VERY HIGH	VERY HIGH	MODERATE/LOW	MODERATE/LOW
Kwandwe Private Game Reserve West - Indalo Protected Environment	HIGH	HIGH	MODERATE/LOW	MODERATE
Buffalo Kloof Protected Environment	HIGH	HIGH	LOW	LOW
<b>PRIVATE UN-PROTECTED RESERVES</b>				
Kwandwe Private Game Reserve North West - none Indalo Protected Environment	HIGH	VERY HIGH	VERY HIGH	MODERATE to VERY HIGH
Kudu Ridge Private Game Reserve	MODERATE	HIGH	MODERATE	LOW
Bucklands Private Nature Reserve	HIGH	HIGH	LOW	LOW
Salvatore Farms	HIGH	HIGH	LOW	LOW
Coleridge Private Game Reserve	LOW	LOW	MODERATE	LOW
Hunters Hoek Lodge	VERY LOW	LOW	LOW	LOW

Note that the Great Fish River Nature Reserve has been split into two portions for analysis purposes based on distance from the WEF:

- 13 to 20 km; and
- 20 to 50 km plus.

## 10. SIMULATED VIEWS FROM SELECTED OBSERVER POINTS

The current section provides an assessment of the visual intrusiveness of the proposed Albany WEF on sensitive receptors using 3D viewpoint simulations. Viewpoint simulations have not been conducted for every sensitive receptor but the selected viewpoints are believed to be a sufficiently representative sample that provides additional information (in addition to the viewshed analyses) for assessing the severity of the visual impacts within a 30 km radius of the proposed WEF.

It should be noted that although 3D simulations do not accurately replicate the real-life situation, it does provide important visualisation input on the visibility (including numbers of turbines) and visual intrusiveness of turbines in the landscape.

Viewpoint simulations have also been conducted for daytime and night lighting. Additional night lighting simulations were included for Kwandwe and Indalo.

The following guidelines were adopted for assessing visual intrusion (Oberholzer 2005).

- High visual intrusion – results in a noticeable change or is discordant with the surroundings;
- Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable; and
- Low visual intrusion – minimal change or blends in well with the surroundings.

### 10.1. Daytime view simulations

Daytime 3D simulations were conducted for nine (9) selected observer points within the 30 km radius of the proposed Albany WEF. These included viewpoints from the boundaries of some of the game reserves to the north and south, and the main roads within the project area within a 30 km radius of the WEF. The viewpoints are shown in the Figure 9.1 below.

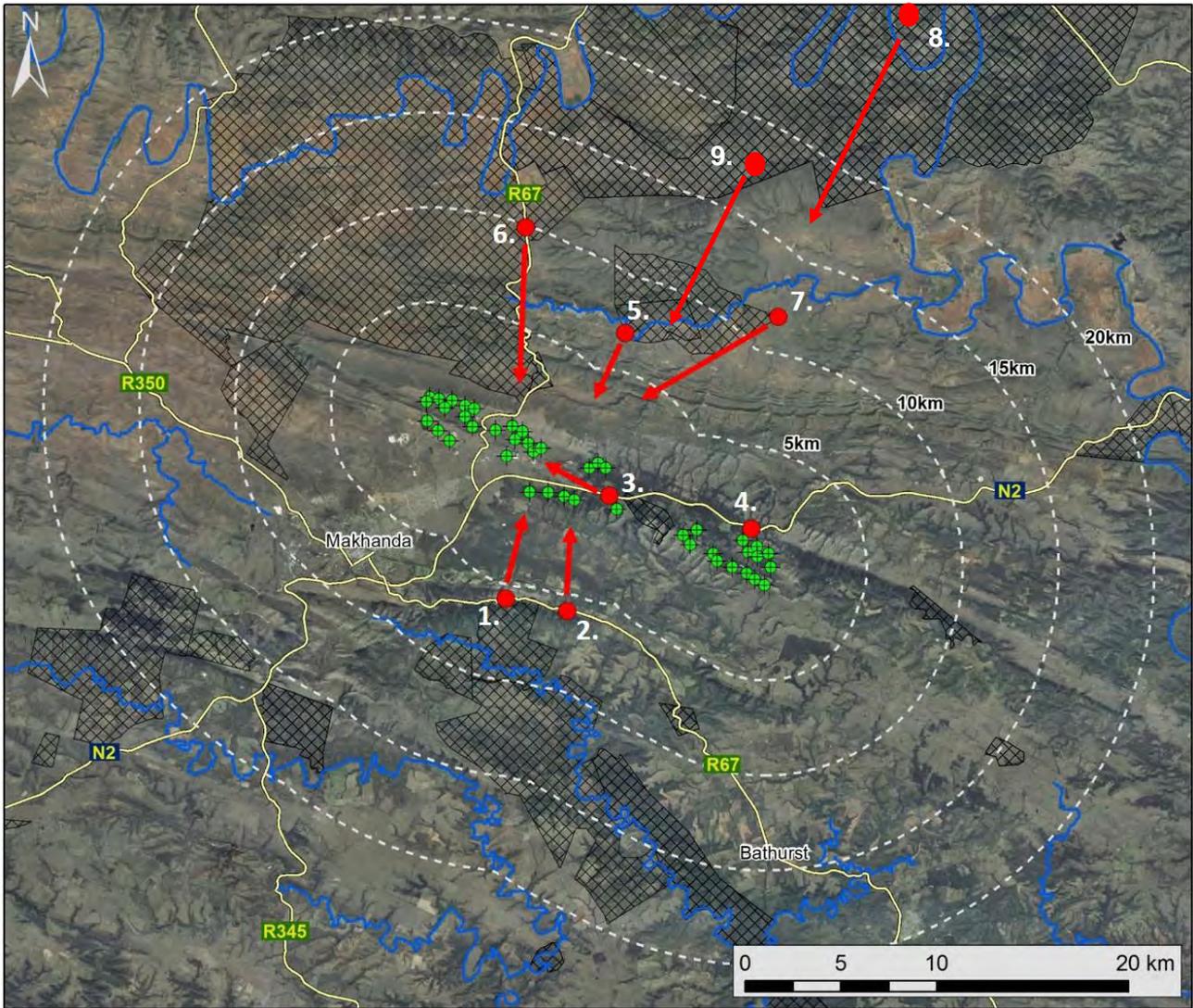


Figure 10.1: Location of 9 daytime viewpoints (red arrows) in relation to the proposed turbines (green dots).

Table 10.1: Locations of viewpoints for daytime turbine 3D simulations.

View-point	Viewpoint location	Viewpoint direction and distance to WEF
1	Near the Coleridge Private Game Reserve along the R67	North 5 km
2	East of Buffalo Kloof Private Game Reserve along the R67 but 5 km closer to WEF than the reserve	North 5 km
3	Along the N2 towards Makhanda	North west 1 km
4	Along the N2 towards Peddie	South 0.5 km
5	Kudu Ridge Game Reserve	South west 7 km
6	Kwandwe Game Reserve	South 10 km
7	East of Kudu Ridge Game Reserve	South west 12 km
8	Great Fish River Nature Reserve – Adam’s Krantz	South 30 km
9	Great Fish River Nature Reserve – Research Station	South 17 km

<p><b>Daytime Viewpoint 1</b></p>	<p><b>Coordinates:</b> 33°19'54.07"S (<i>Latitude</i>), 26°36'32.23"E (<i>Longitude</i>)</p>
<p>Viewpoint 1 shows the view looking north from the Coleridge Private Game Reserve along the R67 at a distance of about 5km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> A significant number of turbines will generally be visible from this general direction and viewpoint. However, although the turbines will be recognizable to the viewer, at a distance of 5km or more, the turbines will be relatively diminished in size. In addition, the scenic value of the landscape could not be described as pristine due to land transformation and would probably fit into a category of HIGH scenic intrusion.</p>
<div style="display: flex; flex-direction: column;"> <div style="margin-bottom: 10px;"> <p><b>A.</b></p>  </div> <div> <p><b>B.</b></p>  </div> </div>	

<p><b>Daytime Viewpoint 2</b></p>	<p><b>Coordinates:</b> 33°20'14.72"S (<i>Latitude</i>), 26°38'41.92"E (<i>Longitude</i>)</p>
<p>Viewpoint 2 shows the view looking north from the R67 close to the Buffalo Kloof Game Reserve at a distance of about 5km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Similar to viewpoint 1, a significant number of turbines will generally be visible from this general direction and viewpoint. However, although the turbines will be recognizable to the viewer, at a distance of 5km or more, the turbines will be relatively, diminished in size. In addition, the scenic value of the landscape could not be described as pristine due to land transformation and would probably fit into a category of HIGH scenic intrusion.</p>
<div style="display: flex; flex-direction: column;"> <div data-bbox="203 400 1856 906" style="border: 1px solid black; padding: 5px;"> <p style="background-color: white; padding: 2px; display: inline-block; margin-bottom: 5px;"><b>A.</b></p>  </div> <div data-bbox="203 906 1856 1351" style="border: 1px solid black; padding: 5px;"> <p style="background-color: white; padding: 2px; display: inline-block; margin-bottom: 5px;"><b>B.</b></p>  </div> </div>	

<p><b>Daytime Viewpoint 3</b></p>	<p><b>Coordinates:</b> 33°16'58.67"S (<i>Latitude</i>), 26°40'12.10"E (<i>Longitude</i>)</p>
<p>Viewpoint 3 shows the view looking north west from the N2 entering Mahkhana at a distance of about 1km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Although up to 20 turbines may be visible at certain points along the north side of the N2 entering Makhanda (i.e. mobile view receptor), turbines will be somewhat screened by vegetation and turbines further away will be diminished in size along the route. In addition, the scenic value of the landscape could not be described as pristine due to land transformation and presence of significant alien trees and shrubs such as Black Wattle, and would probably fit into a category of MODERATE scenic intrusion.</p>
<div style="display: flex; flex-direction: column;"> <div data-bbox="203 406 1816 895" style="margin-bottom: 10px;"> <p><b>A.</b></p>  </div> <div data-bbox="203 895 1816 1358"> <p><b>B.</b></p>  </div> </div>	

<p><b>Daytime Viewpoint 4</b></p>	<p><b>Coordinates:</b> 33°17'56.29"S (<i>Latitude</i>), 26°44'56.41"E (<i>Longitude</i>)</p>
<p>Viewpoint 4 shows the view looking south east from the N2 toward Frasers Camp at a distance of about 0.5 km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Relatively few (4-5) turbines will generally be visible south of the N2 towards Frasers Camp. However, the turbines will be close to the road at less than 1km and will be dominant to viewers using the N2 (but mostly mobile view receptors). In addition, although not pristine due to high incidence of alien species, such as a Black Wattle, the scenic value of the crags would fit into a higher scenic category. Overall, it is suggested that this view point would probably fit into a category of HIGH scenic intrusion.</p>
<div style="display: flex; flex-direction: column;"> <div style="margin-bottom: 10px;"> <p><b>A.</b></p>  </div> <div> <p><b>B.</b></p>  </div> </div>	

<p><b>Daytime Viewpoint 5</b></p>	<p><b>Coordinates:</b> 33°12'17.98"S (<i>Latitude</i>), 26°40'27.07"E (<i>Longitude</i>)</p>
<p>Viewpoint 5 shows the view looking south west from Kudu Ridge Game Reserve at a distance of about 7km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Few turbines will generally be visible looking south from the Kudu Ridge Game Reserve. However, the scenic value could be described as MODERATE to HIGH (but not pristine or unique) due to presence of good condition Fish Arid and Fish Valley thicket vegetation. The impact if turbines would also diminish the further away one is from the WEF from within the game reserve (up to 15km). It is suggested that this viewpoint would probably fit into a category of MODERATE scenic intrusion.</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 10%; text-align: center;"> <p><b>A.</b></p> </div> <div style="width: 80%;">  </div> <div style="width: 10%;"></div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 10%; text-align: center;"> <p><b>B.</b></p> </div> <div style="width: 80%;">  </div> <div style="width: 10%;"></div> </div>	

<p><b>Daytime Viewpoint 6</b></p>	<p><b>Coordinates:</b> 33° 9'25.28"S (<i>Latitude</i>), 26°37'20.46"E (<i>Longitude</i>)</p>
<p>Viewpoint 6 shows the view looking south from the R67 alongside the Kwandwe Game Reserve at a distance of about 10km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Up to 30 turbines will generally be visible looking south from the R67 alongside eastern boundary of the Kwandwe Game Reserve. Excluding the road itself, the scenic value could be described as MODERATE to HIGH (but not pristine or unique) due to presence of good condition Fish Arid and Fish Valley thicket vegetation. At this distance of 10km to the nearest turbine (and a further 20km away), the size and impact if turbines would be diminished. However, the impact will become greater closer to the WEF. It is suggested that this viewpoint would probably fit into a category of MODERATE to HIGH scenic intrusion depending on the distance from the WEF.</p>
<div style="display: flex; flex-direction: column;"> <div data-bbox="203 475 1848 970" style="border: 1px solid black; padding: 5px;"> <p style="background-color: white; padding: 2px 5px; margin-bottom: 5px;"><b>A.</b></p>  </div> <div data-bbox="203 978 1848 1383" style="border: 1px solid black; padding: 5px;"> <p style="background-color: white; padding: 2px 5px; margin-bottom: 5px;"><b>B.</b></p>  </div> </div>	

Daytime Viewpoint 7	Coordinates: 33°11'53.13"S ( <i>Latitude</i> ), 26°45'49.55"E ( <i>Longitude</i> )
<p>Viewpoint 7 shows the view looking south west from east of the Kudu Ridge Game Reserve at a distance of about 12km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Up to 20 turbines will generally be visible looking south west from the Kudu Game Reserve. The scenic value could be described as HIGH (but not pristine or unique) due to presence of good condition Fish Arid and Fish Valley thicket vegetation. At this distance of 12km to the nearest turbine, the size and impact if turbines would be diminished. However, the impact will become greater closer to the WEF. It is suggested that this viewpoint would probably fit into a category of MODERATE to HIGH scenic intrusion depending on the distance from the WEF.</p>
<p><b>A.</b></p> 	
<p><b>B.</b></p> 	

<p><b>Daytime Viewpoint 8</b></p>	<p><b>Coordinates:</b> 33°11'53.13"S (<i>Latitude</i>), 26°45'49.55"E (<i>Longitude</i>)</p>
<p>Viewpoint 8 shows the view looking south west from Adam's Krantz located within the Great Fish Nature Reserve at a distance of about 30km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Up to 20 turbines will generally be visible looking south west from Adam's Krantz located in the Great Fish Nature Reserve. The scenic value could be described as HIGH (but not pristine or unique) due to presence of good condition Fish Valley thicket vegetation and probably VERY HIGH relating to the scenic value of the Fish River gorge. At this distance of over 30 km to the nearest turbine, the size and impact of the turbines would be significantly diminished. It is suggested that this viewpoint would probably fit into a category of MODERATE scenic intrusion.</p>
<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div data-bbox="203 421 1473 874" style="margin-bottom: 10px;"> <p><b>A.</b></p>  </div> <div data-bbox="203 890 1473 1361"> <p><b>B.</b></p>  </div> </div>	

<p><b>Daytime Viewpoint 9</b></p>	<p><b>Coordinates:</b> 33°11'53.13"S (<i>Latitude</i>), 26°45'49.55"E (<i>Longitude</i>)</p>
<p>Viewpoint 9 shows the view looking south west from the Great Fish Nature Reserve research station at a distance of about 25km to the nearest turbine. A) Current view. B) 3D simulation of proposed WEF.</p>	<p><b>Comment:</b> Up to 20 turbines will generally be visible looking south west from the research station located in the Great Fish Nature Reserve. The scenic value could be described as HIGH (but not pristine or unique) due to presence of good condition Fish Valley thicket vegetation. At this distance of about 17 km to the nearest turbine, the size and impact if turbines would be significantly diminished. It is suggested that this viewpoint would probably fit into a category of MODERATE scenic intrusion.</p>
<div style="display: flex; flex-direction: column;"> <div style="display: flex; align-items: flex-start; margin-bottom: 10px;"> <div style="background-color: white; padding: 5px; margin-right: 10px;"><b>A.</b></div>  </div> <div style="display: flex; align-items: flex-start;"> <div style="background-color: white; padding: 5px; margin-right: 10px;"><b>B.</b></div>  </div> </div>	

**10.2. Night lighting view simulations**

Night lighting has been raised by various I&APs as a significant concern. Therefore, in addition to daytime 3D simulations provided in the draft VIA, additional 3D night lighting simulations were also conducted for 8 locations as indicated in Figure 9.2 below. Simulations include: day, dusk and night simulations of turbine lighting.

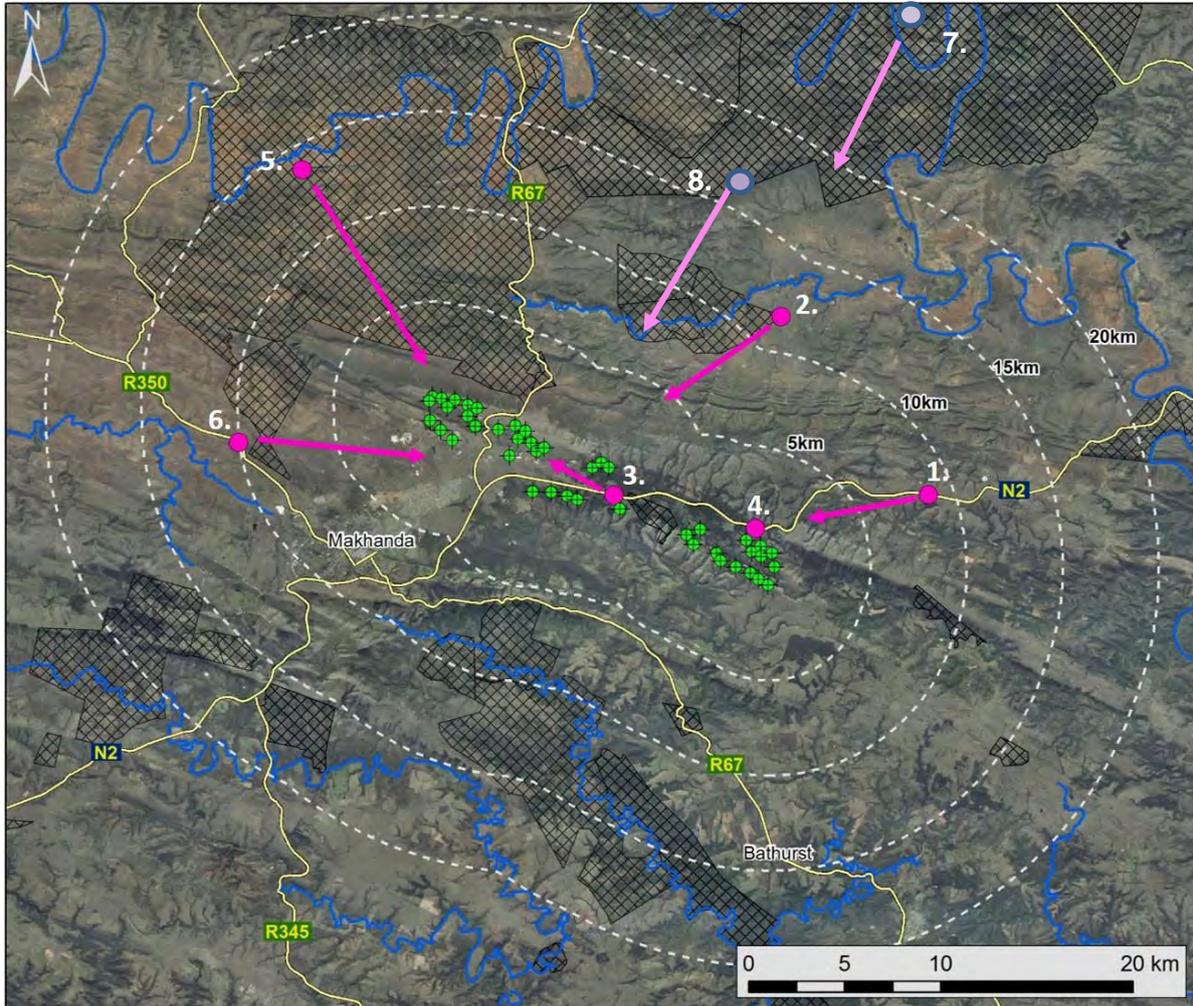


Figure 10.2: Location of 8 night lighting viewpoints (purple arrows) in relation to the proposed turbines (green dots).

