

**PLAN 8 GRAHAMSTOWN WIND ENERGY FACILITY
MAKANA LOCAL MUNICIPALITY
EASTERN CAPE PROVINCE, SOUTH AFRICA**

**AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION FOR THE
PLAN 8 GRAHAMSTOWN WIND ENERGY FACILITY**

Prepared for:



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REVISIONS TRACKING TABLE



EOH Coastal & Environmental Services

Report Title: Amendment of the Environmental Authorisation for the Plan 8 Grahamstown Wind Energy Facility, Eastern Cape Province, South Africa, March 2019

Report Version: Revised Amendment Report, Draft for Review

Project Number: P40700363

Name	Responsibility	Signature	Date
Bill Rowlston	Report preparation		4th March 2019
Alan Carter	Review		1st March 2019

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EXECUTIVE SUMMARY

Background

The Environmental Authorisation was issued on 22nd October 2015, and was valid for a period of five (5) years.

Three appeals against the issue of the EA were submitted to the Minister of Environmental Affairs in November and December 2015, and were dismissed in September 2016 and March 2017.

Scope of Proposed Amendment

- **Part 1 Amendment:** The project will be managed by a special purpose vehicle created for the sole purpose of designing, financing, constructing, managing and operating this project.
- **Part 2 Amendment:** The 22 proposed turbines will be larger (in terms of hub height and rotor diameter) than the 22 approved machines, will have increased generating capacity for the same turbine layout, but will remain in their approved locations.

Specialist Studies

Nine specialist studies were commissioned to assess the impacts of the proposed amendment. The new studies reflected the subjects of the specialist studies that informed the preparation of the EIA Report. The specialists who had undertaken the EIA studies were appointed, with the exception of the ecology (flora and fauna) and visual studies, for which the original specialists had retired from their fields, and new specialists were appointed.

Impacts and Mitigation Measures

Impacts identified during the EIA studies and for the proposed amendment are compared, and any new impacts or mitigation measures are identified.

Agriculture

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of vegetation	HIGH -ve	No change
Pollution of water sources	MODERATE -ve	No change
Erosion and construction on land with a gradient	MODERATE -ve	No change
Operation		
Possible change of use of agricultural land	MODERATE -ve	No change

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation measures proposed in the original report remain valid, and no new mitigation measures were proposed.

Avifauna (Birds)

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Avifauna habitat destruction	LOW -ve	Unchanged
Disturbance of birds	LOW -ve	Unchanged
Operation		
Bird collision and electrocution on overhead power lines: impact on Red Listed and other species	LOW -ve	Unchanged
Bird disturbance and displacement from area as result of wind turbines and	LOW -ve	Unchanged

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
other infrastructure		
Bird collision with turbine blades	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

Chiroptera (bats)

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Destruction of bat foraging habitat	LOW -ve	Unchanged
Destruction of bate roosts	LOW -ve	Unchanged
Operation		
Bat mortalities by turbine blades during foraging	MODERATE -ve	Unchanged
Bat mortalities by turbine blades during migration: cumulative impact	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures specified in the EIA report were found to be sufficient, and remain unchanged: no new mitigation measures were proposed. However, the specialist emphasised the importance of the following measures:

- The sensitivity map (150m-wide buffer zone around bat high-sensitivity areas, plus micro-siting of some turbines to reduce encroachment of turbine blades into the buffer zones) must be adhered to.
- The adaptive mitigation measures recommended in the pre-construction monitoring programme must be adhered to.
- A bat mortality monitoring study must be conducted for a minimum duration of two years during the operational phase of the project. The mitigation and management measures specified in the EIA should apply to whichever turbines may be identified, during the operational monitoring study, to cause unsustainable numbers of bat mortalities.

Ecology (flora and fauna)

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of degraded thicket	LOW -ve	Unchanged
Loss of fynbos	LOW -ve	Unchanged
Loss of fynbos / thicket / karoo mosaic	LOW -ve	Unchanged
Loss of rocky fynbos (RF)	N / A	No turbines in RF
Loss of thicket (Th't)	N / A	No turbines in Th't
Loss of thicket mosaic	LOW -ve	Unchanged
Loss of plant species of special concern	LOW -ve	Unchanged
Loss of animal species of special concern	LOW -ve	Unchanged
Loss of biodiversity	LOW -ve	Unchanged
Disruption of ecosystem function and process	LOW -ve	Unchanged
Invasion of alien species	MODERATE +ve	Unchanged
Operation		
Introduction of alien plant species	LOW +ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

Archaeology

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Impact on heritage resources	LOW -ve	Unchanged
Operation		
Impact on heritage resources	LOW -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed. However, in light of the changes to the turbine layout since the original study was completed, it is recommended that areas not previously surveyed are surveyed prior to commencement of construction.

Noise

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Construction noise from plant and machinery	LOW -ve	Unchanged
Operation		
Noise from turbines	LOW -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

Palaeontology

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of palaeontological resources	LOW -ve	Unchanged
Operation		
No impacts identified		

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed. However, in light of the important fossil discoveries in the nearby excavation for the N2 highway cutting, since completion of the 2011 study, extra vigilance is recommended during excavations on the WEF site, including inspection of excavations in which rock is encountered immediately excavation is completed and before exposed rock faces are covered.

Socio-economics

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Temporary stimulation of the national and local economy	HIGH +ve	Unchanged
Temporary increase in employment, national and local economies	MODERATE +ve	Unchanged
Contribution to skills development: national and local economies	MODERATE +ve	Unchanged
Temporary increase in household earnings	MODERATE +ve	Unchanged
Temporary increase in government revenue	MODERATE +ve	Unchanged
Changes to the sense of place	MODERATE -ve	Unchanged
Impact on the local tourism, game industry and associated industries	LOW -ve	Unchanged
Temporary increase in social conflicts due to the influx of people	LOW -ve	Unchanged
Impact on economic and social infrastructure	LOW -ve	Unchanged
Impact on real estate dynamics and business activity in the immediately affected area	MODERATE -ve	Unchanged
Operation		
Sustainable increase in production and GDP-R: national and local	MODERATE +ve	Unchanged
Creation of sustainable employment positions: national and local	MODERATE +ve	Unchanged
Skills development of permanently employed workers	MODERATE +ve	Unchanged
Improved standards of living for the benefiting households	MODERATE +ve	Unchanged
Sustainable increase in national and local government revenue	MODERATE +ve	Unchanged
Local economic and social development from project operations	HIGH +ve	Unchanged
Changes to the sense of place	MODERATE -ve	Unchanged
Impact on local tourism, game farming and associated industries	MODERATE -ve	Unchanged
Impact on the livelihoods of the household's dependant on the local tourism, game farming and association industries	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

Visual

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Intrusion of construction activities on views of sensitive visual receptors	HIGH -ve	Reduced to MODERATE -ve
Operation		
Intrusion of large, highly visible wind turbines on the existing views of sensitive visual receptors	HIGH -ve	Unchanged
Potential landscape impact	MODERATE -ve	Unchanged
Impact of shadow flicker on residents close to wind turbines	LOW -ve	Unchanged
Impact of night lights of a wind farm on existing nightscape	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

The mitigation measures proposed in the original assessment for the construction phase remain valid, and no new measures were proposed. No mitigation measures were proposed for the operational phase.

Amendments to the EMPr

The EMPr must be amended to include a consolidated sensitivity map of the site.

The amended EMPr must also include all the items specified in paragraphs 15 to 19 of the Environmental Authorisation (*Conditions of this Environmental Authorisation, Scope of authorisation*, pp 12-13), and must be submitted to DEA before construction may commence.