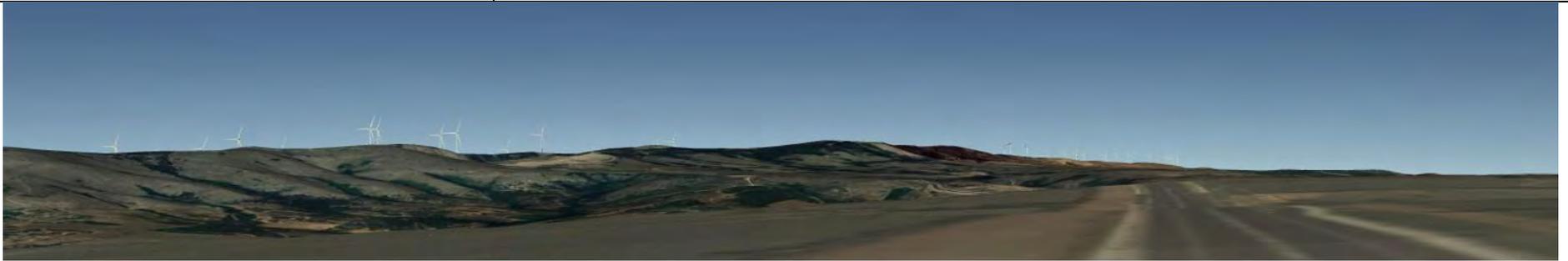
Table 10.2: Locations of viewpoints for 8 turbine night lighting 3D simulations.

Viewpoint	Night viewpoint location	Night viewpoint direction and distance to WEF
1	Along N2 close to Frasers Camp looking west	West 10 km
2	Kudu Ridge Game Reserve looking south west	North 12 km
3	N2 towards Makana looking north west	North west 1 km
4	N2 looking south east	South 0.5 km
5	Kwandwe Game Reserve looking south east	South east 15 km
6	Indalo Protected Environment looking east	East 10 km
7	Great Fish River Nature Reserve – Adam’s Krantz	South 30 km
8	Great Fish River Nature Reserve – Research Station	South 17 km

**NIGHT VIEWPOINT 1**

View along N2 close to Frasers Camp looking south west at a distance of over 10km to the nearest turbine in the eastern cluster and over 20 km to the nearest turbine in the western cluster.

**Comment:** A significant number of turbines will be visible although ranging in distance from 10 km for the eastern cluster and over 20 km for the western cluster. The turbine lighting will probably be very noticeable. It is suggested that night lighting from this viewpoint would probably fit into a category of MODERATE to HIGH scenic intrusion.



**NIGHT VIEWPOINT 2**

View from Kudu Ridge Game Reserve looking south west at a distance of over 12km to the nearest turbine.

**Comment:** Up to 20 turbines will be visible (mostly the central and western turbine clusters) ranging in distance from about 8-12 km. The turbine lighting will be very noticeable. It is suggested that night lighting from this viewpoint would probably fit into a category of MODERATE to HIGH scenic intrusion.



**NIGHT VIEWPOINT 3**

View along N2 towards Makhanda looking west.

**Comment:** Up to 20 turbines may be visible to mobile commuting receptors at certain points along a stretch of about 5 km on the north side of the N2 entering Makhanda. The turbines will be relatively close to the road at less than 1km and the lighting will be bright and obvious to the mobile road user. Vegetation comprising mixed alien trees such as wattle and gums, will also provide some visual screening. It is suggested that night lighting from this viewpoint would probably fit into a category of MODERATE scenic intrusion.



**NIGHT VIEWPOINT 4**

View along N2 moving away from Makhana looking southy east at a distance of about 0.5 km.

**Comment:** Relatively few (4-5) turbines will generally be visible to mobile commuting receptors south of the N2 towards Frasers Camp. The turbines will be close to the road at less than 1km and the lighting will be bright to the mobile road user. Vegetation comprising mixed alien trees such as wattle and gums, will also provide some visual screening. It is suggested that night lighting from this viewpoint would probably fit into a category of HIGH scenic intrusion.



**NIGHT VIEWPOINT 5**

View from middle of Kwandwe Game Reserve looking east at a distance of over 15km to the nearest turbine in the western cluster and a further 15 km to the eastern cluster (i.e. 30 km in total).

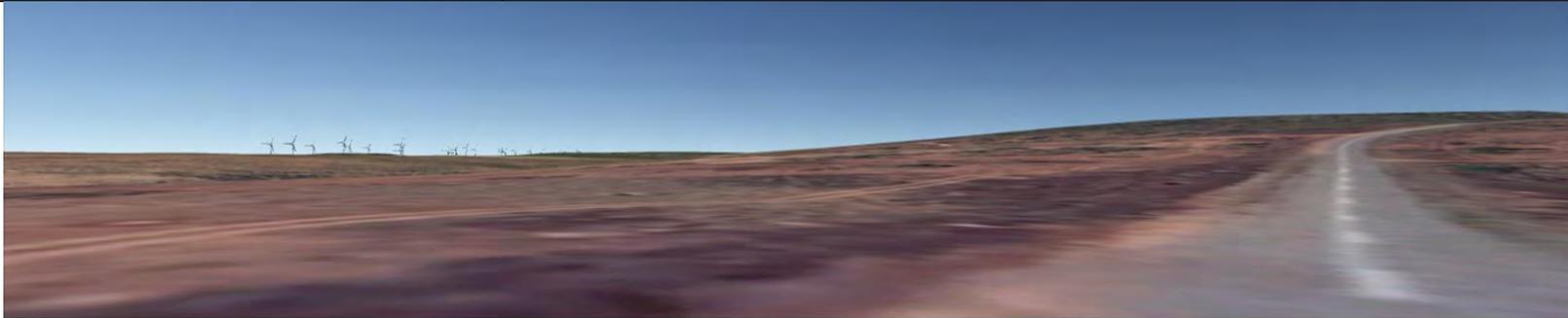
**Comment:** Lighting for between about 18-20 turbines will be visible on the skyline from the viewpoint. At a distance of over 15 km the lighting is likely to be somewhat disipated but still distinct on the skyline. It is suggested that night lighting from this viewpoint would probably fit into a category of LOW to MODERATE scenic intrusion for central and eastern clusters to HIGH scenic intrusion for the western cluster, mostly due to the sensitivity of the receptors known to occur in this area.



**NIGHT VIEWPOINT 6**

View along the R350 road west of Makhandia and Kwandwe West Indalo Protected Environment looking east at a distance of over 10 km to the nearest turbine in the western cluster.

**Comment:** Lighting for between about 20 plus turbines, located mostly in the western turbine cluster, will be visible on the skyline from the viewpoint but diminishing with distance. At a distance over over 15 km the lighting is likely to be somewhat disipated but still distinct on the skyline. It is suggested that night lighting from this viewpoint would probably fit into a fit into a category of LOW to MODERATE scenic intrusion for central and eastern clusters to HIGH scenic intrusion for the western cluster, again, mostly due to the sensitivity of the receptor.



**NIGHT VIEWPOINT 7**

View looking south west from Adam's Krantz located in the Great Fish River Nature Reserve at a distance of about 30km to the nearest turbine.

**Comment:** Up to 20 turbines will generally be visible looking south west from Adam's Krantz located in the Great Fish River Nature Reserve. At this distance of over 30 km to the nearest turbine, the impact if turbine lighting would be significantly diminished. It is suggested that night lighting from this viewpoint would probably fit into a category of LOW scenic intrusion, but could be MODERATE scenic intrusion, mostly due to the sensitivity of the receptor.



**NIGHT VIEWPOINT 8**

View looking south west from the research facility located in the Great Fish River Nature Reserve at a distance of about 30km to the nearest turbine.

**Comment:** Up to 20 turbines will generally be visible looking south west from the research station located in the Great Fish Nature Reserve. At this distance of over 30 km to the nearest turbine, the impact if turbine lighting would be significantly diminished. It is suggested that night lighting from this viewpoint would probably fit into a category of LOW scenic intrusion, but could be MODERATE scenic intrusion, again, mostly due to the sensitivity of the receptor.



**10.3. Summary of 3D visual simulations intrusion assessments**

Tables 10.3 and 10.4 provide a summary of the results of the 3D visual intrusion assessments for selected locations during the daytime and night time lighting conditions. Impacts that are considered to be HIGH are highlighted in RED.

**Table 10.3: Summary of daytime turbine visual intrusion impacts using 3D simulations for selected locations.**

Viewpoint	Daytime viewpoint location	Viewpoint direction and distance to WEF	Expected visual intrusion
1	Near the Coleridge Private Game Reserve along the R67	North 5 km	HIGH
2	East of Buffalo Kloof Private Game Reserve along the R67 but 5 k closer to the WEF than the reserve.	North 5 km	HIGH
3	Along the N2 towards Makhanda	North west 1 km	MODERATE
4	Along the N2 towards Peddie	South 0.5 km	HIGH
5	Kudu Ridge Game Reserve	South west 7 km	MODERATE
6	Kwandwe Game Reserve	South 10 km	MODERATE to HIGH
7	East of Kudu Ridge Game Reserve	South west 12 km	MODERATE to HIGH
8	Great Fish River Nature Reserve – Adam’s Krantz	South 30 km	MODERATE
9	Great Fish River Nature Reserve – Research Station	South 17 km	MODERATE

**Table 10.4: Summary of turbine night lighting visual intrusion impacts using 3D simulations for selected locations.**

Viewpoint	Night lighting viewpoint location	Night viewpoint direction and distance to WEF	Expected visual intrusion
1	Along N2 close to Frasers Camp looking west	West 10 km	MODERATE to HIGH for eastern cluster
2	Kudu Ridge Game Reserve looking south west	North 12 km	MODERATE to HIGH
3	N2 towards Makana looking north west	North west 1 km	MODERATE
4	N2 looking south east	South 0.5 km	MODERATE to HIGH
5	Kwandwe Game Reserve looking south east	South east 15 km	MODERATE to HIGH for western cluster
6	Kwandwe West Indalo Protected Environment looking east	East 10 km	MODERATE to HIGH for western cluster
7	Great Fish River Nature Reserve – Adam’s Krantz	South 30 km	MODERATE
8	Great Fish River Nature Reserve – Research Station	South 17 km	LOW to MODERATE

## 11. OTHER OBSERVATIONS

The following observations are made in addition to the viewshed and 3D simulations described in the previous sections to support the assessment of the visual impact of the Albany WEF.

### 11.1. Residents of surrounding towns and villages

The following three main residential areas are located within the Albany WEF study area.

- **Makhanda**, previously known as Grahamstown, is the largest town in the wider study area. It is located approximately 2-5km to the south-west of the proposed Albany WEF and has about 70,000 inhabitants with urban and peri-urban housing elements.
- **Bathurst** is a small town located approximately 14km South-west (NW) of the proposed Albany WEF.
- **KwaNdwanyana** is a rural village located, approximately 19km north-west of the project site, along the northern bank of the Great Fish River. The village is surrounded by commonage land that is used for a mix of agricultural purposes including crops and livestock.

Although more detailed viewshed analyses or 3D simulations were not conducted for the residential towns and village, it is suggested that the visual impacts will not be significant. Since both Bathurst and KwaNdwanyana village are both located about 20 km from the proposed Albany WEF, the overall visual impacts will be **LOW** due to reduced exposure, lower sensitivity of the receptor and intervening concealment potential.

Since the WEF is located closer to Makhanda at a distance of 2-5 km to the nearest turbines in the western cluster, it will be more noticeable to residents, particularly those within the 2 km range. However, it is suggested that the turbines will not be so noticeable from the town that it will result in a material change in the sense of place of the town or be discordant with the surroundings. It is suggested that the visual impact overall on the town will be **MODERATE**.

### 11.2. Residents on farms hosting and surrounding the wind turbines

There are a number of homesteads on the farms surrounding or hosting the proposed Albany WEF. While some of these farms have been converted to game farms or eco-tourism areas (as already described in previous sections), agriculture is still the main activity for the majority of the study area.

Views from farm homesteads and any scenic viewpoints on these farms may be affected by the WEF depending on their location within the study area and the topography of the area (which tends to be highly variable along the Botha's Hill ridge and Ecce Ridge). There also tends to be a great deal of vegetation with good screening potential along Botha's Hill ridge and the N2.

The sensitivity of residents on surrounding farms is not expected to be significant and the visual impacts of the Albany WEF on these residents, is considered to be **LOW to MODERATE** for residents living more than 5 km from the WEF and potentially **HIGH** for residents living closer than 5 km to the WEF.

Residents living closer than 5 km to the WEF would be subjected to higher visual impacts, but in most cases, these would be farms hosting the WEF and who would potentially be deriving some financial compensation for hosting turbines on their farms.

### 11.3. Passes and scenic routes

The proposed Albany WEF will be visible from Ecca Pass along the R67 entering Makhanda from the north and Botha's Hill along the N2 towards Peddie. Figure 11.1 below shows the R67 route near the Ecca Pass. Since these routes are driven by mobile commuters that are generally considered to be low sensitive receptors, it is suggested that the visual impact will be LOW or at the very most, **MODERATE**.



Figure 11.1: Image of Ecca Pass along the R67 road.

### 11.4. Main roads in the study area

Motorists using the N2 and the R67 will pass through the Albany WEF. Daytime and night lighting 3D simulations have been conducted for sections of the N2 running through the project site where MODERATE to HIGH visual intrusion is predicted. However, motorists are generally classified as **LOW** sensitivity visual receptors since they are mobile and only exposed to a landscape feature for short durations and normally are not focused on the landscape for its aesthetic value.

It should also be noted that sections of N2 and R67 have tall trees adjacent to the road which will limit views considerably. The VAC along parts of these roads is, therefore, HIGH, which will further mitigate against visual impacts.

Appropriate buffers should also be imposed along roads to further mitigate the visual impacts. It is suggested that a 200 metre buffer would be appropriate.



Figure 11.2: View on the N2 which passes through the Albany WEF.



Figure 11.3: Vegetation screening along the R67 south of the proposed site.



Figure 11.4: View towards the Albany WEF from the R67 north of the proposed site.

## 12.ASSESSMENT OF VISUAL IMPACTS

The current section provides an assessment of visual impacts of the proposed Albany WEF according to the approach recommended by Oberholzer (2005) as described in the methodology section.

### 12.1. Overall visibility of the project

The overall visibility of a development is an indication of where in the region the development will potentially be visible from. The rating is based on viewshed size only and is an indication of the extent to which a region will potentially be affected visually by the development. A high overall visibility rating does not necessarily signify a high visual impact, although it can if the region is densely populated with sensitive visual receptors.

The calculated viewshed (Figures 12.1) indicates not only where the Albany WEF will be visible from, but also indicates how many turbines will be visible from that point or area. As expected, due to the turbine heights and their location on relatively elevated land, a high number of wind turbines will be visible from a significant proportion of the study area (30 km radius of the WEF). The viewshed area for the proposed Albany WEF will be about 1,300 km<sup>2</sup>. Therefore, based on the Visual Assessment Criteria (Table 4.1 in the methodology section) the proposed Albany WEF will have a **HIGH** overall visibility within the region.

Overall visibility of the Albany WEF: **HIGH**

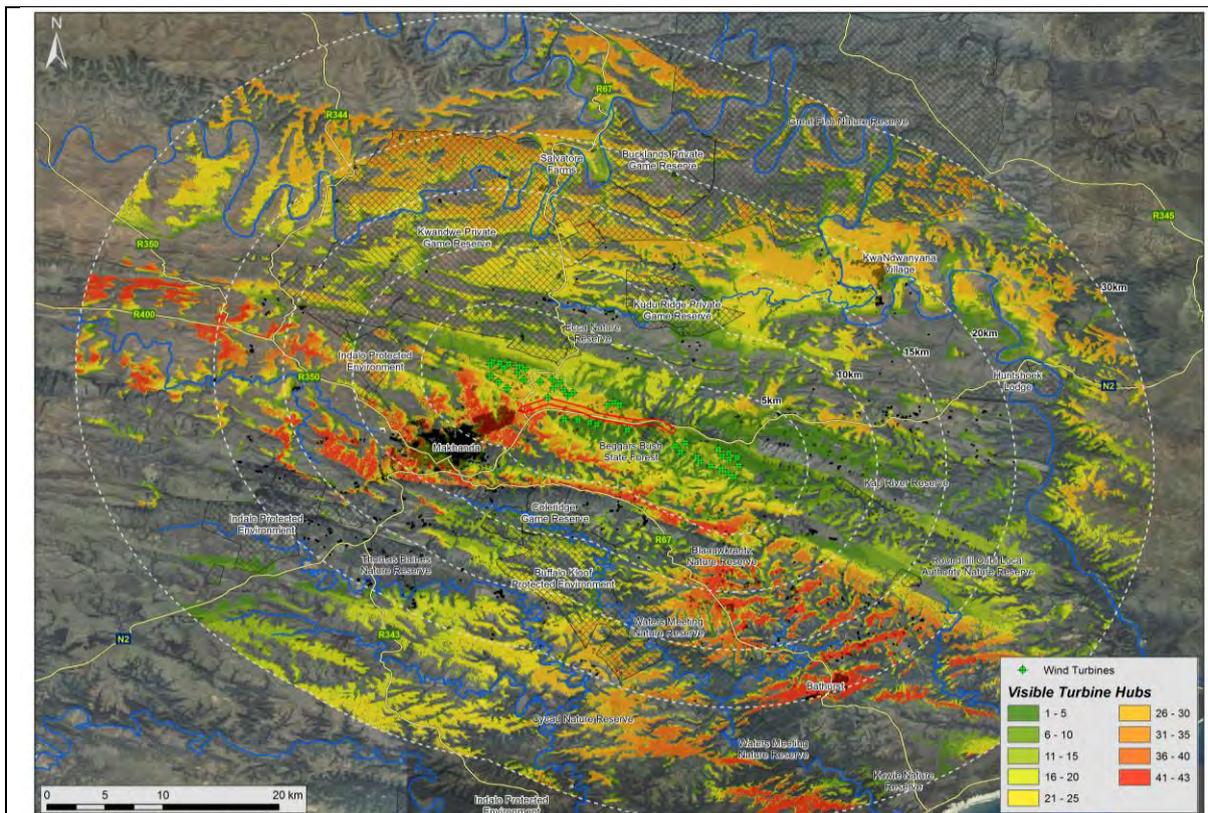


Figure 12.1: Cumulative 30 km radius viewshed for the 43 proposed Albany WEF turbines.