EAP's Opinion and Recommendation

The specialist reports indicate that the proposed increase in the turbine hub height and rotor diameter will not significantly alter the findings of the specialist studies that were undertaken for the environmental impact assessment.

Although the locations of the turbine bases outside the 150m buffer zone around the high bat-sensitivity areas complies with the requirements that prevailed at the time the Environmental Authorisation was issued, judicious micro-siting of the turbines closest to the edges of the buffer zone can be used to ensure that no part of any turbine blade encroaches into the buffer zone (which is the recommendation in the most recent – 2017 – guidelines). In the single case where this is not possible adaptive mitigation management measures can be adopted in the event of unacceptable numbers of bat mortalities during operation.

Accordingly it is the EAP's opinion that the proposed amendments to the environmental authorisation should be authorised, and the Environmental Management Programme amended in accordance with the recommendations of the specialists, the relevant specifications in the existing Environmental Authorisation, and the requirements of the most recent (2017) EIA Regulations.

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REVISED DRAFT FOR REVIEW

1. BACKGROUND

1.1 Environmental Impact Assessment Report

The Second Final Amended Environmental Impact Assessment (EIA) Report for the Plan 8 Grahamstown Wind Energy Facility (CES 2015a), together with an Addendum to the EIA Report (CES 2015b), and the Second Final Amended Environmental Management Programme (EMPr – CES 2015c), was submitted to the Department of Environmental Affairs (DEA) in April 2015, and was accepted on 29th July 2015 (DEA Ref No: 12/12/20/2523).

1.2 Environmental Authorisation

Following a visit to the site of the proposed facility by departmental officials in July 2015 an Environmental Authorisation (EA) for the proposed facility was issued on 22nd October 2015, Authorisation Register Number 12/12/20/2523 (DEA 2015).

1.3 Appeals

Three appeals against the issue of the EA were submitted to the Minister of Environmental Affairs on 26th November 2015 (Mr Orgie Crous, adjacent landowner), 3rd December 2015 (Mr Murray Crous, adjacent landowner), and 11th December 2015 (Smith Ndlovu Summers, Environmental Law Specialists, representing the Moll Property Trust and 21 other individuals and organisations).

The appeals were dismissed in writing by the Minister on 20th September 2016 (Moll Property Trust *et al* – DEA 2016) and 16th March 2017 (Messrs O Crous & M Crous – DEA 2017).

1.4 Currency of the Environmental Authorisation

Item 6 in *Scope of Authorisation*, EA P9, specifies that the activity must commence within a period of five years from the date of issue of the authorisation.

6. This activity must commence within a period of five (05) years from the date of issue of this authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.

However, in terms of s43(7) of the National Environmental Management Act, 1998 as amended, an appeal automatically suspends an EA pending the outcome of the appeal. Accordingly the currency of the EA is extended to 15th March 2022, five years after the settlement of all the appeals.

1.5 Report Structure

Chapter 5 of the Environmental Impact Assessment Regulations, 2014, as amended on 7th April 2017 (Government Notice No 326, Government Gazette No 40772, refers), sets out the requirements of the report that must be submitted in support of an amendment application as follows:

Process and consideration of an application for amendment

32(1) The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority—

- (a) a report, reflecting—
 - (i) an assessment of all impacts related to the proposed change;
 - (ii) advantages and disadvantages associated with the proposed change; and
 - (iii) measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and
 - (iv) any changes to the EMPr;
 which report—
 - (aa) had been subjected to a public participation process, which had been agreed to by the

competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority, and (bb) reflects the incorporation of comments received, including any comments of the competent authority; or

In Addition, Item 13, page 2, of the *Application Form for Amendment of an Environmental Authorisation* (DEA 2018), requires each specialist report submitted as part of the amendment application to include the terms of reference for such a report, and the declaration of interest of the specialist.

Accordingly the structure of the remainder of this report is as follows:

Chapter 2: Sets out the details of the proposed changes to the project for which an amendment of the Environmental Authorisation is proposed. Aspects of the project for which changes are proposed are compared with those approved in the Environmental Authorisation.

Chapter 3: Summarises the key observations made by the specialists, and their conclusions and recommendations. The impacts identified and assessed by the specialist during the original EIA process for the project are tabulated, and any changes to the overall significances of the impacts that are recommended by the specialists are noted. Recommended changes to the mitigation measures proposed during the EIA process are noted, together with any new mitigation measures that the specialist considered to be necessary.

Chapter 4: Describes the advantages and disadvantages associated with the proposed changes to the project.

Chapter 5: Confirms that all mitigation measures proposed in the approved Environmental Impact Assessment Report were included in the Environmental Management Programme submitted to DEA, and describes amendments that should be included in the EMPr when it is finalised and approved before construction commences.

Chapter 6: Sets out the details of the public participation process. Activities undertaken thus far are limited to updating the list of Interested and affected parties, sending notifications of the intention to prepare and submit an Amendment Report to I&APs, posting site notices and publishing a newspaper advertisement. This chapter will be augmented with details of comments from I&APs and responses from the EAP, when the review and comment period is completed.

Chapter 7: Summarises the EAP's opinion of the conclusions presented by the specialists, and sets out his recommendation in respect of approving the amendment to the environmental authorisation.

Chapter 8: Lists the principal documents referred to in the main text of the report. Other references are included in some of the specialist reports.

Appendices:

A to I: Reports submitted by the nine specialists appointed to assess the impacts of the proposed amendment. The text of the reports remains as submitted by the specialists, but in some cases the format has been changed to remove unnecessary white space.

J: Conditional Approval of the amended project from Telkom.

K: Conditional Approval of the amended project from SENTECH.

L: Letter of approval from the Department of Mineral Resources in terms of s53 of the MRPDA, together with a letter of no objection from the owners of kaolin quarries on the site of the WEF.

M: Conditional Approval of the amended project from SANRAL.

N: Copies of signed Specialist Declarations of Interest in respect of this project.

2. DETAILS OF PROPOSED AMENDMENTS

Chapter 5 – *Amendment, suspension, withdrawal and auditing of compliance with environmental authorisation and environmental management programme* – of the Environmental Impact Assessment Regulations, 2014, as amended in April 2017, provides for two types of amendment to an environmental authorisation, as follows:

- Part 1: Amendments where no change of scope or a change of ownership occur

29. An environmental authorisation may be amended by following the process described in this Part if the amendment –

 - (a) will not change the scope of a valid environmental authorisation, nor increase the level or nature of the impact, which impact was initially assessed and considered when application was made for environmental authorisation; or
 - (b) relates to the change of ownership or transfer of rights and obligations.
- Part 2: Amendments where a change of scope occurs

31. An environmental authorisation may be amended by following the process described in this Part if the amendment will result in a change of scope of a valid environmental authorisation where such change will result in an increased level or change in the nature of impact where such level or change in nature of impact was not –

 - (a) assessed and included in the initial application for environmental authorisation; or
 - (b) taken into consideration in the initial environmental authorisation; and the change does not, on its own, constitute a listed or specified activity.

The proposed amendments that are the subject of this report are described in the following sections.

2.1 Part 1 Amendment

2.1.1 Holder of Authorisation

Approved:

The environmental authorisation was issued to Plan 8 Infinite Energy (Pty) Ltd

Holder of authorisation:	<i>Plan 8 Infinite Energy (Pty) Ltd</i>
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(DEA 2015, Environmental Authorisation, first page (unnumbered))

Proposed:

The environmental authorisation to be transferred, together with all associated rights and obligations, to Grahamstown Wind Farm (Pty) Ltd, a special purpose vehicle created specifically to develop, finance, construct and operate the wind energy facility currently known as the Plan 8 Grahamstown Wind Energy Facility.