### 12.2. Overall visual sensitivity of the surrounding landscape

Visual sensitivity is the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement patterns.

The majority of the landscape in the study area has been transformed to some degree by historical agricultural activities. Man-made structures, activities and effects are present in most views of the landscape. While the move to conversion for some of these farms to game farms has contributed to rehabilitation landscape, the process has been slow and not always successful (Smith & Wilson 2002).

The study area to the north and north west includes a number of public nature reserves (such as the Great Fish River Nature Reserve) and private game reserves such as Kwandwe Private Game Reserve. These are sensitive receptors in the surrounding landscape. Turbines are generally located at the highest elevations in the local environment to capture the strongest possible winds and as a result have high visibility. In addition to this, the vegetation of the area has a low screening potential. However, the majority of the land in the study area consists of agricultural land, particularly to the north east and east, and towns and villages, which are a less sensitive visual receptor. Therefore, based on the Visual Assessment Criteria (Table 4.1 in the methodology section) the surrounding landscape will have a **MODERATE** overall visual sensitivity for agricultural and residential areas to **HIGH** overall visual sensitivity for the nature and game reserves.

Overall visual sensitivity of the surrounding landscape: **MODERATE to HIGH**

### 12.3. Overall visual intrusion of the project on the surrounding landscape

Visual intrusion is the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape. The following categories for overall visual intrusion are provided by Oberholzer (2005).

- High visual intrusion – results in a noticeable change or is discordant with the surroundings;
- Moderate visual intrusion – partially fits into the surroundings, but clearly noticeable; and
- Low visual intrusion – minimal change or blends in well with the surroundings.

Sense of place is defined by (Oberholzer 2005) as: 'The unique quality or character of a place... relates to uniqueness, distinctiveness or strong identity.' It describes the distinct quality of an area that makes it memorable to the observer.

Based on the Visual Assessment Criteria (Table 4.1 in the methodology section) the visual intrusion of the proposed wind farm on the surrounding landscape is rated as **HIGH**.

Overall visual intrusion on the surrounding landscape: **HIGH**

### 12.4. Visual assessment of potentially sensitive receptors

The method section provides the following set of criteria for assessing the severity of visual impacts:

- Visibility – extent of turbine hub and blade visibility to receptor
- Visual exposure – distance of receptor from WEF
- Landscape sensitivity – of receptor
- Visual intrusion – on receptor daytime
- Visual sensitivity – of receptor

- Visual intrusion – on receptor night lighting
- VAC – concealment potential

An assessment of the identified sensitive receptors is provided (based on the above criteria, for the following sensitive receptors:

- Protected areas and game reserves;
- Surrounding towns and villages;
- Residents on farms hosting and surrounding the WEF; and
- Roads passes and scenic routes; and

This assessment has also been used to inform the **severity rating** of the EIA impact rating system in Section 12.5 for inclusion in the EIA Report.

**12.4.1. Protected areas and game reserves**

Table 12.1 below provides the combined visual assessment of:

- Proclaimed public nature reserves;
- Private protected areas; and
- Private game reserves.

**Table 12.1: Visual assessment of protected areas and game reserves.**

CRITERIA	RATING	COMMENT
<b>ASSESSMENT OF PUBLIC PROCLAIMED NATURE RESERVES</b>		
<b>ECCA NATURE RESERVE</b>		
Visibility – extent of turbine hubs visible to receptor	MODERATE	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	HIGH	
Visual exposure – distance of receptor	HIGH	
Landscape sensitivity – of receptor	HIGH	
Visual intrusion – on receptor daytime	MODERATE	No 3D simulation but close distance of 4-5 km from western cluster of WEF and moderate visibility of turbines per viewshed.
Visual intrusion – on receptor night lighting	HIGH	No 3D simulation but close distance of 4-5 km from western cluster of WEF and potential impacts of night lighting.
Visual sensitivity – of receptor	HIGH	Proclaimed nature reserve
VAC – concealment potential	MODERATE/LOW	Moderate to high VAC due to partial to high screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Ecca Nature Reserve is considered to be <b>HIGH</b> due to close short distance to the western cluster in particular and the potential impact of night lighting.		
<b>WATERS MEETING NATURE RESERVE</b>		

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visibility – extent of turbine hubs visible to receptor	LOW	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	LOW	
Visual exposure – distance of receptor	MODERATE/LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but low turbine and blade visibility per viewshed and 12 – 25 km distance from WEF.
Visual intrusion – on receptor night lighting	MODERATE	No 3D simulation but low turbine and blade visibility per viewshed and 12 – 25 km distance from WEF and moderate due to potential impacts of night lighting.
Visual sensitivity – of receptor	<b>HIGH</b>	Proclaimed nature reserve
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography and vegetation.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Waters Meeting Nature Reserve is considered to be <b>LOW</b> mostly due to low visibility of turbines and blades and long distance from the WEF.		
<b>ROUNDHILL ORIBI NATURE RESERVE</b>		
Visibility – extent of turbine hubs visible to receptor	MODERATE	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>HIGH</b>	
Visual exposure – distance of receptor	MODERATE/LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but moderate turbine hub visibility per viewshed and 14-16 km distance from WEF.
Visual intrusion – on receptor night lighting	MODERATE	No 3D simulation but moderate turbine hub visibility per viewshed and 14-16 km distance from WEF and potential impacts of night lighting.
Visual sensitivity – of receptor	<b>HIGH</b>	Proclaimed nature reserve
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography and vegetation.

CRITERIA	RATING	COMMENT
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Roundhill Oribi Nature Reserve is considered to be MODERATE due to the moderate turbine hub visibility and distance from the WEF and potential impacts of night lighting.		
<b>KAP RIVER NATURE RESERVE</b>		
Visibility – extent of turbine hubs visible to receptor	MODERATE	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	MODERATE	
Visual exposure – distance of receptor	MODERATE	
Landscape sensitivity – of receptor	MODERATE/LOW	
Visual intrusion – on receptor daytime	MODERATE/LOW	
Visual intrusion – on receptor night lighting	MODERATE	No 3D simulation but moderate turbine hub and blade visibility per viewshed and 7-12 km distance from WEF and potential impacts of night lighting.
Visual sensitivity – of receptor	HIGH	Proclaimed nature reserve
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Kap River Nature Reserve is considered to be <b>MODERATE</b> due to the moderate turbine hub visibility and distance from the WEF.		
<b>GREAT FISH RIVER NATURE RESERVE at 13-20 km from WEF</b>		
Visibility – extent of turbine hubs visible to receptor	HIGH	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	HIGH	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	MODERATE/LOW	
Visual intrusion – on receptor daytime	MODERATE	
Visual intrusion – on receptor night lighting	MODERATE	Per 3D Simulation Table 10.4: Moderate due to 13-20 km distance from WEF and potential impacts of night lighting.

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual sensitivity – of receptor	<b>HIGH</b>	Proclaimed nature reserve
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Great Fish River Nature Reserve 13-20 km is considered to be <b>MODERATE</b> due to the long distance from the WEF and potential impact of night lighting.		
<b>GREAT FISH RIVER NATURE RESERVE at 20 -50 km from WEF</b>		
Visibility – extent of turbine hubs visible to receptor	LOW	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	LOW	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	Per 3D Simulation Table 10.3: Low due to 20-50 km distance from WEF.
Visual intrusion – on receptor night lighting	MODERATE	Per 3D Simulation Table 10.4: Moderate due to 20-50 km distance from WEF and potential impacts of night lighting.
Visual sensitivity – of receptor	<b>HIGH</b>	Proclaimed nature reserve
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Great Fish River Nature Reserve is considered to be <b>LOW</b> due to distance but <b>MODERATE</b> due to the potential impact of night lighting.		
<b>BEGGAR’S BUSH STATE FOREST</b>		
Visibility – extent of turbine hubs visible to receptor	LOW	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	LOW	
Visual exposure – distance of receptor	<b>HIGH</b>	
Landscape sensitivity – of receptor	<b>VERY HIGH</b>	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but very few turbines visible per viewshed.

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual intrusion – on receptor night lighting	LOW	No 3D simulation but very few turbines visible per viewshed.
Visual sensitivity – of receptor	HIGH	Proclaimed state forest
VAC – concealment potential	LOW	High VAC due to high screening by topography.

Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Beggar’s Bush State Forest is considered to be **LOW** due to few turbines visible and high VAC.

**ASSESSMENT OF PRIVATE PROTECTED ENVIRONMENTS**

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
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**Kwandwe Private Game Reserve North Indalo Protected Environment**

Visibility – extent of turbine hubs visible to receptor	HIGH to VERY HIGH for western cluster	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	HIGH to VERY HIGH for western cluster	
Visual exposure – distance of receptor	MODERATE/LOW	
Landscape sensitivity – of receptor	MODERATE/LOW	
Visual intrusion – on receptor daytime	MODERATE to HIGH	Per 3D simulation Table 10.3: Moderate to high due to diminishing intrusion with distance beyond 10 – 20 km from WEF.
Visual intrusion – on receptor night lighting	MODERATE to HIGH	Per 3D simulation Table 10.4: Moderate to high due to diminishing intrusion with distance beyond 10 – 20 km from WEF and also due to sensitivity of the receptor to night lighting.
Visual sensitivity – of receptor	HIGH	Protected environment
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography and vegetation.

Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Kwandwe Private Game Reserve Indalo Protected Environment is considered to be **MODERATE** due to distance but **HIGH** due to the conservation status of the reserve and the potential impact of night lighting, particularly from the western WEF cluster.

**Kwandwe West Indalo Protected Environment**

Visibility – extent of turbine hubs visible to receptor	HIGH for western cluster	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	HIGH for western cluster	

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual exposure – distance of receptor	MODERATE/LOW	
Landscape sensitivity – of receptor	MODERATE	
Visual intrusion – on receptor daytime	MODERATE	No 3D simulation but moderate due to 7-10 km distance from WEF for western cluster.
Visual intrusion – on receptor night lighting	<b>HIGH for western cluster</b>	Per 3D simulation Table 10.4: Moderate for central and eastern clusters due to diminishing intrusion with distance beyond 10 – 20 km from WEF but high due to sensitivity of the receptor to night lighting from the western cluster.
Visual sensitivity – of receptor	<b>HIGH</b>	Protected environment
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography.
<p>Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Kwandwe West Indalo Protected Environment is considered to be <b>HIGH</b> due to the conservation status of the reserve and the potential impact of night lighting, particularly from the western WEF cluster.</p>		
<b>Buffalo Kloof Private Protected Area</b>		
Visibility – extent of turbine hubs visible to receptor	<b>HIGH</b>	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>HIGH</b>	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	MODERATE	Per 3D simulation Table 10.3: High per simulation but moderate as reserve located 10 km distance from WEF.
Visual intrusion – on receptor night lighting	<b>HIGH</b>	No 3D simulation but high due to 10 km distance from WEF and sensitivity of the receptor to night lighting.
Visual sensitivity – of receptor	<b>HIGH</b>	Protected environment
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography and vegetation.
<p>Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Buffalo Kloof Private Protected Environment is considered to be <b>HIGH</b> due to protected environment and the potential impact of night lighting.</p>		
<b>ASSESSMENT OF PRIVATE GAME RESERVES</b>		

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
<b>Kwandwe Private Game Reserve North none Indalo Protected Environment</b>		
Visibility – extent of turbine hubs visible to receptor	<b>HIGH</b>	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>VERY HIGH</b>	
Visual exposure – distance of receptor	<b>VERY HIGH</b>	
Landscape sensitivity – of receptor	<b>MODERATE to HIGH for western cluster</b>	
Visual intrusion – on receptor daytime	<b>MODERATE to VERY HIGH for western cluster</b>	Per 3D Simulation Table 10.3: Moderate to high due to diminishing intrusion with distance beyond 10 – 20 km from WEF.
Visual intrusion – on receptor night lighting	<b>MODERATE to HIGH for western cluster</b>	Per 3D Simulation Table 10.4: Moderate to high due to diminishing intrusion with distance beyond 10 – 20 km from WEF and also due to sensitivity of the receptor to night lighting.
Visual sensitivity – of receptor	<b>MODERATE</b>	Not proclaimed or protected environment
VAC – concealment potential	<b>MODERATE/LOW</b>	Moderate to high VAC due to partial to high screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Kwandwe Private Game Reserve North none Indalo Protected Environment is considered to be MODERATE due to distance but HIGH due to the close proximity of the reserve to the WEF, and the potential impact of night lighting, particularly from the western WEF cluster.		
<b>Kudu Ridge Private Game Reserve</b>		
<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visibility – extent of turbine hubs visible to receptor	<b>MODERATE</b>	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>HIGH</b>	
Visual exposure – distance of receptor	<b>MODERATE</b>	
Landscape sensitivity – of receptor	<b>LOW</b>	
Visual intrusion – on receptor daytime	<b>MODERATE</b>	Per 3D Simulation Table 10.3: Moderate due to diminishing intrusion with distance beyond 7-12 km from WEF.
Visual intrusion – on receptor night lighting	<b>MODERATE to HIGH</b>	Per 3D Simulation Table 10.4: Moderate to high due to diminishing intrusion with distance beyond 7-12 km from WEF and also due to sensitivity of the receptor to night lighting.

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual sensitivity – of receptor	MODERATE	Not proclaimed or protected environment
VAC – concealment potential	MODERATE/LOW	Moderate to high VAC due to partial to high screening by topography and vegetation.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Kudu Ridge Private Game Reserve is considered to be <b>MODERATE</b> due to long distance and the potential impact of night lighting.		
<b>Bucklands Private Game Reserve</b>		
Visibility – extent of turbine hubs visible to receptor	<b>HIGH</b>	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>HIGH</b>	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but low due to 17-25 km distance from WEF.
Visual intrusion – on receptor night lighting	MODERATE/LOW	No 3D simulation but low due to 17-25 km distance from WEF and moderate due to potential impact of night lighting.
Visual sensitivity – of receptor	MODERATE	Not proclaimed or protected environment
VAC – concealment potential	LOW	High VAC due to high screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Bucklands Private Game Reserve is considered to be <b>LOW</b> due to distance but <b>MODERATE</b> due to the potential impact of night lighting.		
<b>Salvatore Farms</b>		
Visibility – extent of turbine hubs visible to receptor	<b>HIGH</b>	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	<b>HIGH</b>	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but moderate due to 15-20 km distance from WEF.

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual intrusion – on receptor night lighting	MODERATE	No 3D simulation but moderate due to 15-20 km distance from WEF and high due to potential impact of night lighting.
Visual sensitivity – of receptor	MODERATE	Not protected
VAC – concealment potential	MODERATE	Moderate VAC due to partial screening by topography.

Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Salvatore Farms is considered to be **LOW** due to distance but **MODERATE** due to the potential impact of night lighting.

**Coleridge Private Game Reserve**

Visibility – extent of turbine hubs visible to receptor	LOW	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	LOW	
Visual exposure – distance of receptor	MODERATE	
Landscape sensitivity – of receptor	LOW	
Visual intrusion – on receptor daytime	LOW	No 3D simulation but very few turbines visible per viewshed.
Visual intrusion – on receptor night lighting	MODERATE	No 3D simulation but very few turbines visible per viewshed but may be some impacts from night lighting.
Visual sensitivity – of receptor	MODERATE	Not proclaimed or protected environment
VAC – concealment potential	LOW	High VAC due to high screening y topography.

Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Coleridge Private Game Reserve is considered to be **LOW** due to distance but **MODERATE** due to the potential impact of night lighting.

**Huntershoek Lodge**

Visibility – extent of turbine hubs visible to receptor	VERY LOW	Per viewshed analysis Section 9 Table 9.1.
Visibility – extent of turbine blades visible to receptor	LOW	
Visual exposure – distance of receptor	LOW	
Landscape sensitivity – of receptor	LOW	

<b>CRITERIA</b>	<b>RATING</b>	<b>COMMENT</b>
Visual intrusion – on receptor daytime	LOW	No 3D simulation but very few turbines visible per viewshed.
Visual intrusion – on receptor night lighting	LOW	No 3D simulation but very few turbines visible per viewshed.
Visual sensitivity – of receptor	MODERATE	Not proclaimed or protected environment
VAC – concealment potential	LOW	High VAC due to high screening by topography.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the Huntershoek Lodge is considered to be LOW due to distance and low turbine visibility.		

The visual impacts of the Albany WEF on other proclaimed state-owned nature reserves within the study area, such as Thomas Baines and Blaauwkrantz and Nature Reserves, are considered to be LOW since either few or no turbines will be visible or they are located far from the WEF.

In addition, the visual impacts on other private protected environments within the study area, such as Indalo Protected Areas to the south west of Makhanda, are considered to be LOW since either no turbines will be visible or they are located far from the WEF.

Table 12.2 below provides a summary of the visual assessment ratings for protected areas and game reserves.

Table 12.2: Summary of visual assessment ratings for protected areas and game reserves.