The entity was registered with the Companies and Intellectual Properties Commission (CIPC) on 15th February 2012, Registration No 2012 / 029824 / 07.

2.2 Part 2 Amendment

2.2.1 Facility Location and Farm Properties

Approved:

- Farm Gilead 361 (SG C00200000000036100000)
- Farm Tower Hill 363 (SG C00200000000036300000)
- Farm Peynes Kraal 362 (SG C00200000000036200000)
- Total area of properties is approximately 2 550ha

(As described in CES 2015a, s2.1, Table 2-1, p14)

Location of the site	~ approximately 30km outside of Grahamstown along the N2 in an easterly direction towards East London
Extent of the proposed development footprint	~ 2,550 hectares (ha)
SG Codes	» C00200000000036100000 » C00200000000036300000 » C00200000000036200000

(DEA 2015, p8: Technical details for the proposed facility)

Proposed:

No change – as approved.

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

2.2.2 Number of Turbines

Approved:

Up to 22 turbines

(As described in CES 2015a, s1.1, p14)

Up to 22 individual wind turbines with an approximate generation capacity of between 2.5MW – 3MW with a total generation capacity of up to 66MW;

(DEA 2015, p7, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

No change – as approved.

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

2.2.3 Turbine Locations

Approved:

Turbine locations are set out in Figure 2.4 - Layout of Project Infrastructure on a 1:50 000 topocadastral map – p19, in CES 2015a, the approved EIA Report.

(DEA 2015 – Environmental Authorisation)

Proposed:

No change – as approved.

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

The coordinates of the turbine locations are set out in Table 2.1 below. Turbine locations are illustrated in Figure 2.2.

Table 2.1: Approved coordinates of wind turbines

Turbine No	Latitude (°S)	Longitude (°E)
1	33° 16' 50.06" S	26° 49' 29.08" E
2	33° 16' 48.24" S	26° 49' 47.62" E
3	33° 16' 46.58" S	26° 51' 29.70" E
4	33° 17' 08.37" S	26° 50' 12.87" E
5	33° 17' 07.94" S	26° 50' 32.60" E
6	33° 17' 34.26" S	26° 50' 38.22" E

Turbine No	Latitude (°S)	Longitude (°E)
7	33° 17' 40.50" S	26° 51' 08.92" E
8	33° 17' 29.75" S	26° 51' 52.93" E
9	33° 17' 49.21" S	26° 51' 44.26" E
10	33° 17' 41.18" S	26° 52' 06.07" E
11	33° 17' 47.59" S	26° 52' 22.01" E
12	33° 17' 53.91" S	26° 52' 32.16" E
13	33° 17' 05.47" S	26° 49' 39.80" E
14	33° 17' 02.96" S	26° 49' 55.44" E
15	33° 16' 52.52" S	26° 51' 01.32" E
16	33° 16' 57.28" S	26° 51' 22.41" E
17	33° 17' 07.54" S	26° 49' 20.57" E
18	33° 16' 11.01" S	26° 50' 11.37" E
19	33° 16' 01.21" S	26° 49' 37.07" E
20	33° 16' 07.21" S	26° 49' 52.78" E
21	33° 16' 03.14" S	26° 50' 51.31" E
22	33° 16' 07.17" S	26° 51' 06.54" E

2.2.4 Total Generating Capacity

Approved:

Each turbine 2.5–3MW; total installed generating capacity up to 66MW.

(As described in CES 2015a, s1.1 p14)

- Up to 22 individual wind turbines with an approximate generation capacity of between 2.5MW – 3MW with a total generation capacity of up to 66MW;

(DEA 2015, p7, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

Each turbine up to 4.5MW; total installed generating capacity up to 99MW.

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, August 2018)

2.2.5 Hub height

Approved:

Up to 91.5m above ground level.

(As described in CES 2015a, s5.2.1, p52)

- The ultimate size of the wind turbines will depend on further technical assessments, but will typically consist of rotor turbines (3 x ±50m length blades) with rotor diameters of 100 to 117 metres, mounted atop a 91.5 metre high steel (or hybrid steel/concrete) tower.

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

Up to 125m above ground level

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

2.2.6 Rotor Diameter

Approved:

100m–117m

(As described in CES 2015a, s5.2.1, p52)

▪ The ultimate size of the wind turbines will depend on further technical assessments, but will typically consist of rotor turbines (3 x ±50m length blades) with rotor diameters of 100 to 117 metres, mounted atop a 91.5 metre high steel (or hybrid steel/concrete) tower.

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

Up to 149m

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

A schematic of the comparative size of the approved and proposed turbines is shown in Figure 2.1.

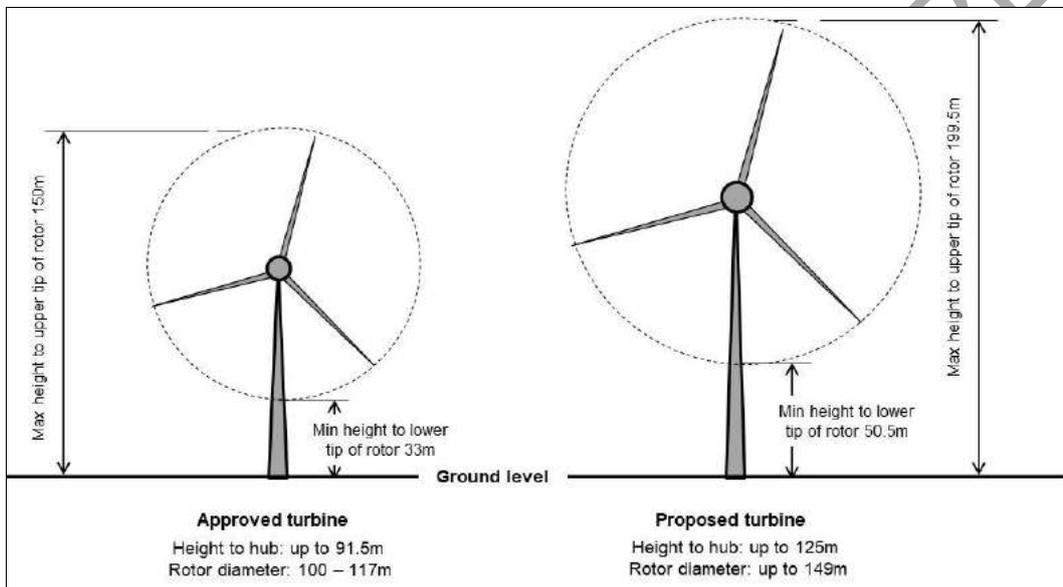


Figure 1.1: Schematic comparison of approved and proposed turbine sizes
(Dimensions are internally consistent)

2.2.7 Foundation Size:

Approved:

- Plan Size: 20m x 20m (400 square metres)
- Base Thickness: 2 – 6m

(As described in CES 2015a, s1.1 p14)

▪ Foundation will be 20 m x 20 m and an average of 2 to 6 m deep.