Visual Receptors	Visibility – extent of turbine hubs visible to receptor	Visibility – extent of turbine blades visible to receptor	Visual exposure – distance of receptor	Landscape sensitivity – of receptor	Visual intrusion – on receptor daytime	Visual intrusion – on receptor night lighting	Visual sensitivity – of receptor	VAC – concealment potential	Overall severity of impact
<b>Provincial and Municipal Nature Reserves</b>									
Ecca Nature Reserve	MODERATE	HIGH	HIGH	HIGH	MODERATE	HIGH	HIGH	MODERATE/LOW	HIGH
Waters Meeting Nature Reserve	LOW	LOW	MODERATE/LOW	LOW	LOW	MODERATE	HIGH	MODERATE	LOW
Roundhill Oribi Local Authority Nature Reserve	MODERATE	HIGH	MODERATE/LOW	LOW	LOW	MODERATE	HIGH	MODERATE	MODERATE
Kap River Nature Reserve	MODERATE	MODERATE	MODERATE	MODERATE/LOW	MODERATE/LOW	MODERATE	HIGH	MODERATE	MODERATE
Great Fish River Nature Reserve 13-20 km	HIGH	HIGH	LOW	MODERATE/LOW	MODERATE	MODERATE	HIGH	MODERATE	MODERATE
Great Fish River Nature Reserve 20-50 km	LOW	LOW	LOW	LOW	LOW	MODERATE	HIGH	MODERATE	MODERATE/LOW
Beggars Bush State Forest	LOW	LOW	HIGH	VERY HIGH	LOW	LOW	HIGH	LOW	LOW
<b>Private Protected Environment</b>									
Kwandwe Private Game Reserve North (Indalo)	HIGH/VERY HIGH	HIGH/VERY HIGH	MODERATE/LOW	MODERATE/LOW	MODERATE/HIGH	MODERATE/HIGH	HIGH	MODERATE	MODERATE to HIGH
Kwandwe West Indalo Protected Environment	HIGH western cluster	HIGH western cluster	MODERATE/LOW	MODERATE	MODERATE	HIGH western cluster	HIGH	MODERATE	HIGH western cluster

**Visual Impact Assessment**

Visual Receptors	Visibility – extent of turbine hubs visible to receptor	Visibility – extent of turbine blades visible to receptor	Visual exposure – distance of receptor	Landscape sensitivity – of receptor	Visual intrusion – on receptor daytime	Visual intrusion – on receptor night lighting	Visual sensitivity – of receptor	VAC – concealment potential	Overall severity of impact
Buffalo Kloof Protected Environment	HIGH	HIGH	LOW	LOW	MODERATE	HIGH	HIGH	MODERATE	HIGH
<b>Private reserves and game farms</b>									
Kwandwe Private Game Reserve (non Indalo)	HIGH	VERY HIGH	VERY HIGH	MODERATE to HIGH	MODERATE/ HIGH western cluster	MODERATE/ HIGH western cluster	MODERATE	LOW	MODERATE to HIGH
Kudu Ridge Private Game Reserve	MODERATE	HIGH	MODERATE	LOW	MODERATE	MODERATE/ HIGH	MODERATE	MODERATE/ LOW	MODERATE
Bucklands Private Nature Reserve	HIGH	HIGH	LOW	LOW	LOW	MODERATE/ LOW	MODERATE	LOW	MODERATE
Salvatore Farms	HIGH	HIGH	LOW	LOW	LOW	MODERATE	MODERATE	MODERATE	MODERATE to LOW
Coleridge Private Game Reserve	LOW	LOW	MODERATE	LOW	LOW	MODERATE	MODERATE	LOW	MODERATE
Huntershoek Lodge	VERY LOW	LOW	LOW	LOW	LOW	LOW	MODERATE	LOW	LOW

**12.4.1. Surrounding towns and villages**

Table 12.3 below provides a visual assessment for surrounding towns and villages based on the sensitivity criteria.

**Table 12.3: Visual assessment of surrounding towns and villages.**

CRITERIA	RATING	COMMENT
<b>MAKHANDA</b>	Makhanda (formerly Grahamstown) is the main town in the Makana Municipal area and is located at a distance ranging from 2-5km from the proposed Albany WEF.	
Visual intrusion – on receptor	MODERATE	Most views of the turbines will probably be noticeable from within the town but not so severe to be discordant with the surroundings or to impact on the sense of place of the town.  Night lighting could have greater impacts.
Visual sensitivity – of receptor	MODERATE	A built up area with impact likely to be considered acceptable.
Visual exposure – distance of receptor	MODERATE	At a distance of 2-5km, turbines will be recognisable to viewers but not necessarily be dominant.
VAC – concealment potential	MODERATE to LOW	Generally, there will be high to moderate VAC due to partial to high screening of most turbines by topography, existing buildings, planted vegetation and infrastructure.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the town of Makhanda is considered to be <b>MODERATE</b> .		
<b>BATHURST</b>	Small town located approximately 14km South-west (NW) of the proposed Albany WEF	
Visual intrusion – on receptor	LOW	Turbines may be noticeable from within the town but not so severe to be discordant with the surroundings or to <u>impact on the sense of place of the town.</u>
Visual sensitivity – of receptor	LOW	Turbines unlikely to be highly noticeable at a distance of 15km with varied separating terrain.
Visual exposure – distance of receptor	LOW	At a distance of 15km the nearest turbines may be noticeable but not so severe to be discordant with the surroundings.
VAC – concealment potential	LOW	Generally, there will be high VAC due to high effective screening of most turbines by topography, existing buildings and planted vegetation (tall trees).
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the town of Bathurst is considered to be <b>LOW</b> .		
<b>KWANDWANYANA</b>	A rural village located, approximately 19km north-west of the project site, along the northern bank of the Great Fish River.	
Visual intrusion – on receptor	LOW	Turbines are unlikely to impact on the sense of place of the village, particularly at a distance of 19 km to the nearest turbine.

CRITERIA	RATING	COMMENT
Visual sensitivity – of receptor	LOW	Turbines unlikely to be highly noticeable at a distance of 19km and varied terrain.
Visual exposure – distance of receptor	LOW	Approximately 85% of the proposed turbines are located more than 20km from the village and the topography of the landscape screens views of the turbines from large portions of the village, and will not be particularly noticeable to the viewer.
VAC – concealment potential	LOW	There will be high VAC and effective screening by topography, dwellings and vegetation.
Conclusion: Based on the above assessment, the overall visual impact of the Albany WEF on the village of Kwandwanyana is considered to be <b>LOW</b> .		

Table 12.4 below provides a summary of the visual assessment ratings for surrounding towns and villages.

**Table 12.4: Summary of visual assessment ratings for surrounding towns and villages.**

Sensitivity feature	Visual Receptors	Visibility – extent of turbine hubs visible to receptor	Visibility – extent of turbine blades visible to receptor	Visual exposure – distance of receptor	Landscape sensitivity – of receptor	Visual intrusion – on receptor daytime	Visual intrusion – on receptor or night lighting	Visual sensitivity – of receptor	VAC – concealment potential	Overall severity of impact
Towns, villages and settlements	Makhandana	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE to HIGH	MODERATE
	Bathurst	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	LOW
	KwaNdwanyana	LOW	LOW	LOW	LOW	LOW	LOW	LOW	HIGH	LOW

**12.4.1. Roads, passes and scenic routes**

Table 12.5 below provides a summary of the overall severity visual assessment ratings for residents and farms, roads, passes and scenic routes.

**Table 12.5: Summary of the overall severity visual assessment ratings for residents and farms, roads, passes and scenic routes.**

CATEGORY	RECEPTOR	OVERALL SEVERITY OF IMPACT
National roads	N2 to Peddie and Makhandana	MODERATE – mobile commuter receptor
Scenic routes, passes and ports.	Ecca Pass	MODERATE – mobile commuter receptor
	N2 Botha’s Hill	MODERATE – mobile commuter receptor
Provincial and arterial roads.	R67 to Fort Beaufort	MODERATE – mobile commuter receptor

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CATEGORY	RECEPTOR	OVERALL SEVERITY OF IMPACT
	R67 to Port Alfred	MODERATE – mobile commuter receptor
	Committees Drift Road	MODERATE – mobile commuter receptor
Residents on farms hosting and surrounding the wind turbines	Residents on farms	MODERATE/LOW – mobile commuter receptor

## 12.5. Assessment of Impacts for EIA Reporting

The current section provides an assessment of visual impacts for inclusion in the EIA Report based on the CES EIA impact rating system provided at Appendix E.

### 12.5.1. Construction phase impacts

#### **Impact 1: Visual impact of construction activity**

##### ***Cause and comment***

There are various activities which will take place during the construction phase which may have impacts on sensitive visual receptors:

- Large areas of vegetation will need to be cleared to make way for digging of the turbine foundations, hardstand areas, substation footprints, access roads, laydown areas, workshops and storage yards.
- Construction of wind turbines will potentially draw attention if they are exposed above the skyline.
- There will be an increase in the movement of vehicles in the area: large trucks delivering supplies and construction material; graders, excavators and bulldozers; light vehicle movement around site; large trucks hauling rubble and construction waste, etc.
- Soil stockpiles and heaps of vegetation debris.
- Dust emissions from construction activity.
- Activity at night is also probable since transport of large turbine components may occur after work hours to minimise disruption of traffic on main roads.



**Figure 12.2: Construction of a wind turbine (2km distance).**

The following visual impact ratings are applicable for construction:

Impact	Effect			Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact			
Without Mitigation	Short term 1	Municipal 3	Moderate 2	Definite 4	<b>10</b>	<b>MODERATE</b>
With Mitigation	Short term 1	Municipal 3	Slight 1	Definite 4	<b>9</b>	<b>MODERATE</b>

**Mitigation measures**

The following mitigation measures are proposed:

- The construction contractor must clearly demarcate construction areas to minimise site disturbance.
- Construction of new roads must be minimised and existing roads should be used where possible.
- Clearance of vegetation must be minimised, and restoration of cleared areas should start as soon as possible.
- Erosion risks must be assessed and minimised as erosion scarring can create areas of strong visual contrast which can often be seen from long distances.
- Laydown areas and stockyards must be located in low visibility areas (e.g. valleys between ridges) and existing vegetation should be used to screen them from views where possible.
- Roads must be treated to reduce dust emissions.
- The site must be kept neat and tidy. Littering should be fined, and the ECO should organise rubbish clean-ups on a regular basis.
- Night lighting of the construction sites must be minimised within requirements of safety and efficiency. See section on lighting for more specific measures.

**12.5.2. Operational phase impacts**

**Impact 2: Impact of wind turbines on visually sensitive receptors**

***Cause and comment***

The draft Albany WEF VIA was conducted for 66 wind turbines. This has been reduced by 23 turbines to 43 turbines mostly due to concerns raised by I&APs relating to the visual intrusion of turbines. This includes the removal of 12 turbines in the western turbine cluster which are particularly visible to Kwandwe and Indalo Protected Environments in the west and north west, of which five turbines were located almost immediately adjacent to the south east boundary of Kwandwe (unprotected portion). While the remaining turbines still remain visible, this reduction in turbine numbers will reduce the density of turbines and numbers of visible turbines.

The blade tip height of the remaining 43 proposed turbines is 215m (worst case scenario) above the ground. The viewshed of the 43 wind turbines was calculated using this value.

As seen in the cumulative viewshed for the 43 Albany WEF turbines (Figures 9.1 and 9.2), turbine hubs and blades will be visible from a wide area surrounding the WEF. Notable features within the viewshed include: the towns of Makhanda, Bathurst and KwaNdwanyana, public nature reserves such as the Great Fish River Nature Reserve, private game reserves such as Kudu Ridge, Bucklands, Kwandwe, Buffalo Kloof and Coleridge, multiple homesteads, the N2 and R67 roads.

The overall severity ratings for sensitive receptors from Table 12.2 to 12.5 are applied to the EIA ratings in Table 12.6 below where the overall significance rating pre- and post-mitigation, is rated **HIGH** for:

- Kwandwe Protected Environment North Indalo Protected Environment;
- Kwandwe West Indalo Protected Environment;
- Kwandwe North None Indalo Protected Environment; and
- Buffalo Kloof Protected Environment.

**Table 12.6: Summary of EIA visual impact assessment ratings for sensitive receptors.**

Visual Receptors	Effect					Overall significance	
	Temporal scale	Spatial scale	Likelihood	Severity scale	Score	Without mitigation	With mitigation
<b>Proclaimed Public Nature Reserves</b>							
Ecca Nature Reserve	Long term 3	Municipal 3	Definite 4	High 4	14	HIGH	MODERATE
Waters Meeting Nature Reserve	Long term 3	Municipal 3	Definite 4	Low 1	11	MODERATE	MODERATE
Roundhill Oribi Local Authority Nature Reserve	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Kap River Nature Reserve	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Great Fish Nature Reserve 13-20 km	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Great Fish Nature Reserve 20-50 km	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Beggars Bush State Forest	Long term 3	Municipal 3	Definite 4	Low 1	11	MODERATE	MODERATE
<b>Private Protected Environment</b>							
Kwandwe Private Game Reserve (Indalo) North	Long term 3	Municipal 3	Definite 4	High 4	14	HIGH	HIGH
Kwandwe West Indalo Protected Environment	Long term 3	Municipal 3	Definite 4	High 4	14	HIGH	HIGH
Buffalo Kloof Protected Environment	Long term 3	Municipal 3	Definite 4	High 4	14	HIGH	MODERATE
<b>Private Non-Protected Reserves</b>							
Kwandwe Private Game Reserve North (none Indalo)	Long term 3	Municipal 3	Definite 4	High 4	14	HIGH	HIGH
Kudu Ridge Private Game Reserve	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Bucklands Private Nature Reserve	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Salvatore Farms	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Coleridge Private Game Reserve	Long term 3	Municipal 3	Definite 4	Moderate 2	12	MODERATE	MODERATE
Huntershoek Lodge	Long term 3	Municipal 3	Definite 4	Low 1	11	MODERATE	MODERATE
<b>Surrounding towns and villages</b>							
Makhana	Long term 3	Municipal 3	Probable 3	Moderate 2	11	MODERATE	LOW
Bathurst	Long term 3	Municipal 3	Probable 3	Low 1	10	LOW	LOW
KwaNdwanyana	Long term 3	Municipal 3	Probable 3	Low 1	10	LOW	LOW
<b>Other receptors</b>							
Residents on local farms	Long term 3	Localised 1	Possible 2	Moderate/Low 2	8	LOW	LOW
N2 to Peddie and Makhanda	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW
Ecca Pass	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW
N2	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW

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Visual Receptors	Effect					Overall significance	
	Temporal scale	Spatial scale	Likelihood	Severity scale	Score	Without mitigation	With mitigation
Blaauwkrantz Pass	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW
R67 to Fort Beaufort	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW
R67 to Port Alfred	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW
Committees Drift Road	Long term 3	Localised 1	Possible 2	Moderate 2	8	LOW	LOW

### ***Mitigation and management***

Other than the removal of further turbines from the Albany WEF project (in addition to the 23 turbines already removed since the draft VIA), there are no other feasible mitigation measures that will further reduce the visual intrusion of the wind turbines due to their size, height and visibility, and the lack of screening opportunities in the landscape. However, there are a number of measures and suggestions that can enhance the positive aspects of the impact.

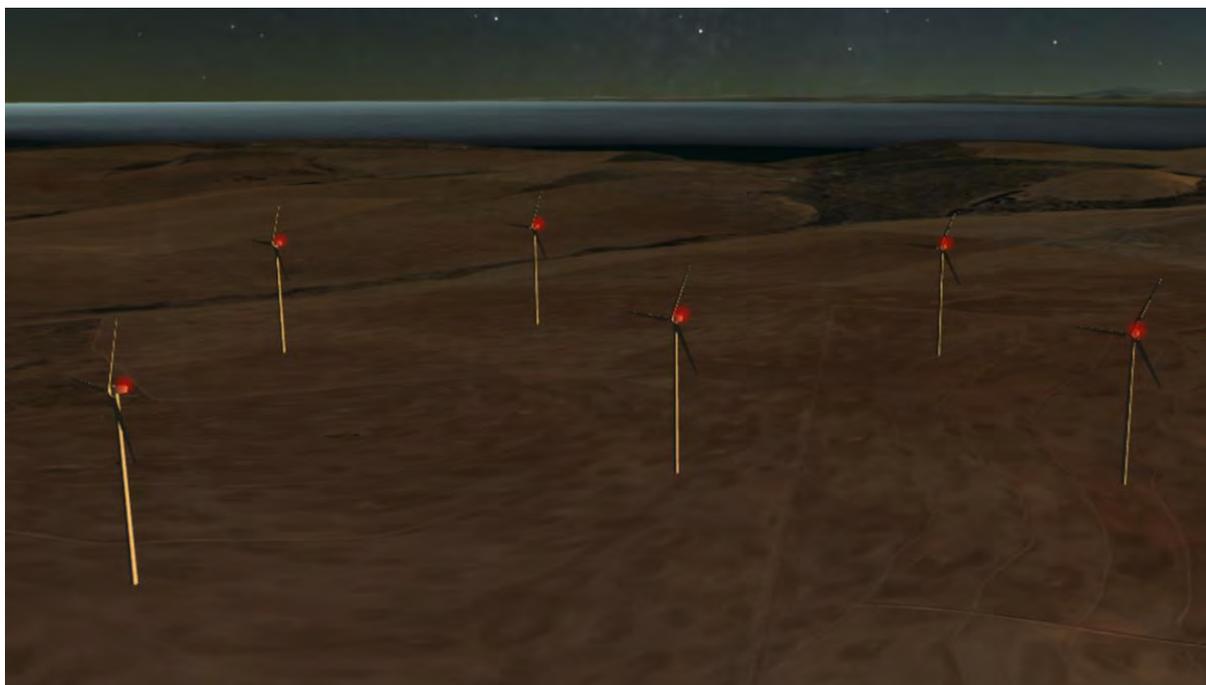
The following mitigation measures are proposed:

- There must be no wind turbines closer than 500m to a residence.
- Turbines must be properly maintained. A spinning rotor is perceived as being useful. If a rotor is stationary when the wind is blowing it is seen as not fulfilling its purpose and a negative impression is created (Gipe 1995).
- Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided.
- According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations, 1997: “Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required.”
- Lighting must be designed to minimise light pollution without compromising safety as described below (see Operations Phase Impact 3 below).

### **Impact 3: Impact of night lights on the surrounding landscape**

#### ***Cause and comment***

Wind farms are required by law to be lit at night as they represent hazards to aircrafts due to the height of the turbines. Marking of turbines depends on the wind farms layout and not all turbines need to be lit. Marking consists of a red flashing light of medium intensity (2000 candela).



**Figure 12.3: Conceptual example of nightlights on wind turbines**

Section 10.2 provides a detailed assessment of the impacts of night lighting from eight (8) locations using 3D simulations. This information was also considered in the visual assessment of potentially sensitive receptors in Section 12.4 above.

Table 12.7 below shows the viewpoints assessed that would experience HIGH visual intrusion due to night lighting. The high lighting intrusion particularly relates to the 20 turbines located in the western cluster.