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

- Plan Size: Circular base 26.5m diameter (area = 550 square metres)
- Base Thickness: see Figure 2.2 below, but will depend on substrate conditions.
- Exposed area after rehabilitation: 6m diameter pedestal (area = 28.3m²)

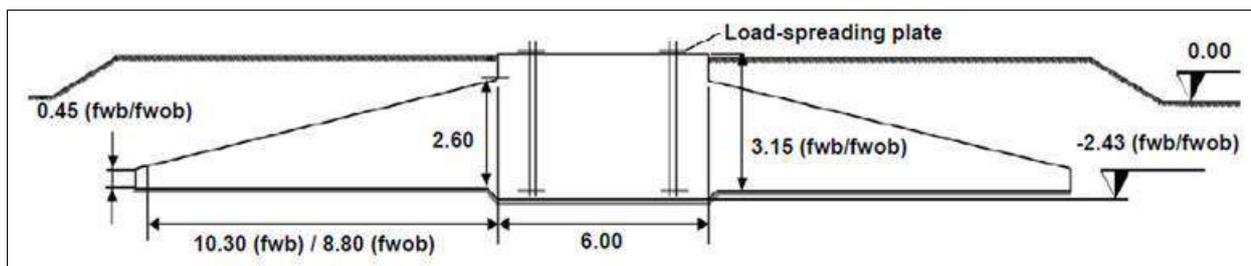


Figure 2.2: Cross-sectional detail of shallow foundation for Delta4000 TS125, 125 m hub height
(Source: Nordex 2017, Figure 2, p6)

Notes:

- (i) fwb = foundation with buoyancy. Assumes groundwater level at ground level (a conservative assumption resulting in a larger foundation diameter – applies to Plan 8 WEF).
- (ii) fwob = foundation without buoyancy. Assumes groundwater level below the base of the foundation.
- (iii) Permanent, compacted backfill, up to 50mm below the pedestal over the slab, is an essential part of the foundation, and must not be removed.
(Source: Nordex 2017, section 2, p5)
- (iv) Only the 6m-diameter concrete pedestal will be visible after backfilling and reinstatement.

2.2.8 Turbine Interconnections

Approved:

Underground cables connecting the wind turbines following the routes of the internal roads.
(As described in CES 2015a, s2.2.3 p22)

- Underground cables connecting the wind turbines;

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

No change – as approved.

2.2.9 Access and Site Roads

Approved:

Internal site roads between 4.7 and 8m wide.
(As described in CES 2015a, s2.2.3 p21)

- Internal access roads to each turbine - approximately 4.7 m to 8 m wide;

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Proposed:

No change – as approved.

(Routes illustrated in CES 2015a: Figure 2.4: Layout of Project infrastructure, p19, and Figure 2.1 following)

2.2.10 Substation

Approved:

Alternative, Option 2:

- Centre point 33.276784°S, 26.831437°E
(Location shown in CES 15a, Figure 2-4, Layout of Project infrastructure, p19, and Figure 2.1 following)
- Plan area approximately 100m by 65m
(As described in CES 2015a, s2.1, p14)

- One substation will be constructed for the project to receive the generated power and transmit this to the point of interconnection;

(DEA 2015, p8, in “The Plan 8 Grahamstown Wind Energy Facility will comprise the following:”)

Substation: Option 2		
Alternative	Latitude	Longitude
Centre	-33.276784°S	26.831437°E

(DEA 2015, p7)

Proposed:

No change – as approved

(Pers Comm, Plan 8, Mr Z Jessa, via e-mail, July 2018)

2.2.11 Development Footprint (disturbed area)

Approved:

- Estimated disturbed area during construction: 9.8 ha (includes roads, material laydown / hardstanding areas, turbine bases and substation)
- Estimated disturbed area during operation: 7.8 ha (includes roads, turbine bases and substation)

(As described in CES 2015a, s2.1, p14)

Notes:

- The total disturbed area of the material laydown / hardstanding areas was underestimated. The nominal size of each area was 45m x 60m, a total disturbed area for 22 turbines of 5.94 ha.
- It was wrongly assumed that material laydown / hardstanding areas would be reinstated after construction.
- Accordingly, the actual disturbed area was 13.7ha.

Proposed:

- Turbine bases: 22No circular bases 26.5m dia – total area 1.21ha. (Note that, after backfilling and reinstatement of the excavation for the turbine bases, only the 6m-diameter concrete pedestal will be visible (see Figure 2.2, Note (iv)), a total visible disturbance of 622m² (0.06ha).
- Laydown areas/hardstandings: 22No laydown areas/hardstandings 80mx50m (includes 25m² for turbine transformer) – total area 8.8ha.
- Roads: 16.35km of roads average width 4.8m – total area 7.68ha.
- Substation: 100mx65m (includes operations instrument/control centre and store) – total area 0.65ha.

Estimated area of disturbance for construction and operation is therefore **18.35ha** (0.72% of the total project area of 2 550 ha). This assumes that materials laydown areas/hardstandings used during construction will remain in place as hardstandings during operation to facilitate repairs and maintenance activities, including the use of large mobile cranes.

The total disturbed area for the proposed amendment is about 34% greater than the approved project, which is accounted for by the increased area of the laydown areas/hardstandings and the larger turbine bases.

2.2.12 Evacuation Power Line

Approved:

Alternative, Option 2:

- Start: 33°16'34.59"S, 26°49'51.89"E
- End: 33°16'23.56"S, 26°49'51.17"E

(CES 15a, s2.2.2, p17)

- Connection, via 132kV overhead power line 350m long, to existing Eskom 132kV overhead line from Pembroke to Albany sub-station
(CES 15a, Figure 2-4, Layout of Project infrastructure, p19)

Power line		
Alternative (Option 2)	Latitude	Longitude
Start	33°16'34.59"S	26°49'51.89"E
End	33 16'23.56"S	26 49'51.17"E

(DEA 2015, p7)

Proposed:

No change – as approved

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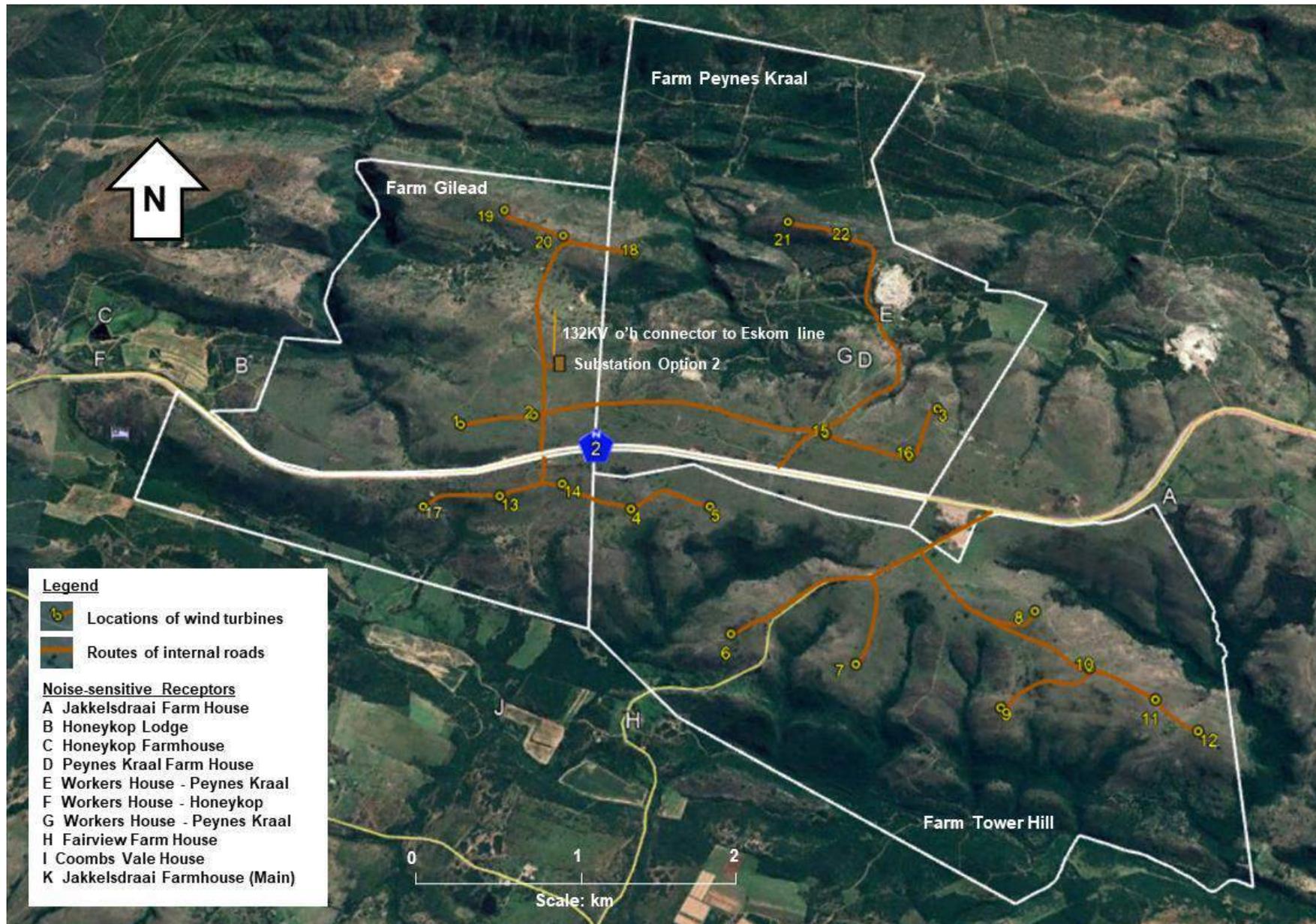