**Table 12.7: Summary of night lighting visual intrusion ratings for sensitive receptors.**

Viewpoint	Night lighting viewpoint location	Night viewpoint direction and distance to WEF	Expected visual intrusion
1	Along N2 close to Frasers Camp looking west	West 10 km	MODERATE to HIGH for eastern cluster
4	N2 looking south east	South 0.5 km	MODERATE to HIGH
5	Kwandwe Game Reserve looking south east	South east 15 km	MODERATE to HIGH for western cluster
6	Kwandwe West Indalo Protected Environment looking east	East 10 km	MODERATE to HIGH for western cluster

Similarly, Table 12.8 below provides a summary of those sensitive visual receptors that will be impacted by night lighting to a HIGH degree based on expected exposure per the viewshed analyses.

**Table 12.8: Impact of night lighting on sensitive receptors.**

Visual Receptors	Visual intrusion – on receptor night lighting
<b>Provincial and Municipal Nature Reserves</b>	
Ecca Nature Reserve	HIGH
<b>Private Protected Environment</b>	
Kwandwe Private Game Reserve North (Indalo)	MODERATE/HIGH
Kwandwe West Indalo Protected Environment	HIGH western cluster
Buffalo Kloof Protected Environment	HIGH
<b>Private reserves and game farms</b>	
Kwandwe Private Game Reserve (non Indalo)	MODERATE/HIGH western cluster
Kudu Ridge Private Game Reserve	MODERATE/HIGH

Based on the above analysis, it is suggested that overall, night lighting will have a MODERATE to a HIGH visual impact on many sensitive visual receptors depending on distance from the WEF and direction of view of the WEF. The impact will be particularly HIGH from the 20 turbines in the western turbine cluster on the Kwandwe Reserve and Indalo Protected Environment to the west and north.

The following visual impact ratings are applicable for night lighting:

Impact	Effect			Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact			
Without Mitigation	Long Term 3	Municipal 3	HIGH 4	Probable 3	13	HIGH
With Mitigation	Long Term 3	Municipal 3	HIGH 4	Probable 3	13	HIGH

**Mitigation and management**

The applicant estimates that up to 50-60% of the Albany WEF turbines will need to have navigation lights (i.e. 40-50% will not require lighting). While this reduced aviation lighting will significantly mitigate the night lighting impacts, this is still subject to approval and very much dependent on the requirements of the CAA.

The following mitigation measures are proposed to reduce the impacts of night lighting:

- Aviation standards and CAA Regulations for turbine lighting must be followed.
- The possibility of limiting aircraft warning lights to the turbines on the perimeter according to CAA requirements, thereby reducing the overall impact, must be investigated.
- Other available navigation lighting technologies must be investigated such as:
  - Detection-Based Activated Lights Systems (where specific receptors turn on lights only when an aircraft is detected).
  - Pilot Activated Lights (where the aircraft pilots activate the lights manually when they are in the vicinity – system is currently not preferred by CAA).
- Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety. Motion sensitive lighting can be used for security purposes.

#### **Impact 4: Shadow Flicker**

##### ***Cause and comment***

Shadow flicker results from the shade cast by a wind turbine and its rotating blades. The shade cast by the blades, “flicker” from the point of view of a stationary observer as the blades rotate. This is most pronounced when the shadow is cast through a building’s opening, such as a window, especially when the window is one of the main sources of light in a room.

The impact of shadow flicker caused by wind turbines appears to be a minor issue in most countries where wind farms are common. There are no official regulations governing the levels of exposure to shadow flicker and it is unclear what the health risks are. Most reports on shadow flicker suggest that the threshold for a significant impact is 30 hours per year or more and many countries have adopted this as an informal regulation, following a court judgement made in Germany (EDR 2009).

England’s Companion Guide to PPS22 (2004) and Northern Ireland’s Best Practice Guidance to PPS18 (2009) state that only properties within 130 degrees either side of north of a particular turbine can be affected by shadows (Parsons Brinckerhoff, 2011). We assume therefore that the situation in South Africa is opposite i.e. only properties within 130 degrees either side of south of a particular turbine can be affected by shadows.

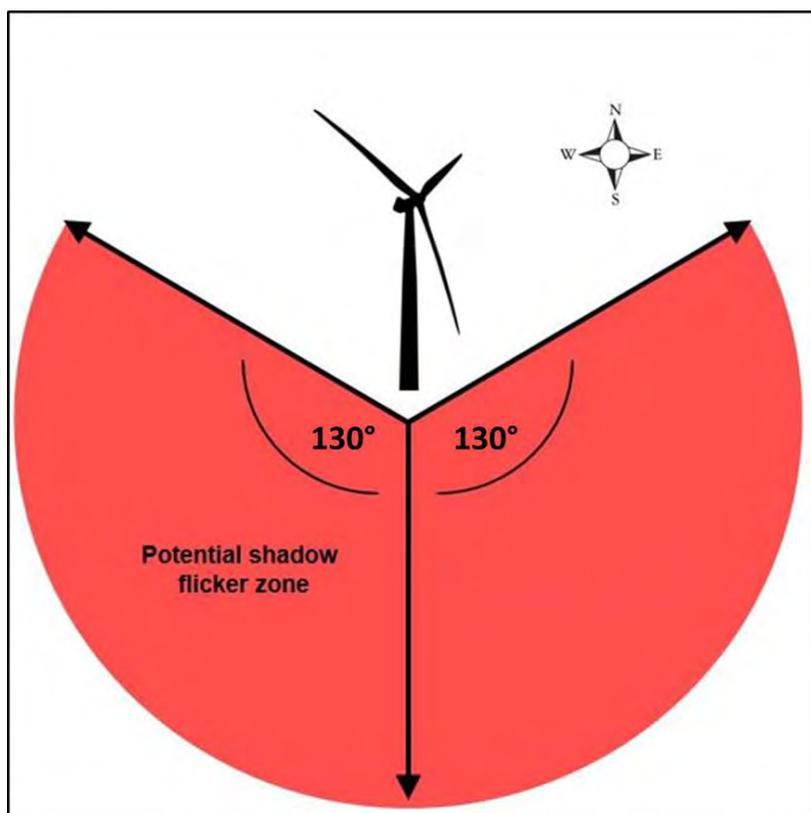


Figure 12.4: Potential shadow flicker zone in the southern hemisphere.

When considering shadow flicker, local conditions also need to be taken into account. These include:

- The latitude of the sight - Turbines at lower latitudes will cast longer shadows because the sun spends more time closer the horizon. In Australia the South Australian Planning Bulletin (2002) notes that shadow flicker is unlikely to be a significant issue at distances greater than 500 m. Australia lies within approximately the same lines of latitude as South Africa (South Africa: 22°S to 35°S; Australia: 10°S to 44°S).
- The hub height - When the hub is higher, the same shadow will be spread over a larger area resulting in a reduced shadow intensity near the turbine. The turbines to be used in the Albany WEF have a maximum hub height of 130m.
- Intervening vegetation - Vegetation may screen shadows. In the study area, vegetation is not dense or tall enough to reduce potential shadow flicker impacts. However, trees are commonly planted around homesteads.

Shadow flicker only needs to be considered relevant to buildings that are occupied most of the time: residential dwellings and places-of-work. It is not relevant to unoccupied structures, such as storage sheds. Furthermore, shadow flicker is only relevant to occupied buildings that have a window which faces the turbine. Shadow flicker cast against a wall will not impact occupants. As stated previously, it will only be a nuisance to occupants when that shadow temporarily blocks light streaming through a window, resulting in the “flicker” effect.

According to the data sets available to the author there are five buildings within 500 m and 130 degrees either side of south of a turbine. However, these buildings are either farm stores or sheds and are not residential dwellings.

Based on the above, shadow flicker is not considered to be an issue of concern with respect to the Albany WEF.

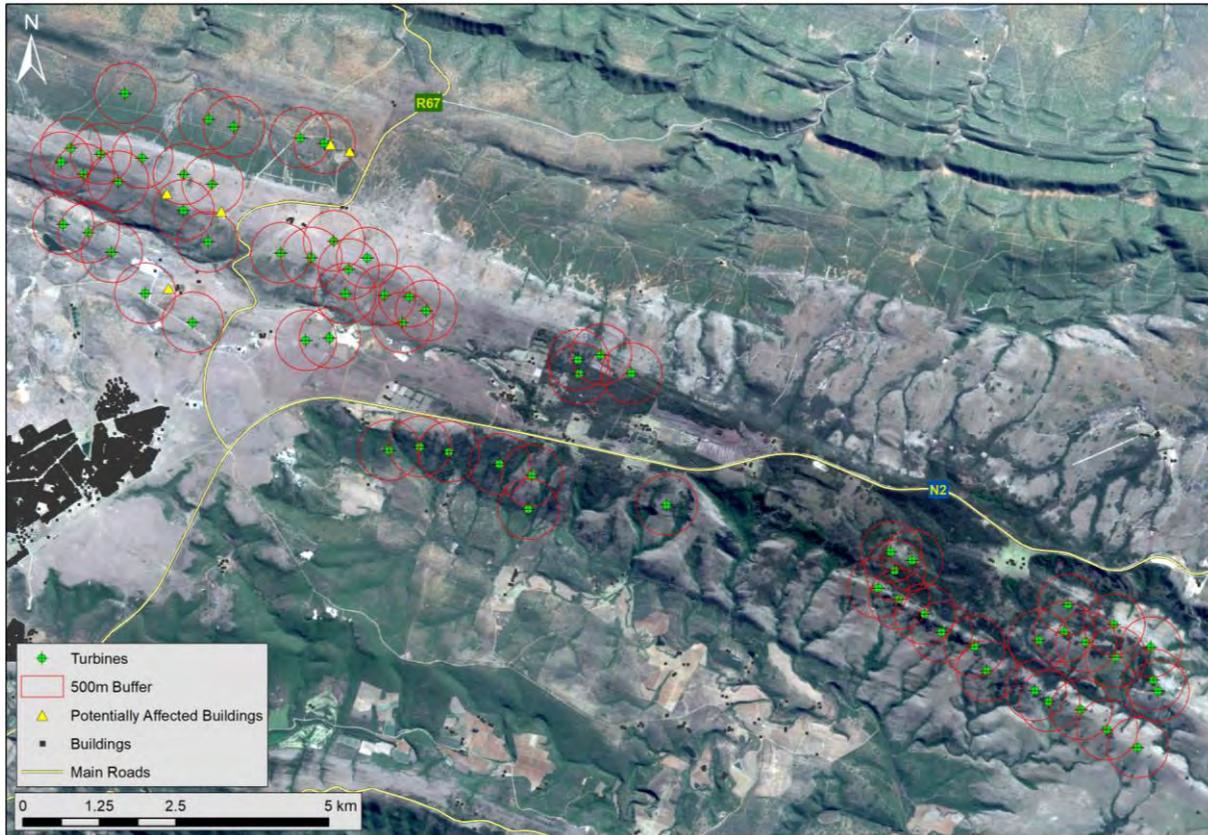


Figure 12.5: 500m buffer around the proposed turbines.

The following visual impact ratings are applicable for shadow flicker:

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Without Mitigation	Negligible. This layout will not result in shadow flicker.				NEGLIGIBLE
With Mitigation	Negligible. This layout will not result in shadow flicker.				NEGLIGIBLE

**Mitigation and management**

None proposed.

**Impact 5: Visual impact of 132kV powerline and ancillary infrastructure**

**Cause and comment**

The Albany WEF will include a 132kV powerline, of approximately 11km, and new on-site ancillary infrastructure (which includes two switching stations substation, underground 33kV cabling between the wind turbines and internal access roads). No dedicated viewshed has been generated for this infrastructure, as the range of visual exposure will fall within that of the turbines. There are very few sensitive receptors within 5km of the powerline corridor. Furthermore, there is existing electrical infrastructure in the area already.

The following visual impact ratings are applicable for the powerline and ancillary infrastructure:

Impact	Effect			Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact			
Without Mitigation	Long term 3	Localised 1	Moderate 2	Probable 3	9	MODERATE
With Mitigation	Long term 3	Localised 1	Moderate 2	Probable 3	9	MODERATE

**Mitigation and management**

The following mitigation measures are proposed:

- Clearance of vegetation must be minimised.
- Cleared areas which fall outside the powerline servitude and development footprint must be rehabilitated.

**12.5.3. Decommissioning phase impacts**

**Impact 6: Visual impact of decommissioning activity**

**Cause and comment**

Wind farms are typically designed for a 25-year life. After 25 years, the proposed Albany WEF may either be refurbished (re-powered) or decommissioned. If it is decommissioned, the impacts during the decommissioning phase will be very similar to those identified in the construction phase.

The following visual impact ratings are applicable for decommissioning:

Impact	Effect			Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact			
Without Mitigation	Short term 1	Municipal 3	Moderate 2	Definite 3	9	MODERATE
With Mitigation	Short term 1	Municipal 3	Slight 1	Definite 3	8	MODERATE

**Mitigation and management**

The mitigation measures applicable to the construction phase will be applicable during the decommissioning phase as well.

**12.5.4. Cumulative Impacts**

**Cumulative Impact 7: Visual impact of facility construction and operation**

**Cause and comment**

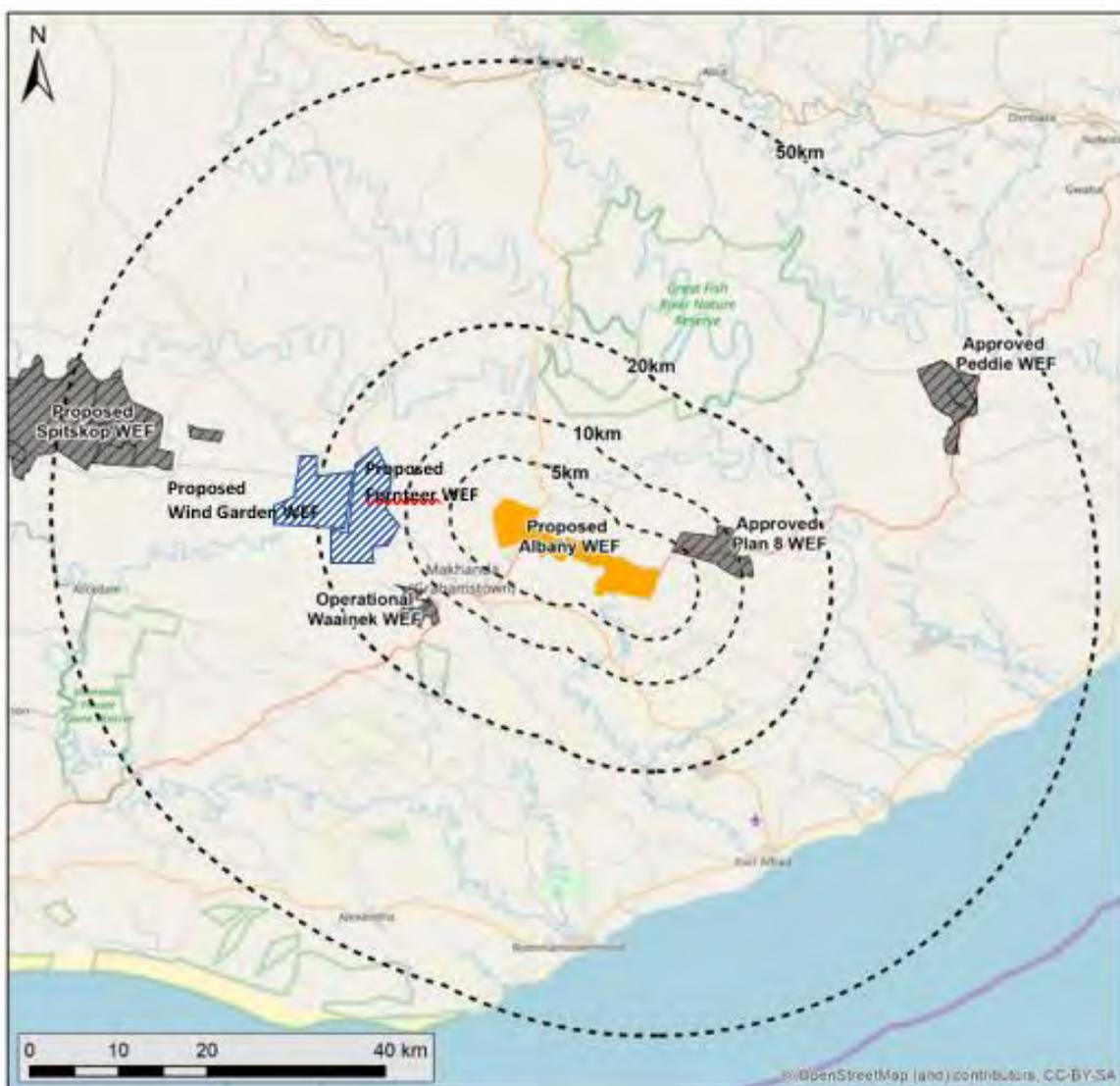
Sadler (1996) defines cumulative impacts as the “the net result of environmental impact from a number of projects and activities”.

There are a number of wind energy facilities within 50km of the Albany site that are at various stages of development. These facilities included:

- Waainek Wind Energy Facility (Operational);
- Peddie Wind Energy Facility (Approved);
- Plan 8 Wind Energy Facility (Approved);
- Fronteer Wind Farm (Proposed);
- Wind Garden Wind Farm (Proposed); and

- Spitskop WEF (Proposed).

The locations of these facilities are shown in Figure 12.6 below.



**Figure 12.6: WEF's within 50km of the Albany site**

The most significant cumulative visual impacts will come from the following WEF's which are located within 20 km of the Albany WEF:

- Operational Waainek WEF located between over 10-15 km to the south west of the Albany WEF and comprising eight (8) turbines, each with a hub height of 84m and a rotor diameter of 117m;
- Approved Plan 8 WEF located between about 5-10 km to the north east of the Albany WEF and comprising up to 22 turbines, each with a hub height of up to 91.5m and a rotor diameter of up to 117m.;
- Proposed Frontier WEF located between about 10-20 km to the west of the Albany WEF and comprising 47 turbines, each with a hub height of up to 120 m and a rotor diameter of up to 160 m; and
- Proposed Wind Garden WEF located between about 15-25 km to the west of the Albany WEF and comprising 38 turbines, each with a hub height of up to 120 m and a rotor diameter of up to 160 m.

Since turbine visibility diminishes with distance, as already described in this VIA, it is suggested that, due to the distances between the five respective wind farms, that the overall cumulative visual impacts will be **MODERATE** during the daytime. However, the impacts of night lighting could be **HIGH**, with the proposed Albany WEF making the largest contribution to the impact.