Figure 2.3: Approved Site Layout

3. SUMMARY OF SPECIALIST REPORTS AND ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED AMENDMENTS

3.1 Agriculture

The report included in the EIA submission – Agricultural Resources Desktop Assessment, 13th December 2011 – was prepared by isi-Xwiba Consulting (CJ Bradfield). The report included in this Amendment Report – Opinion on the Increased Impact on the Agricultural Resources, 14th August 20187 – was also prepared by isi-Xwiba Consulting (CJ Bradfield), and is included in full as Appendix A.

Key Observations:

The December 2011 report assumed an average of 6 ha/Large Stock Unit (LSU), and estimated that the permanent loss of grazing due to the footprint of project-related infrastructure would reduce the carrying capacity of the total area occupied by the three farm properties by 2 LSU. The specialist considered this to be insignificant.

The increase in the size of the footprint of project-related infrastructure occasioned by the proposed amendment (to a total area of 18.34ha) of was estimated to result in a further reduction in the carrying capacity of the project area of 1.05 LSU, to a total reduction of 3.05 LSU – effectively 3 LSU. The specialist considered a reduction in the overall carrying capacity of 3.05 LSU not to be significant in terms of the overall carrying capacity of the remaining 2 531 ha.

The specialist’s assessment of the overall significance of impacts on carrying capacity during operation was unchanged from the original (2011) ratings. Impacts were considered to be Moderate negative without mitigation, and Low negative with mitigation. Mitigation measures comprised rehabilitating as much of the disturbed areas as possible to facilitate stock grazing. The specialist noted that he had been informed by a stock breeder that the presence of wind turbines does not affect grazing by cattle and sheep in their vicinity.

Mitigation measures proposed in the original report remain valid, and no new mitigation measures were proposed.

Conclusions:

- ❖ *“The construction of the twenty two (22) wind turbines and associated permanent infrastructure will impact on both the natural vegetation through the removal of 18.34 ha of grazing area, and on the grazing capacity of the properties with a decrease of 3.05 LSU in the number of livestock that can be run on the three properties.”*
- ❖ *“It is our opinion that the increase in the development footprint that will occur as a result of the envisaged application for an amendment, will not have a significant impact on the economic viability or long-term carrying capacity of the three commercial farms in the study area or on the natural vegetation component, the conservation status of which is least threatened.”*

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of vegetation	HIGH -ve	No change
Pollution of water sources	MODERATE -ve	No change
Erosion and construction on land with a gradient	MODERATE -ve	No change
Operation		
Possible change of use of agricultural land	MODERATE -ve	No change

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

Mitigation measures proposed in the original report remain valid, and no new mitigation measures were proposed.

3.2 Avifauna (Birds)

The report included in the EIA submission – Avifaunal Impact Assessment, 21st December 2011 – was prepared by Wild Skies Ecological Services (J Smallie). The report included in this Amendment Report – Avifaunal Statement, 18th August 2018 – was also prepared by Wild Skies Ecological Services (J Smallie), and is included in full as Appendix B.

Wild Skies Ecological Services also carried out a pre-construction bird monitoring programme from May 2014 to February 2015. The results are reported in Appendix 2 of the Addendum to the EIA Report (CES 2015b).

Key Observations:

Habitat destruction: The original (2011) finding was that habitat destruction during construction will be of LOW significance, both pre-and post-mitigation. Given that the habitat is not particularly unique and none of the priority bird species relevant to the study are habitat specialists the specialist does not believe the proposed amendments warrant an increase in the significance of this impact.

Disturbance of birds: The original (2011) finding was that disturbance of birds during construction will be of LOW significance both pre- and post-mitigation. This is unchanged by the proposed amendments.

Disturbance and displacement: The original (2011) finding was that disturbance and displacement of birds during operations will be of LOW significance pre- and post-mitigation. This is unchanged by the proposed amendments.

Collision and electrocution: The original (2011) finding was that collision and electrocution of birds with and on the grid connection power line will be of MODERATE significance, but can be mitigated to LOW significance. This is unchanged by the proposed amendments.

Collision of birds with turbine blades: The original (2011) finding was that collision of birds with turbine blades during operations will be of MODERATE significance, and remains of MODERATE significance post-mitigation. Based on four seasons of monitoring during 2015 the specialist assessed the potential impact of the change in the height of the rotor above ground level and the increase in risk area presented by the larger rotor.

With regard to the change in the height of the rotor above ground level there was no change in risk expected for ten of the 15 priority bird species observed, a slight increase in risk for one species, and a slight decrease in risk for four species. Accordingly it was concluded that the change in turbine blade height above ground does not materially change the collision risk posed to birds, and hence the original findings will not be affected.

With regard to the increase in turbine rotor sweep area only one of the priority species recorded flying on site – the African Crowned Eagle - had average flight heights in the upper part of the area swept by the rotor. It was therefore concluded that the actual realised increase in collision risk area to the relevant bird species flying on the Grahamstown Plan 8 site will not be sufficient to warrant a change from MODERATE to HIGH significance.

Conclusions:

- ❖ “We conclude that the proposed amendment does not substantially alter the risk to avifauna, and does not change the significance of the impacts as previously assessed. The raising of the rotor zone higher above ground level has a net beneficial effect for avifauna, and the increased absolute collision risk envelope is mostly at altitudes too high to be of concern for most bird species.”
- ❖ “In addition it must be remembered that the species considered most at collision risk by the original assessment are not regionally Red Listed, and so the significance of any impacts on them is diminished. As a result there is no need for additional mitigation measures due to the proposed amendment.”

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Avifauna habitat destruction	LOW -ve	Unchanged
Disturbance of birds	LOW -ve	Unchanged
Operation		
Bird collision and electrocution on overhead power lines: impact on Red Listed and other species	LOW -ve	Unchanged
Bird disturbance and displacement from area as result of wind turbines and other infrastructure	LOW -ve	Unchanged
Bird collision with turbine blades	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

3.3 Chiroptera (Bats)

The report included in the EIA submission – Specialist Bat (Chiroptera) Sensitivity Assessment, January 2012 (amended 25th April 2012) – was prepared by Animalia Zoological & Ecological Consultation (WC Marais). The revised specialist report included in this Amendment Report – *Proposed amendment to the environmental authorisation for the Plan 8 Grahamstown Wind Energy Facility in the Eastern Cape, and the impacts on bats: Turbine Dimensions, 11th February 2019* – was also prepared by Animalia Zoological & Ecological Consultation (WC Marais), and is included in full as Appendix C.

Animalia Zoological & Ecological Consultation also carried out a pre-construction bat monitoring programme from May 2014 to February 2015. The results are reported in Appendix 3 of the Addendum to the EIA Report (CES 2015b).

Key Observations:

The advantage of the proposed amendment is that it will increase the rotor swept height above ground and therefore decrease the likelihood of impacts on bats.

The disadvantage is that it will also result in a larger airspace of moving blades, although the larger airspace of moving blades is in a lower risk zone. The specialist noted that, during the 12-month pre-construction monitoring period, bat activity was observed to be significantly higher at 10m

above ground level than at 50m.

The proposed increased development footprint is still relatively small (0.72% of total project area), therefore the impact of loss of foraging habitat remains as assessed in the bat EIA study.

Due to more recent insights gained in the industry (that is, since the EAI study was carried out) the sensitivity map that was used in the EIA phase (in which a 50m buffer zone around high bat-sensitivity areas was recommended) was subsequently deemed as insufficient by the specialist and may not adequately minimise the risk of impacts to bats. The sensitivity map accords with the recommendation in the reports of the pre-construction bat monitoring programme, in which a 150m buffer zone around high bat-sensitivity areas was specified.

Specific observations relating to the approved locations of the turbines were:

- ❖ All turbine bases are outside the high bat-sensitivity buffers, as required by the 2014 SABAA Guidelines that were in force when the study was undertaken.
EAP's Note: Re-examination of the Google Earth™ images shows that the bases of turbines 3 and 21 are inside the buffer zone by approximately 2m and 11m respectively.)
- ❖ The blades of turbines 3, 4, 5, 9, 17, 18, 19 and 21 encroach into the high bat-sensitivity buffers. Although not required by the 2014 SABAA Guidelines, it is recommended that, where possible, turbines should be micro-sited to satisfy the “no-blade-encroachment criterion” set out in the 2017 SABAA Guidelines¹.
EAP's note: Google Earth™ images indicate that turbines 3, 4, 5, 18, 19 and 21 can be micro-sited, by distances between 30m and 85m, such that no part of any turbine blade encroaches into the high bat-sensitivity buffer zones. The proposed micro-siting of these six turbines is illustrated on Figure 3.1 (general) and 3.2 (detail). The estimated movements required to satisfy the “no-blade-encroachment criterion” are shown on Figure 3.2.
- ❖ The current approved location for Turbine 9 is sufficient, by considering the elevation difference between the high bat sensitivity area and the turbine blade tip, to keep the turbine blades outside the high bat sensitivity buffer.
- ❖ Turbine 17 cannot be micro-sited without violating the N2 road reserve buffer². Consideration of the difference in elevation between the turbine blade tip and the bat high sensitivity still means that the blades encroach into the high bat-sensitivity buffer zone. However, the location of this turbine satisfies the minimum requirements at the time that the study was conducted (that is, the turbine base is outside the high bat-sensitivity buffer zone). The turbine is a candidate for the implementation of adaptive mitigation management measures in the event of unacceptable numbers of bat mortalities during operation.

Conclusions:

The proposed amendment is acceptable from a bat sensitivity perspective if the revised sensitivity map is adhered to, the recommended adaptive mitigation measures are adhered to, and a bat mortality monitoring study is conducted for a minimum duration of two years during the operational phase.

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Destruction of bat foraging habitat	LOW -ve	Unchanged
Destruction of bate roosts	LOW -ve	Unchanged

¹ SABAA 2017, S9.1 –Buffer Zones, p26.

² The N2 buffer is 200m from the edge of the road reserve on each side of the road. The road has been realigned through the area to be occupied by the WEF, and the revised location of the reserve has not yet been finalised.

Operation		
Bat mortalities by turbine blades during foraging	MODERATE -ve	Unchanged
Bat mortalities by turbine blades during migration: cumulative impact	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures specified in the EIA report were found to be sufficient, and remain unchanged: no new mitigation measures were proposed. However, the specialist emphasised the importance of the following:

- The sensitivity map (150m buffer zone around bat high-sensitivity areas, plus micro-siting of turbines to reduce encroachment of turbine blades into the buffer zones) must be adhered to.
- The adaptive mitigation measures recommended in the pre-construction monitoring programme must be adhered to.
- A bat mortality monitoring study must be conducted for a minimum duration of two years during the operational phase of the project. The mitigation and management measures specified in the EIA should apply to whichever turbines may be identified, during the operational monitoring study, to cause unsustainable numbers of bat mortalities.

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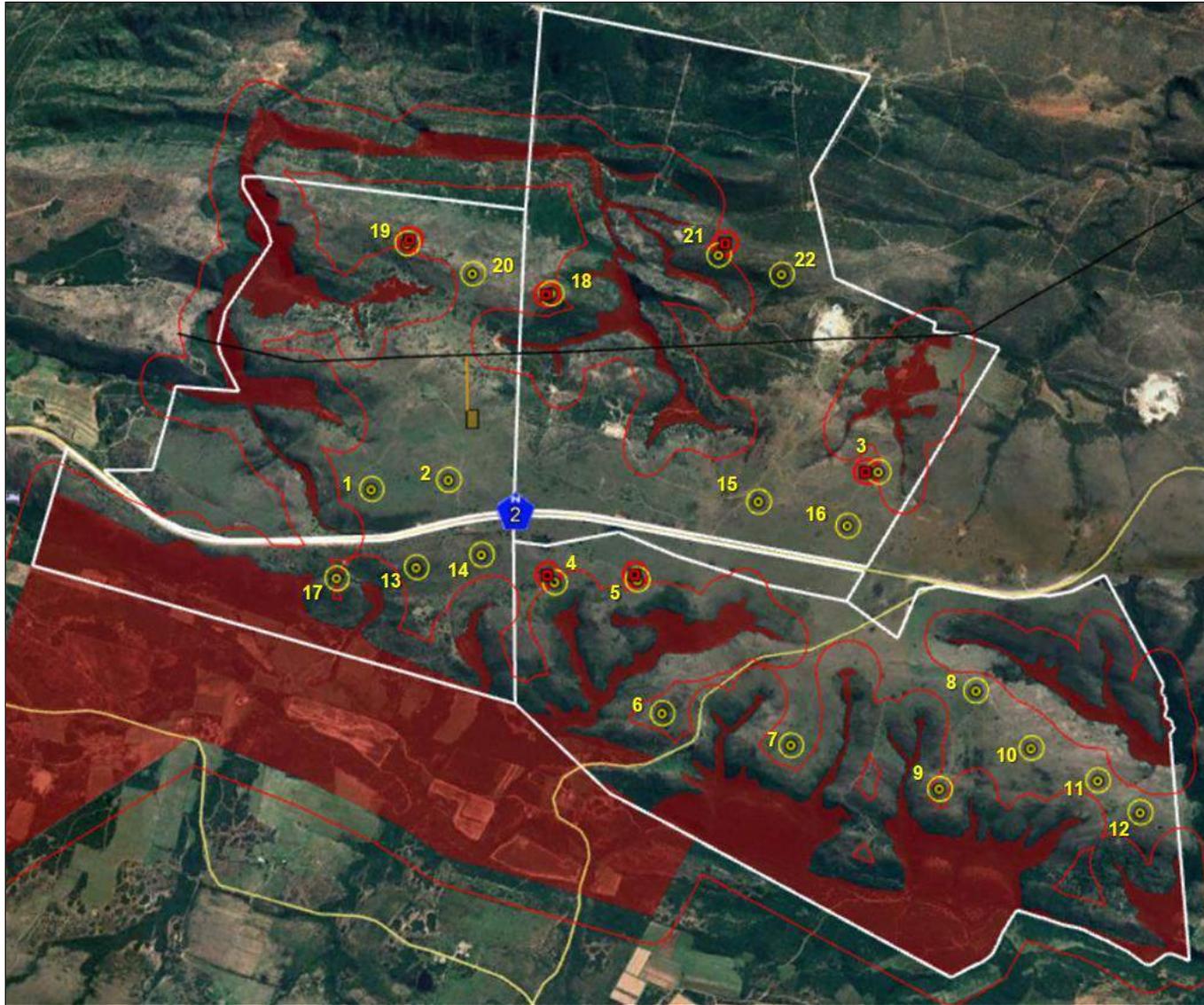