The following visual impact ratings are applicable for cumulative visual impacts:

Impact	Effect			Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact			
Without Mitigation	Long Term 3	Regional 3	High 4	Definite 4	14	HIGH
With Mitigation	Long Term 3	Regional 3	High 4	Definite 4	14	HIGH

**Mitigation and management**

There are no feasible mitigation measures that the Albany WEF is able to implement to further reduce its contribution to the cumulative impacts of the five wind farms on the surrounding areas, in addition to the 23 turbine reduction already implemented by the applicant. If each wind farm implements the mitigation measures suggested in their respective individual VIAs and Environmental Management Programmes, this will contribute to a reduction in the cumulative impact to some extent. With respect to night lighting, the mitigation measures described above with respect to reducing turbine lighting (such as radar activated lighting), will also likely contribute to a reduction in cumulative impacts.

**12.5.5. No-Go Impacts**

**No-Go Impact 8: Impact of wind turbines on sensitive visual receptors**

**Cause and comment**

The “no-go” option should always be considered as an alternative. The “No-go” alternative entails maintaining the status quo. In other words, the proposed construction of the Albany WEF would not go ahead, and current land uses would continue as before. This is not automatically the optimal environmental option, as a site may not have intrinsic conservation value. In addition, from a socio-economic perspective a development of the site may contribute to some extent to socio-economic upliftment through, for example local investment in the area. In the case of the Albany WEF, the development can have local job-creation benefits, while at the same time adding to the energy security of the region.

The following visual impact ratings are applicable for the no-go option:

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
<b>No-Go Impact 1: Impact of wind turbines on sensitive visual receptors</b>					
Without Mitigation	N/A	N/A	N/A	N/A	NONE
With Mitigation	N/A	N/A	N/A	N/A	NONE

**Mitigation and management**

Not applicable to the no-go option.

#### **12.5.6. Scale and nature of impacts**

In assessing the significance of impacts, Oberholzer (2005) recommends that beneficiaries and losers be specifically identified. In the case of the Albany WEF, the benefits are likely to be both local and regional in character.

Local benefits accrue in terms of job creation and local economic development, including short term and permanent direct jobs (e.g. construction, maintenance and security), and indirect jobs associated with supporting services.

Regional and National benefits accrue with regard to energy security (particularly in the context of national energy shortages) and national obligations for the reduction of greenhouse gas emissions.

In terms of the negative visual impacts, those affected will include residents and visitors in the area that are exposed to the proposed wind turbines and have a negative perception towards them.

## 13. CONCLUSIONS AND RECOMMENDED MANAGEMENT ACTIONS

The proposed Albany WEF is located on a large, elevated area of land that will be visible from many locations within the 30 km radius viewshed, including towns such as Makhanda, surrounding public nature reserves such as the Great Fish River Nature Reserve, and private game reserves such as Kwandwe and Indalo Protected Environments, farms and homesteads, and roads. The majority of the land surrounding the WEF is agricultural land.

The proposed Albany WEF comprises 43 turbines with the turbines arranged within a band spread out over a distance of about 20km from the most westerly turbine to the most easterly turbine. The approximate width of band ranges from about 3-4 km. The turbines are also arranged in three distinct clusters: western, central and eastern.

The current final VIA is based on a significantly reduced number of turbines compared with the first draft VIA, where 23 turbines have been removed, including 12 turbines in the western cluster that are particularly visible to the Kwandwe and Indalo Protected Environments in the west and north west of the WEF. This includes five turbines that were originally located almost immediately adjacent to the south east boundary of the unprotected portion of Kwandwe. While the remaining turbines still remain visible, this reduction in turbine numbers will reduce the density of turbines and numbers of visible turbines.

### 13.1. Approach and methodology

While there are no gazetted Regulations or guidelines indicating the methodology for VIA's, CES has adopted a systematic approach based on current best practice, particularly that of Oberholzer (2005) and also input from the REDZ SEA (2015), which we believe is objective and repeatable.

A combination of methods were used for assessing visual impacts including:

- Viewshed analyses for the project and study area as a whole, and for seven (7) public nature reserves and eight (8) private game reserves.
- 3D simulated views for selected viewer points during the daytime (9) and turbine night lighting (8).
- Field observations for assessing impacts on:
  - Surrounding towns and villages;
  - Farms hosting and surrounding the wind turbines; and
  - Various roads, passes and scenic routes in the study area.

### 13.2. Overall results

The following overall results are presented according to the visual assessment framework proposed by Oberholzer (2005).

#### ***Overall visibility of the project***

The overall visibility of a development is an indication of where in the region the development will potentially be visible from. As expected, due to the turbine heights and their location on relatively elevated land, a high number of wind turbine hubs and blades will be visible from a significant proportion of the study area (30 km radius of the WEF). The viewshed area for the proposed Albany WEF will be about 1,300 km<sup>2</sup> and will have a **HIGH** overall visibility within the region.

#### ***Overall visual sensitivity of the surrounding landscape***

Visual sensitivity is the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement patterns.

The study area to the north and north west includes a number of public nature reserves (such as the Great Fish River Nature Reserve) and private game reserves (such as Kwandwe Private Game Reserve) which are sensitive receptors in the surrounding landscape. However, the majority of the land in the study area consists of agricultural land, particularly to the north east and east, and towns and villages, which are a less sensitive visual receptors.

The majority of the landscape in the study area has been transformed to some degree by historical agricultural activities. Man-made structures, activities and effects are present in most views of the landscape. The scenic value could be described as **HIGH** (but not pristine or unique) due to presence of good condition Fish Arid and Fish Valley thicket vegetation.

It is concluded that the surrounding landscape will have a **MODERATE** overall visual sensitivity for agricultural and residential areas to **HIGH** overall visual sensitivity for the nature and game reserves.

**Turbine density**

The REDZ SEA provides turbine cluster sensitivity severity guidelines based on density limits. The following is applicable with respect to Albany WEF turbine density:

**Table 13.1: Turbine densities.**

Criteria	Albany WEF	Rating per REDZ SEA
Cluster size	43	MEDIUM – below 60m turbines threshold
Buffer between clusters	6 km If within same viewshed as another cluster	VERY HIGH – Grahamstown WEF within 4 km of Albany WEF – further assessment required
Development density		
- ha/turbine	146 ha/turbine	LOW – below 160 ha/turbine threshold
- MW/km <sup>2</sup>	4.7 MW/km <sup>2</sup>	LOW – well below 1.4 MW/km <sup>2</sup> threshold

**Integration with heritage features**

The specialist Heritage Impact Assessment (HIA) identified the following main heritage features:

- Some age artifacts at various locations;
- Several stone packed features such as kraals and farm walls at various locations; and
- Various historical ruins, such as farmhouses, other buildings and a church.

It is our opinion that the proposed Albany WEF will not have a significant detrimental impact on these heritage resources.

**Overall visual intrusion of the project on the surrounding landscape**

Visual intrusion is the level of compatibility or congruence of the project with the particular qualities of the landscape of the affected area, or its 'sense of place'. Based on the criteria for overall visual intrusion provided by Oberholzer (2005), it is concluded that the Albany WEF will have a **HIGH** overall visual intrusion since it will result in a noticeable change in the surroundings.

**Visual assessment of individual potentially sensitive receptors**

Section 12.4 of this report provides a comprehensive visual impact assessment of the individual sensitive visual receptors based on the following seven sensitivity criteria proposed by Oberholzer (2005):

- Visibility – extent of project visible to receptor

- Visual intrusion – on receptor daytime
- Visual intrusion – on receptor night lighting
- Landscape sensitivity – of receptor
- Visual sensitivity – of receptor
- Visual exposure – distance of receptor
- VAC – concealment potential

Table 13.2 below provides a summary of the visual assessment of the proposed Albany WEF on individual sensitive receptors that showed a **HIGH** overall impact severity.

**Table 13.2: Summary of HIGH overall severity visual impacts of individual sensitive receptors.**

Visual Receptors	Overall severity of impact
<b>Provincial and Municipal Nature Reserves</b>	
Ecca Nature Reserve	HIGH
<b>Private Protected Environment</b>	
Kwandwe Private Game Reserve North (Indalo)	MODERATE to HIGH
Kwandwe West Indalo Protected Environment	HIGH western cluster
Buffalo Kloof Protected Environment	HIGH
<b>Private reserves and game farms</b>	
Kwandwe Private Game Reserve (non Indalo)	MODERATE to HIGH

### 13.3. Assessment of Impacts for EIA Reporting

The following is a summary of the impact ratings for EIA reporting purposes according to the CES EIA impact rating system (Appendix E) where the severity rating is based on the overall severity of visual impacts as described above.

#### *Construction phase impacts*

Impact	Pre-Mitigation	Post Mitigation
Impact 1: Visual impact of construction activity	MODERATE	MODERATE

#### *Operational phase impacts*

Impact 2: Impact of wind turbines on visually sensitive receptors.	Overall significance	
	Pre-Mitigation	Post Mitigation
<b>Visual Receptors</b>		
<b>Proclaimed Public Nature Reserves</b>		
Ecca Nature Reserve	HIGH	MODERATE
Waters Meeting Nature Reserve	MODERATE	MODERATE
Roundhill Oribi Local Authority Nature Reserve	MODERATE	MODERATE
Kap River Nature Reserve	MODERATE	MODERATE
Great Fish Nature Reserve 13-20 km	MODERATE	MODERATE
Great Fish Nature Reserve 20-50 km	MODERATE	MODERATE
Beggars Bush State Forest	MODERATE	MODERATE
<b>Private Protected Environment</b>		
Kwandwe Private Game Reserve (Indalo) North	HIGH	HIGH
Kwandwe West Indalo Protected Environment	HIGH	HIGH

Buffalo Kloof Protected Environment	HIGH	MODERATE
<b>Private Non-Protected Reserves</b>		
Kwandwe Private Game Reserve North (none Indalo)	HIGH	HIGH
Kudu Ridge Private Game Reserve	MODERATE	MODERATE
Bucklands Private Nature Reserve	MODERATE	MODERATE
Salvatore Farms	MODERATE	MODERATE
Coleridge Private Game Reserve	MODERATE	MODERATE
Huntershoek Lodge	MODERATE	MODERATE
<b>Surrounding towns and villages</b>		
Makhana	MODERATE	LOW
Bathurst	LOW	LOW
KwaNdwanyana	LOW	LOW
<b>Other receptors</b>		
Residents on local farms	LOW	LOW
N2 to Peddie and Makhanda	LOW	LOW
Ecca Pass	LOW	LOW
N2 along Botha's Hill	LOW	LOW
R67 to Fort Beaufort	LOW	LOW
R67 to Port Alfred	LOW	LOW
Committees Drift Road	LOW	LOW

Impact	Pre-Mitigation	Post Mitigation
Impact 3: Impact of night lights on the surrounding landscape	MODERATE to HIGH	MODERATE to HIGH
Impact 4: Shadow flicker	NEGLIGIBLE	NEGLIGIBLE
Impact 5: Visual impact of 132kV powerline and ancillary infrastructure	MODERATE	MODERATE

**Decommissioning phase impacts**

Impact	Pre-Mitigation	Post Mitigation
Impact 6: Visual impact of decommissioning activity	MODERATE	MODERATE

**Cumulative Impacts**

Impact	Pre-Mitigation	Post Mitigation
Cumulative Impact 1: Visual impact of facility construction and operation	HIGH	HIGH

**No-Go Impacts**

Impact	Pre-Mitigation	Post Mitigation
No-Go Impact 1: Impact of wind turbines on sensitive visual receptors	NONE	NONE

In assessing the direct impacts to visual resources, it has been recognised that, although the lifespan of the project is likely to extend for 20-25 years, all of the components of the superstructures can be removed on decommissioning, after which the landscape will be rehabilitated back to a near natural state. This means that although the proposed facility will undoubtedly have an impact on the visual resources of the area, it does not represent a completely irreversible loss of scenic resources.

#### 13.4. Concluding Statement

According to Oberholzer (2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

- Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
- Non-compliance with conditions of existing Records of Decision.
- Impacts that may be evaluated to be of high significance and that are considered by stakeholders and decision-makers to be unacceptable.

Overall, the visual impacts of the Albany WEF range from **LOW** for many receptors (either due to low sensitivity of receptors or distance from the WEF), to **HIGH** for other more sensitive receptors such as formally protected nature reserves and game farms.

Based on the analyses, visual impacts are considered to be **MODERATE** to **HIGH** for the following four sensitive visual receptors, particularly to the closer western turbine cluster:

- Kwandwe Private Game Reserve (Indalo);
- Kwandwe West Indalo Protected Environment;
- Buffalo Kloof Protected Environment; and
- Kwandwe Private Game Reserve (none Indalo).

The **MODERATE** to **HIGH** rating is due to the diminishing impact with increasing distance from the WEF for the four receptors with the higher rating being for portions of the properties located closer to the WEF. Night lighting will in particular, contribute to the **HIGH** impact and every effort should be made to minimise turbine lighting requirements.

There are many other receptors including public nature reserves and private game farms, farms, towns and villages, roads, etc. where the impacts will be **LOW** to **MODERATE** mostly due to low receptor sensitivity, distance and potential screening mostly due to the varied topography, particularly in the region of the Ecca Pass/Ridge to the north of the WEF.

The Albany WEF will have a **HIGH** visual impact on the landscape. However, this impact should be considered within the context of the following:

- The wind farm will not be a permanent development (i.e. 20-25 years life span), after which the turbines and other superstructure will be removed on decommissioning, failing which a new Environmental Authorization will need to be secured;
- The landscape can be restored through rehabilitation after decommissioning;
- Although limited, certain recommended measures can be implemented to mitigate the impacts to some extent such as radar activated lighting;
- The landscape of the immediate study area (farms on which turbines will be located) is not pristine or of very high scenic value; and
- The wind farm is partially situated within and adjacent to a Renewable Energy Development Zone (REDZ 3 - Cookhouse) and adjacent to the already approved Grahamstown Wind Farm.

While the Albany WEF will have high negative visual impacts, benefits will also accrue in terms of job creation and local economic development, and in terms of energy security (particularly in the context of national energy shortages) and national obligations for the reduction of greenhouse gas emissions.

Based on the results of the current VIA, it is our opinion that even though the Albany WEF will have **HIGH** visual impacts on certain private game reserves and Protected Environments, the proposed Albany WEF should be approved provided that the proposed recommended mitigation measures are included as conditions in the Environmental Authorisation, particularly those relating to reducing night lighting impacts.

## 14. REFERENCES

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## APPENDIX A - REQUIREMENTS FOR SPECIALIST REPORTS

Appendix 6 of the Environmental Impact Assessment Regulations of 2014 (as amended in 2017), specifies the requirements for specialist reports as follows.

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;
  - (b) a declaration that the specialist is independent in a form as may be specified by the competent authority;
  - (c) an indication of the scope of, and the purpose for which, the report was prepared;
  - (cA) an indication of the quality and age of base data used for the specialist report;
  - (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
  - (d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;
  - (e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;
  - (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;
  - (g) an identification of any areas to be avoided, including buffers;
  - (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;
  - (i) a description of any assumptions made and any uncertainties or gaps in knowledge;
  - (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;
  - (l) any conditions for inclusion in the environmental authorisation;
  - (m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
  - (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;
  - (o) a description of any consultation process that was undertaken during the course of preparing the specialist report;
  - (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
  - (q) any other information requested by the competent authority.

**APPENDIX A – I&AP submissions relating to the draft VIA.**

<i>I&amp;AP comment</i>	Specialist response
<p><b>Richard Summers, Inc. for Kwandwe Game Reserve</b></p>	
<p><b>VIA alternatives</b>            3.12. The VIA report recognises the fundamental importance of alternatives assessment to the EIA as follows: “Integral to the EIA process is the consideration and evaluation of alternatives to a proposed development plan”. The EAP (who also acted as the visual specialist) however failed to carry this through into the assessment.</p>	
<p>3.13. The fact that various alternatives were not assessed during the EIA process is confirmed by the following:</p> <ul style="list-style-type: none"> <li>• 3.13.1. Paragraph 3.7 (above) illustrates that only one project alternative was assessed during the EIA process.</li> <li>• 3.13.2. With regard to the location of alternatives, the VIA report confirms that only one site (the project area) has been considered in the report.</li> <li>• 3.13.3. With regard to technological alternatives, the VIA report confirms that only the development of a <i>wind energy facility</i> has been considered in the VIA report.</li> <li>• 3.13.4. With regard to layout alternatives, the VIA confirms that only the proponent’s preferred alternative - the turbine layout of 66 turbines – has been assessed.</li> </ul>	<p>The Scoping report determined that:</p> <ul style="list-style-type: none"> <li>• The wind farm is the preferred activity, and this was the only reasonable and feasible alternative since the applicant is a wind farm developer.</li> <li>• The site and location are preferred based on the high wind resource and proximity to electricity grid infrastructure.</li> </ul>
<p>3.14. In terms of applicable policy and guidelines Level 4 Visual Assessment ought to consist of <i>inter alia</i> a description of alternatives and mitigation measures as some of its main elements. The investigation and implementation of alternatives in connection with the VIA and the DEIR was simply not done in connection with this project. The failure to investigate alternatives serves as confirmation that the EIA is fatally flawed and specifically the VIA has failed to satisfy the NEMA requirements regarding the evaluation of alternatives.</p>	<p>Only the preferred alternative was assessed in the EIA as it was deemed to be the only reasonable and feasible alternative.</p> <p>The NO-GO alternative was assessed.</p>
<p><b>5. VISUAL IMPACTS</b></p> <p>5.1. In terms of significance ratings, the VIA report states:</p>	

<b>I&amp;AP comment</b>	<b>Specialist response</b>
<p><i>“Negative impacts that are ranked as being of “VERY HIGH” and “HIGH” significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented.... The most effective and practical mitigations measures will then be proposed”.</i></p>	
<p>5.2. This was simply not done. There has been no attempt to implement the hierarchical approach to impact management through impact avoidance to address the negative visual impacts ranked as being of “VERY HIGH” and “HIGH” significance.</p>	<p>This has been rectified by the removal of potentially very high impact turbines (72, 73, 74, 75 and 76) immediately adjacent to the south eastern boundary of Kwandwe Game Reserve and seven additional turbines in the western portion of the WEF (3, 8, 12, 14, 18, 24, 69) also visible to Kwandwe.</p>
<p>5.3. The VIA report does not satisfy the requirements of a Level 4 Visual Assessment.</p> <ul style="list-style-type: none"> <li>• Firstly, the VIA fails to describe or assess any genuine project alternatives.</li> <li>• Secondly, it fails to prescribe or implement impact avoidance and/or mitigation measures required to address high impacts.</li> <li>• Thirdly, it fails to ensure that the assessment is undertaken by an <i>“independent visual specialist.”</i></li> </ul>	<p>Same response as above. CES provides independent EAP and various other independent specialist services including VIAs. In addition, the VIA will be reviewed by an external specialist.</p>
<p>5.4. Not one of the significance ratings in the VIA report has varied between pre- and post-mitigation, notwithstanding the fact that the negative visual impacts are ranked as being of high significance. This alone serves as confirmation that the EIA is fatally flawed and the VIA – as a critical component of the EIA process - has failed to integrate the findings of high negative visual impacts in the assessment process.</p>	<p>Same response as above.</p>
<p>5.5. The visual impacts of the project were some of the key concerns identified by stakeholders during the public participation process. Given the findings of VERY HIGH and HIGH significance of visual impacts, coupled with the fact that no meaningful attempt has been made to avoid and/or mitigate adverse impacts, Kwandwe commissioned an independent review of the VIA report. The review was undertaken by Bernie Oberholzer and Quinton Lawson both of whom are experts in visual impact assessment and widely recognised leaders in this field. The report by Bernie Oberholzer and Quinton Lawson (attached hereto marked “A”) must be read as if incorporated into and forming part of these comments.</p>	<p>Same response as above.</p>