Figure 3.1: General layout - turbine micro-siting required to satisfy the no-blade-encroachment criterion

- (i) Yellow dots & circles: Approved locations of turbines & 149m diameter horizontal sweep of turbine blades;
- (i) Red dots & circles: Proposed micro-sited locations of turbines & 149m diameter horizontal sweep of turbine blades;
- (iii) Opaque red shading & solid red line: High bat-sensitivity areas & outer edge of 150m-wide high bat-sensitivity buffer.

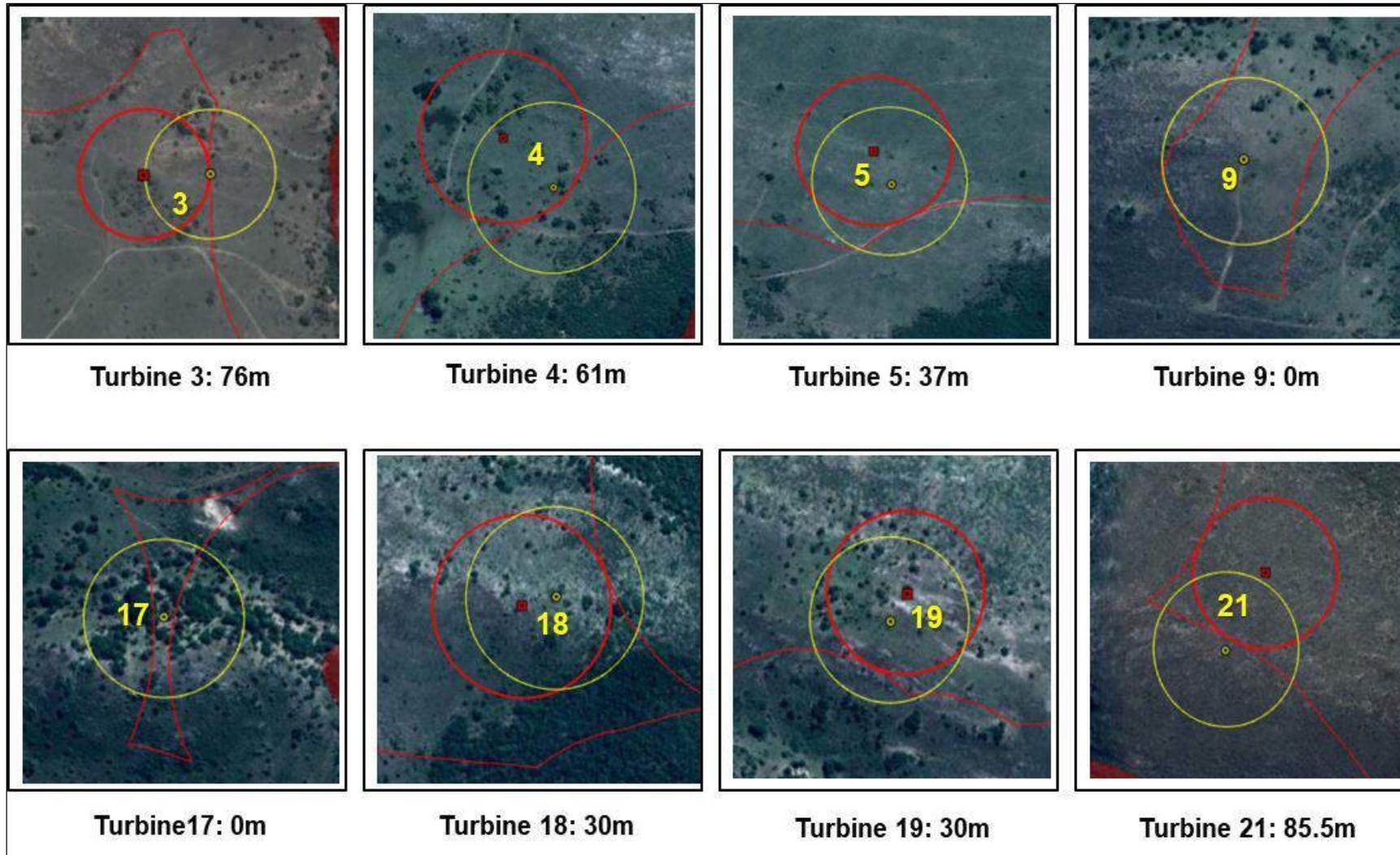


Figure 3.3: Details of turbine micro-siting required to satisfy the no-blade-encroachment criterion

- (i) Yellow dots & circles: Approved locations of turbines & 149m diameter horizontal sweep of turbine blades;
- (i) Red dots & circles: Proposed micro-sited locations of turbines & 149m diameter horizontal sweep of turbine blades;
- (iii) Solid red line: Outer edge of 150m-wide high bat-sensitivity buffer.

3.4 Ecology (Flora and Fauna)

The report included in the EIA submission – Ecological Specialist Report, January 2012 – was prepared by Coastal & Environmental Services (CES – L-A de Wet). The report included in this Amendment Report – Amendment for the Proposed Plan 8 Grahamstown Wind Energy Facility close to the Town of Grahamstown, Eastern Cape: Comment from the Ecological Specialist, 5th October 2018 – was also prepared by Coastal & Environmental Services. However, at the time of preparing this Amendment Report the original author had left the employment of CES, and the specialist opinion was written by R de Kock, who contributed to the preparation of the ecological components of the EIA Report, together with Ms de Wet and Professor Roy Lubke. The full ecological opinion is included as Appendix D

Key Observations:

The significances of all impacts identified in the original Ecological Report are still valid for all changes to the approved specifications for the facility.

There are no additional impacts identified for any of the changes.

Conclusions:

- ❖ The proposed changes to the layout will have no additional impact on the ecological landscape and therefore no additional issues were identified when compared to the final Ecological Impact Assessment (2012) for the proposed Plan 8 Grahamstown Wind Energy Facility, dated January 2012.
- ❖ The significance of all issues identified in the 2012 Ecological Impact Assessment remain valid and all recommended mitigation measures identified must still be implemented for all phases of the wind farm.
- ❖ This Letter of Opinion is not a standalone document, and the conclusions made must be read in conjunction with the 2012 Ecological Impact Assessment.