<i>I&amp;AP comment</i>	<i>Specialist response</i>
5.6. The findings of the Oberholzer / Lawson review include the following:	
5.6.1. The conclusions in the VIA report are questionable, having not been adequately informed by accurate baseline information.	The baseline information has been enhanced in the current VIA.
5.6.2. The avoidance of high significance visual impacts is completely ignored.	High visual impacts are not ignored.
5.6.3. Several findings in the VIA report lack credibility.	Noted.
5.6.4. The DEIR ignores the high scenic value and wilderness quality of the study area and the negative impacts on visual scenic resources are not meaningfully responded to.	The scenic value of the study area is discussed in the VIA.
5.6.5. There is limited evidence of proper screening having been undertaken during the EIA in order to avoid visually sensitive areas.	It is our opinion that the final VIA addresses these concerns.
5.6.6. The DEIR ignores the REDZ visual mapping which shows that this portion of the REDZ 3 is classified as very high visual sensitivity.	This is addressed in the final VIA.
5.6.7. The VIA was conducted 'in house' by the EAP and the external peer review report commissioned by the EAP cannot be relied upon as an independent expert peer review.	CES provides independent EAP and various other independent specialist services including VIAs. In addition, the VIA will be reviewed by an external specialist.
5.6.8. The VIA report is riddled with self-contradiction. For example, on the one hand recognising the integrity and value of scenic resources and the high potential loss of such resources as a result of the proposed Albany WEF, but then failing to implement any measures to avoid and/or mitigate this high adverse impact.	Noted It is our opinion that the final VIA addresses these concerns.
5.6.9. The impact of lighting at night from critical viewpoints has not been addressed at all.	This is comprehensively addressed in the final VIA.
5.6.10. The EAP's attempt to justify the high visual impact on the landscape by stating that the lifespan of the project is only 20- 25 years is highly questionable and unscientific.	The WEF would be approved for 25 years. Continuation will require a new EIA. The WEF will not be a permanent development. This is a recognised and relevant factor in assessing the severity of an impact.
5.6.11. The VIA report contains too many omissions and inaccuracies, and does not serve as a basis for informed recommendations or assessments regarding the visual acceptability of the proposed Albany WEF.	It is our opinion that the final VIA addresses these concerns.
5.7. Due to the errors and inaccuracies in the VIA, the findings in the DEIR regarding visual impacts are disputed and not regarded as credible for the purposes of satisfying the national environmental management principles in section 2 of NEMA. It is plainly evident that the concerns previously raised	It is our opinion that the final VIA addresses these concerns.

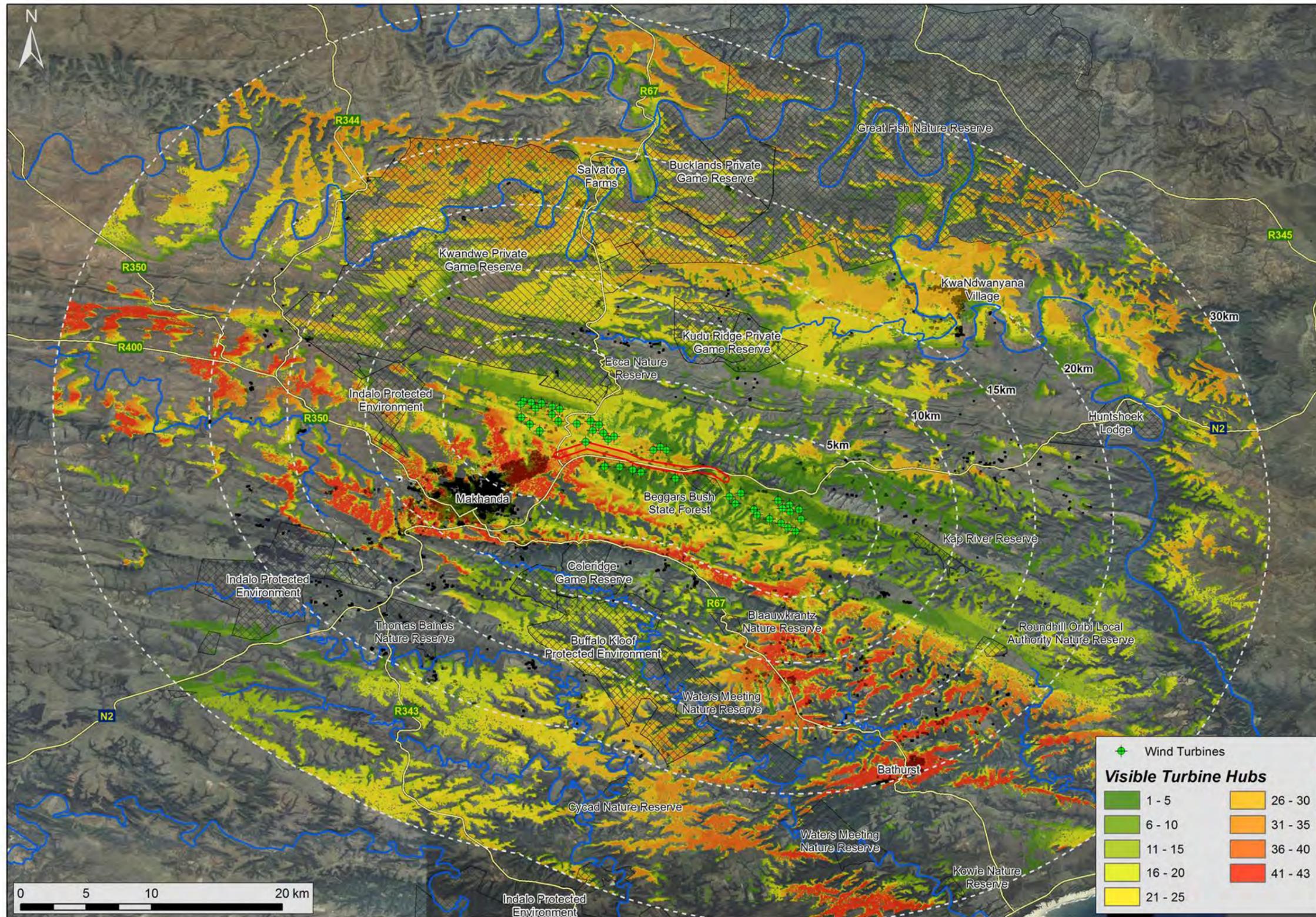
<b>I&amp;AP comment</b>	<b>Specialist response</b>
<p>by I&amp;APs about significant adverse visual impacts have been ignored and this constitutes a fatal flaw in the EIA process.</p>	
<p>5.8. In terms of the implications of the significance ratings, the VIA report states: Negative impacts that are ranked as being of “VERY HIGH” and “HIGH” significance will also “assist decision makers i.e. numerous HIGH negative impacts may bring about a negative decision.”<sup>41</sup> In light of the large number of turbines that gives rise to significant negative impacts ranked as being of “VERY HIGH” and “HIGH” significance, coupled with the material flaws, inaccuracies and omissions in the VIA report, the Department would be justified in refusing the application. The Oberholzer / Lawson review concludes that large portions of the proposed Albany WEF represent a fatal flaw based on the sensitivity maps analysed as part of the review.</p>	<p>It is our opinion that the final VIA addresses these concerns.</p>
<p>5.9. The DEIR explicitly states that turbines should not be erected in direct view of lodges and strategic viewpoints on surrounding game reserves such as Kwandwe. Notwithstanding, the proposed Albany WEF layout has not only not undergone any changes in response to the EIA findings, but the impact avoidance option is blatantly ignored. No attempt at all has been made to reduce “high significant” impacts on visual sensitive receptors such as Kwandwe through mitigation in order to avoid adverse impacts.</p>	<p>Based on the comments on the draft EIR and VIA, 23 turbines have been removed.</p>
<p>5.10. The concern that the visual impacts (both during day and night) of the proposed Albany WEF on Kwandwe Private Game Reserve gives rise to unacceptably high impacts which will damage the landscape and undermine the integrity of the visual scenic resource is confirmed by the independent assessment by Oberholzer and Lawson. This in turn will have a direct detrimental effect on the tourism experience offered by Kwandwe and will negatively affect the sustainability of its ecotourism and hospitality business and the marketability of the tourism product it is able to offer. In the longer term, this will undermine the financial viability and sustainability of the environmental management of the landholding and its conservation outcomes.</p>	<p>It is our opinion that the final VIA addresses these concerns.</p>

<b>I&amp;AP comment</b>	<b>Specialist response</b>
On this basis alone, the NEMA application for the proposed Albany WEF should be refused outright.	
<b>EScience Associates (Pty) Ltd for EScience for Indalo Private Game Reserve Association</b>	
<p><b>4. VISUAL IMPACT ASSESSMENT</b>            The Visual Impact Assessment (VIA) is defective and must be rejected, for the following reasons, amongst others:</p>	
<p>4.1 Poor selection of vantage points and complete omission of the Great Fish Provincial Nature Reserve are material deficiencies in the Report. The absence of the Great Fish is conspicuous, and the deficiency is of such a nature that it makes the WEF ecologically unsustainable and should prevent the development of the Albany WEF on the proposed locality.</p>	<p>It is our opinion that the final VIA addresses these concerns.</p>
<p>4.2 The actual impact on the Great Fish Provincial Reserve and the Adam’s Krans viewpoint as determined by Indalo’s independent specialists, alone constitutes a fatal flaw in the VIA and the draft EIR. The aggregated visual impact on wildlife and nature tourism operations in the area would be an externality of fatal proportions for the further development of the WEF as proposed.</p>	<p>This has been rectified by inclusion of Great Fish Provincial Reserve.</p>
<p>4.3 It attempts to justify a high visual impact by indicating that the lifespan of the facility will be 20-25 years. If this expected lifespan were accurate it would not be justification for the high impact. In reality however the lifespan will likely be indefinite as turbine and wind energy technology advances and turbines are replaced so that operations continue past the 20-25 year period.</p>	<p>The WEF would be approved for 25 years. Continuation will require a new EIA.</p>
<p>4.4 It fails to scientifically contextualise the WEF development amidst the “<i>very high visual sensitivity</i>” of the receiving environment, rather it makes a statement that “<i>the landscape of the study area is not pristine or of very high scenic value</i>”.</p>	<p>We confirm that the location of the WEF is not pristine.</p>
<p>4.5 It fails to adequately investigate, assess and visually demonstrate through representative viewsheds the cumulative (combined) impact of all the present and planned different WEFs in the region e.g. Waaihoek, Plan 8 (Grahamstown – where the developer intends to enlarge the approved size of the turbines and environmental footprint), Albany, Dassenridge and Cookhouse. The VIA does not provide simulations (as EScience</p>	<p>It is our opinion that the final VIA addresses these concerns. Simulations from Adam’s Krans have been included.</p>

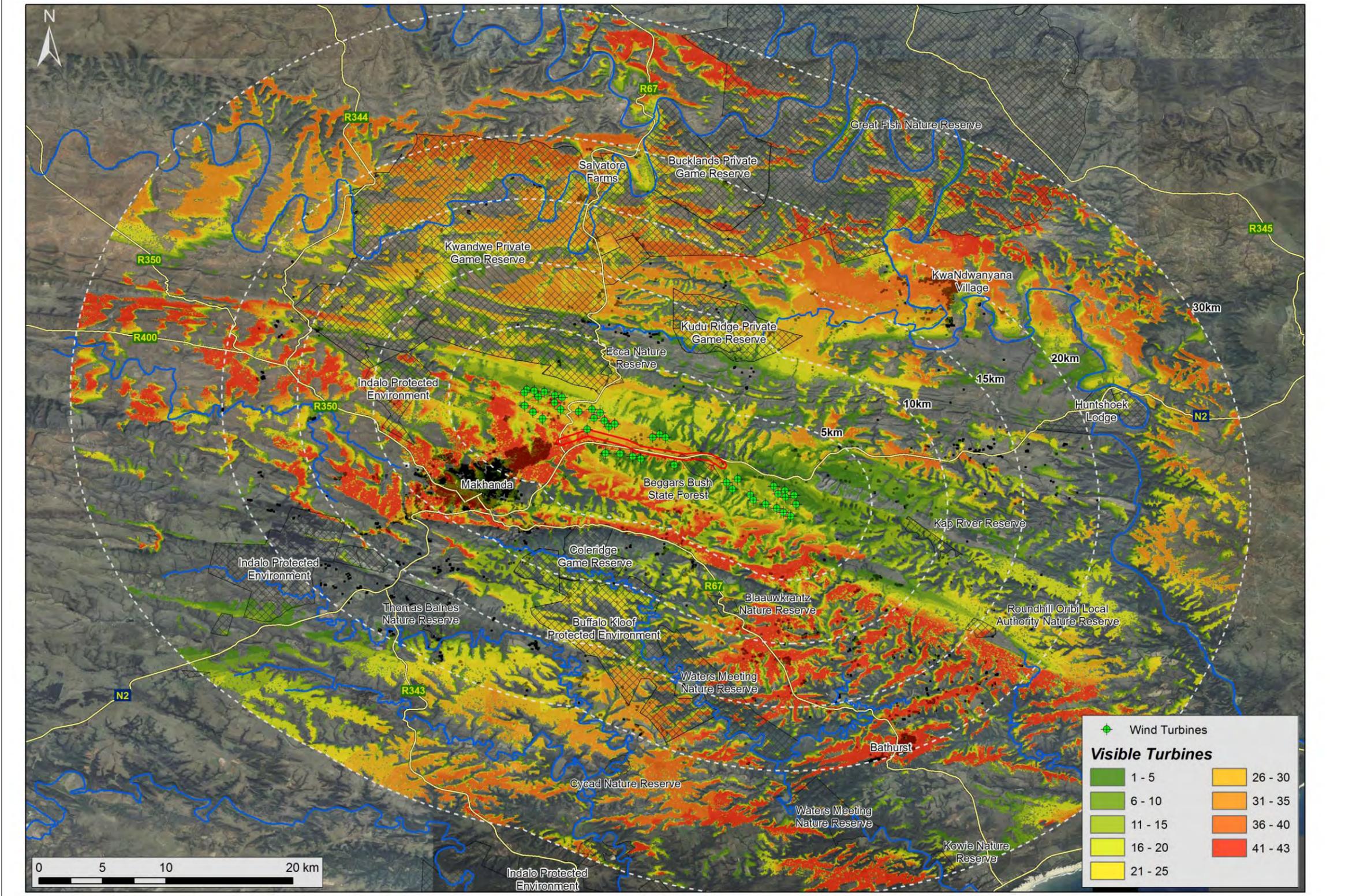
<b>I&amp;AP comment</b>	<b>Specialist response</b>
<p>has done for Albany WEF from Adam’s Krans) of the total impact on the visual and aesthetic wilderness character of the Expanded Protected Areas. This is a fatal omission of the report. Indalo submits this combined impact will be dramatic and prohibitive of yet another WEF development as it will materially disturb the wilderness character of the region for nature-based tourism.</p>	
<p>4.6 It indicates that there is limited mitigation potential due to the extreme size of turbines. However, it fails to investigate a reduced hub-height or the no-go alternative, both per turbine as well as for the WEF.</p>	<p>It is submitted that feasible and appropriate mitigation measures (such as that relating to night lighting) have been recommended.</p>
<p>4.7 The EIR’s external specialist review notes that the <i>“peer reviewer received the VIA report at a very late stage in the process and has had very limited time to produce this peer review report”</i>. This statement confirms that the specialist review cannot be upheld as verification of the veracity of the study, it, should be rejected and referred back to the specialist to perform a proper independent review that meets independent scientific standards.</p>	<p>This will be rectified.</p>
<p>4.8 The lack of the consideration of impact to formally Protected Areas, most notably impact to the Great Fish Provincial Reserve measured against the stated expansion of the Indalo, Addo and Great Fish Protected Areas, is viewed with circumspection. The perpetuation of this material omission throughout the VIA (and perpetuation downstream into the SIA and EIR) is obfuscating the fact and severity of the matter.</p>	<p>This has been rectified by inclusion of Great Fish Provincial Reserve.</p>

## **APPENDIX B – Viewshed analyses for turbine hubs and turbine tips.**

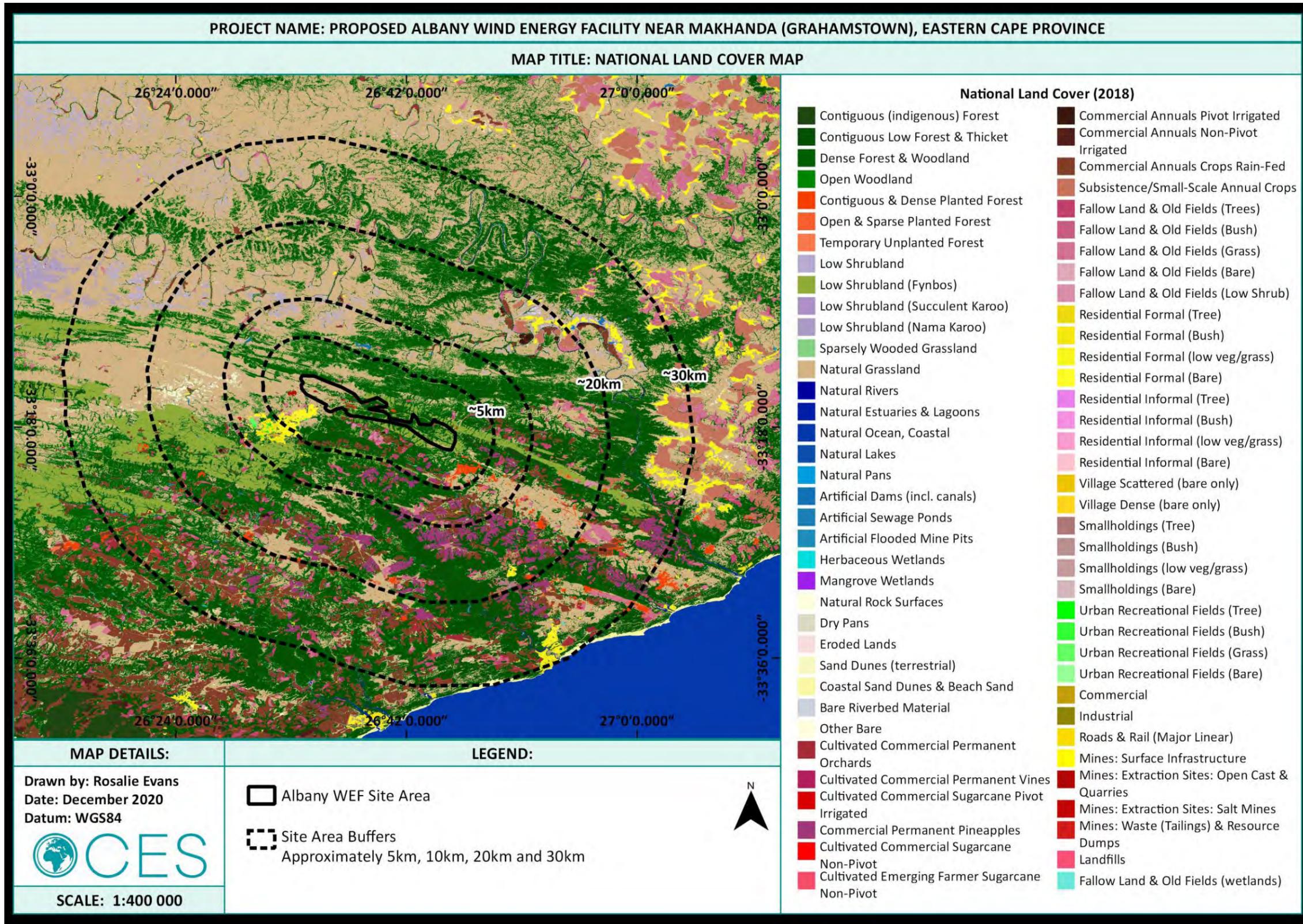
Appendix B: Viewshed analysis turbine hubs within a 30 km radius of the project site.



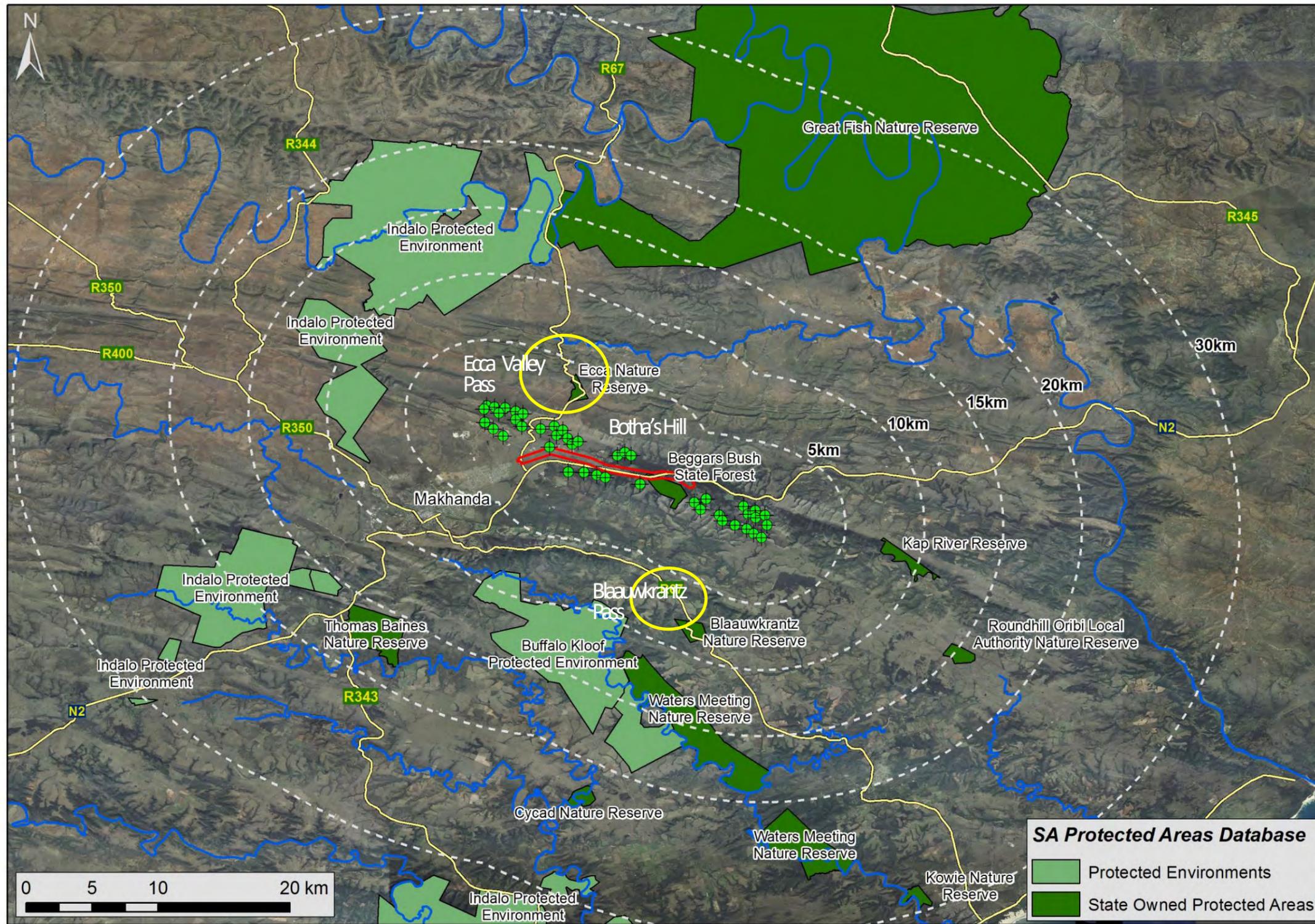
Appendix B: Viewshed analysis turbine tips within a 30 km radius of the project site.



Appendix C – National Landcover Map



Appendix D – SA Protected Areas Database Map.



## APPENDIX E - CES EIA criteria used for the assessment of impacts

The following standard CES EIA rating scales have been defined for assessing and quantifying the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. The identified impacts have been assessed against the following criteria:

- Relationship of the impact to **temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- Relationship of the impact to **spatial scales** - the spatial scale defines the physical extent of the impact.
- The **likelihood of the impact occurring** - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.
- The **severity of the impact** - the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected party.

The severity of impacts should be evaluated with and without mitigation to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. However, mitigation must be practical, technically feasible and economically viable.

### Appendix E: Criteria used to rate the significance of an impact

<b>Temporal scale (the duration of the impact)</b>		
<b>Short term</b>	<b>1</b>	Less than 5 years (Many construction phase impacts are of a short duration).
<b>Medium term</b>	<b>2</b>	Between 5 and 20 years.
<b>Long term</b>	<b>3</b>	Between 20 and 40 years (From a human perspective almost permanent).
<b>Permanent</b>	<b>4</b>	Over 40 years or resulting in a permanent and lasting change that will always be there.
<b>Spatial scale (the area in which any impact will have an effect)</b>		
<b>Localised</b>	<b>1</b>	Impacts affect a small area of a few hectares in extent. Often only a portion of the project area.
<b>Study Area</b>	<b>2</b>	The proposed site and its immediate surroundings.
<b>Municipal</b>	<b>3</b>	Impacts affect the Municipality, or any towns within the municipality.
<b>Regional</b>	<b>3</b>	Impacts affect the wider area or the Western Cape Province as a whole.
<b>National</b>	<b>3</b>	Impacts affect the entire country.
<b>International</b>	<b>4</b>	Impacts affect other countries or have a global influence
<b>Likelihood (the confidence with which one has predicted the significance of an impact)</b>		
<b>Definite</b>	<b>4</b>	More than 90% sure of a particular fact. Should have substantial supportive data.
<b>Probable</b>	<b>3</b>	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
<b>Possible</b>	<b>2</b>	Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.

<b>Unlikely</b>	<b>1</b>	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.
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**Appendix E: Impact severity rating**

<b>Impact severity (The severity of negative impacts, or how beneficial positive impacts would be on a particular affected system or affected party)</b>			
<b>Very severe (very HIGH)</b>	<b>8</b>	<b>Very beneficial</b>	<b>8</b>
An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example the permanent loss of land.		A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example the vast improvement of sewage effluent quality.	
<b>Severe (HIGH)</b>	<b>4</b>	<b>Beneficial</b>	<b>4</b>
Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation.		A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example an increase in the local economy.	
<b>Moderately severe (MODERATE)</b>	<b>2</b>	<b>Moderately beneficial</b>	<b>2</b>
Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated. For example constructing a sewage treatment facility where there was vegetation with a low conservation value.		A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example a 'slight' improvement in sewage effluent quality.	
<b>Slight (LOW)</b>	<b>1</b>	<b>Slightly beneficial</b>	<b>1</b>
Medium or short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example a temporary fluctuation in the water table due to water abstraction.		A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.	
<b>No effect (NEGLIGABLE)</b>		<b>Don't know/Can't know</b>	
The system(s) or party(ies) is not affected by the proposed development.		In certain cases it may not be possible to determine the severity of an impact.	

**Appendix E: Matrix used to determine the overall significance of the impact based on the likelihood and effect of the impact**

Likelihood		Effect													
		3	4	5	6	7	8	9	10	11	12	13	14	15	16
1		4	5	6	7	8	9	10	11	12	13	14	15	16	17
2		5	6	7	8	9	10	11	12	13	14	15	16	17	18
3		6	7	8	9	10	11	12	13	14	15	16	17	18	19
4		7	8	9	10	11	12	13	14	15	16	17	18	19	20

**Appendix E: The significance rating scale**

Significance	Description
<b>LOW</b>	These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as <b>LOW</b> will need to be considered by the public and/or the specialist as constituting a relatively unimportant and usually short-term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.
<b>MODERATE</b>	These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as <b>MODERATE</b> will need to be considered by society as constituting a relatively important and usually medium-term change to the (natural and/or social) environment. These impacts are real but not substantial.
<b>HIGH</b>	These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as <b>HIGH</b> will need to be considered by society as constituting an important and usually long-term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.
<b>VERY HIGH</b>	These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

The *environmental significance* scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

**Prioritising**

The evaluation of the impacts, as described above is used to assess the significance of identified impacts and determine which impacts require mitigation measures.

Negative impacts that are ranked as being of “**VERY HIGH**” and “**HIGH**” significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. numerous **HIGH** negative impacts may bring about a negative decision. For impacts identified as having a negative impact of “**MODERATE**” significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed. For impacts ranked as “**LOW**” significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.

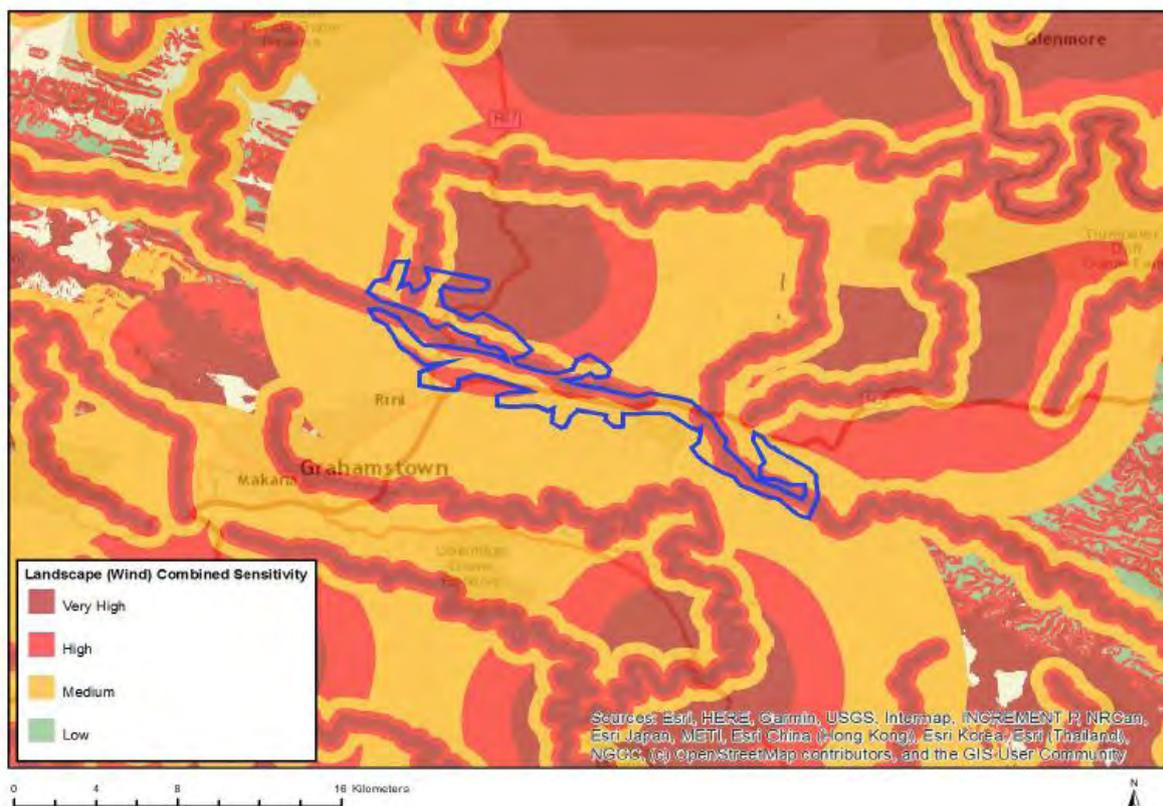
These significance ratings may have limited usefulness unless they are described in terms of the broader visual context (Oberholzer 2005). The visual assessment criteria (Table 6) have, therefore, been used to assist in this regard.

## APPENDIX F – DFFE Screening report maps of relative landscape (wind) theme sensitivity.

The DFFE screening report maps are provided below for the Albany WEF for reports generated in 2020 and in 2021. A significant difference in terms of VERY HIGH sensitivity is apparent. Note also that the sensitivity features for 2021 report excluded the following criteria that were included in the 2020 report.

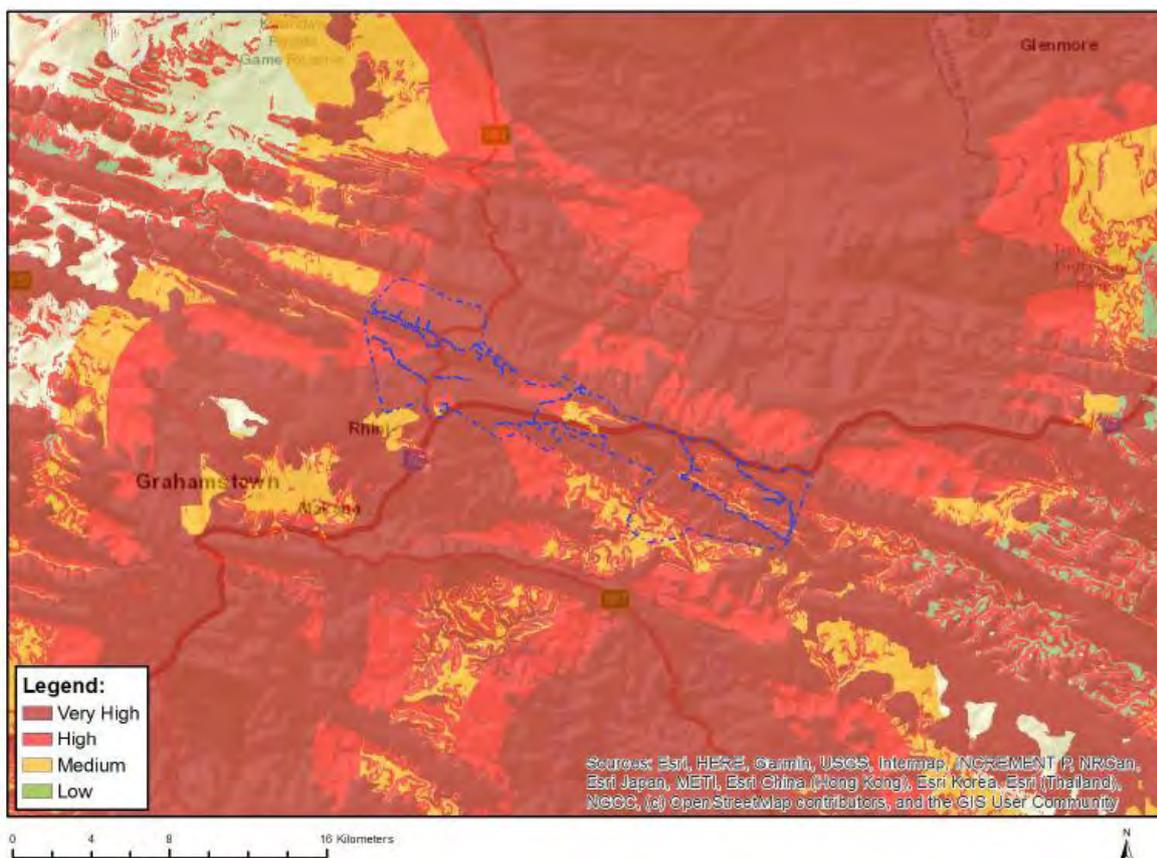
- High – within 500 m of a river;
- Medium – Within 1000 m of a wetland; and
- Very high – within 250 metres of a river.

### March 2020



Sensitivity	Feature(s)
High	Between 2 and 4 km of a town or village
High	Slope between 1:4 and 1:10
High	Between 2 and 5 km of a game farm
High	Between 3 and 5 km of a nature reserve, botanical garden or other protected area
High	Within 500 m of a river
Low	Slope less than 1:10
Medium	Between 4 and 6 km of a town or village
Medium	Between 5 and 7 km of a game farm
Medium	Between 5 and 10 km of a nature reserve, botanical garden or other protected area
Medium	Within 1000 m of a wetland
Very High	Within 2 km of a town or village
Very High	Mountain tops and high ridges
Very High	Slope more than 1:4
Very High	Within 3 km of a nature reserve, botanical garden or other protected area
Very High	Within 250 m of a river

## October 2021



**Sensitivity Features:**

<b>Sensitivity</b>	<b>Feature(s)</b>
High	Between 2 and 4 km of a town or village
High	Slope between 1:4 and 1:10
High	Between 2 and 5 km of a game farm
High	Between 3 and 5 km of a nature reserve, botanical garden or other protected area
Low	Slope less than 1:10
Medium	Between 5 and 10 km of a nature reserve, botanical garden or other protected area
Medium	Between 4 and 6 km of a town or village
Medium	Between 5 and 7 km of a game farm
Very High	Within 2 km of a town or village
Very High	Mountain tops and high ridges
Very High	Slope more than 1:4
Very High	Within 3 km of a nature reserve, botanical garden or other protected area