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of degraded thicket	LOW -ve	Unchanged
Loss of fynbos	LOW -ve	Unchanged
Loss of fynbos / thicket / karoo mosaic	LOW -ve	Unchanged
Loss of rocky fynbos (RF)	N / A	No turbines in RF
Loss of thicket (Th't)	N / A	No turbines in Th't
Loss of thicket mosaic	LOW -ve	Unchanged
Loss of plant species of special concern	LOW -ve	Unchanged
Loss of animal species of special concern	LOW -ve	Unchanged
Loss of biodiversity	LOW -ve	Unchanged
Disruption of ecosystem function and process	LOW -ve	Unchanged
Invasion of alien species	MODERATE +ve	Unchanged
Operation		
Introduction of alien plant species	LOW +ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

3.5 Archaeology

The report included in the EIA submission – Scoping Archaeological Impact Assessment, 15th December 2011 – was prepared by Nilssen Archaeological Resources Management (P Nilssen). Xwiba Consulting (CJ Bradfield). The report included in this Amendment Report – Addendum: Archaeological Inputs to the Proposed Amendment to Authorized Development, 1st October 2018 – was also prepared by Nilssen Archaeological Resources Management (P Nilssen). The original report (2011) and the Addendum (2018) are included in full as Appendix E.

Key Observations:

The 2011 scoping study addressed the proposed layout of 27 wind turbines, which was subsequently amended by reducing the number of turbines to 22, in a revised layout. The survey identified a few *ex situ* Stone Age artefacts of low archaeological significance, two unmarked graves older than 80 years and an old and rusted horse/oxen drawn plough on Farm Gilead 361, and a cave with rock paintings in one of the gorges on Peynes Kraal 362, which was known to the owner of the property. The specialist observed that there was an overall lack in archaeological remains on the site, and SAHRA, in its comments on the report, noted that the general sensitivity of the area is low from an archaeological perspective.

In his assessment of the proposed amendments to the project the specialist noted that the increased area of the disturbed area (arising from the increased size of the turbine foundations and the increased size of the materials laydown / hardstanding areas) are the changes that potentially impact the archaeological record, but that the main concern is that the changes in the turbine locations means that considerable areas within the revised development footprint were not previously been assessed from an archaeological standpoint.

The specialist rated the significance of the impacts on potential loss of archaeological resources as Moderate without mitigation measures and Low with mitigation. He did not suggest that the impact assessment should change for the amended project.

Recommendations:

- ❖ *“It is recommended that SAHRA’s recommendations of 2012 be incorporated in the Environmental Management Program for the development.”*
- ❖ *“That an archaeological walk-down study of areas not covered during the original assessment should be undertaken prior to the construction phase of development and that this study need not be a full Phase 1a Archaeological Impact Assessment.”*
- ❖ *“That this addendum be submitted to ECPHRA for comment prior to submission of the Amendment Application to the DEA.”*

These recommendations are discussed further in Chapter 5.

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Impact on heritage resources	LOW -ve	Unchanged
Operation		
Impact on heritage resources	LOW -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed. However, in light of the changes to the turbine layout since the original study was completed, it is recommended that areas not previously surveyed are surveyed prior to commencement of construction.

3.6 Noise

The report included in the EIA submission – Specialist Study on Noise Impacts (Ver8), February 2014 – was prepared by Safetech (B Williams). The report included in this Amendment Report – Re-modelling of Noise Impact Assessment: Plan8 Wind Energy Project, 18th September 2018 – was also prepared by Safetech (B Williams), and is included in full as Appendix F.

Key Observations:

The specialist notes that the report is to be viewed as an addendum to the main Noise Impact Report that was issued in February 2014 (Version 8), and that the purpose of the report is to determine if the revised turbine specifications for the proposed 22 turbines will comply with the noise emission limits as contained in the Department of Environmental Affairs - Environmental Authorisation (12/12/20/2523) issued in 2015.

86. All wind turbines should be located at a setback distance of 500m from any homestead and a day/night noise criteria level at the nearest residents of 45dB(A) should be used to locate the turbines. The 500m setback distance can be relaxed if local factors, such as high ground between the noise source and the receiver, indicates that a noise disturbance will not occur.

(DEA 2015, p20/21)

The revised turbine specification necessitated a remodelling of the layout, using noise data published in the WindPro catalogue of wind turbines for the Nordex N149/4.0-4.5 turbine with a rated power of 4.5MW.

The modelling results indicate that the Environmental Authorisation limit of 45 dB(A) will be exceeded at two of the ten noise sensitive areas - the Main Farm House and Workers House on the Farm Peynes Kraal – where the noise limit will only be exceeded at wind speeds exceeding 6m/s, when the sound power level will not be more than 46.2 dB(A). The specialist noted that it is highly likely that the wind noise will provide a masking effect of the turbine noise, as the predicted noise is only one decibel above the limit, and that the modelling assumes the receiver is outdoors at all times.

Conclusions:

- ❖ *“The overall environmental noise impact significance remains low taking into account the changes to the turbine specifications.”*
- ❖ *“The amended project description will slightly exceed the current Environmental Authorisation limit of 45 dB(A) at two of the noise sensitive receptors using the data that was modelled.”*
- ❖ *“The specific conditions as set in the Environmental Authorisation are thus partially complied with.”*
- ❖ *“It is my recommendation that, based on the results and information presented here, the granting of an amended Environmental Authorisation with respect to the noise impacts is recommended.”*

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Construction noise from plant and machinery	LOW -ve	Unchanged
Operation		
Noise from turbines	LOW -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

3.7 Palaeontology

The report included in the EIA submission – Palaeontological Heritage Impact assessment for a proposed 80MW windfarm, 30km east of Grahamstown, December 2011 – was prepared by Rob Gess Consulting (R Gess). The report included in this Amendment Report – Palaeontological Heritage Impact assessment for a proposed 88-99 MW windfarm, 30km east of Grahamstown, September 2018 – was also prepared Rob Gess Consulting (R Gess), and is included in full as Appendix G.

Key Observations:

The centre of the site of the WEF is some 30km east of a deep road cutting for the N2 highway near Waterloo Farm, south of Grahamstown, where black shale lenses in the rocks of the Witpoort Formation (part of the Witterberg Group, the uppermost of the three subdivisions of the Cape Supergroup), have yielded at least 20 taxa of fossil fish, dozens of plant and algal taxa, remains of several arthropods, and evidence for Africa’s earliest four-legged animal. Thus far 21 taxa new to science have been described from the Waterloo Farm site, many more await description, and the site is considered to be the most important Late Devonian palaeontological locality in Africa.

Nevertheless, after surveying the site of the WEF in 2011 the palaeontology specialist concluded that the fossil significance of the footprint area of the facility was quite low, since the black shale of the Witpoort Formation in the vicinity of the site is deeply weathered, and has degraded into kaolin soft clay, which is currently exploited for brick making, along with silcrete. The specialist noted that the Witpoort Formation is in places overlain by fine grained brown shales of the Lake Mentz Subgroup, where only a few plant fragment fossils, also considered to be of low significance, were recorded.

The original (2011) study was carried out prior to the commencement of work on the rehabilitation and upgrading of the N2 highway between Grahamstown and the Fish River. Part of this work involved the excavation of a deep cutting for a realigned section of the road, in an area known as Coombs Hill, 5 to 10km west of the site of the WEF. These excavations, at Coombs Hill and Rabbit Ridge (see Appendix G, Figure 6), uncovered a number of palaeontologically important black shale lenses within the Witpoort Formation, which provided the first record of predominantly marine invertebrate shells within the Witpoort Formation, more than one species of bivalve, a wealth of plant fossils, and extensive trace fossils.

In light of the discoveries since completion of the 2011 study a new survey of the site of the WEF was conducted in September 2018.

Conclusions:

“The development area is focussed on Witpoort Formation quartzite ridges, which were not, at surface, found to be significantly fossiliferous. Potentially important interbedded black shales within the quartzites are sometimes kaolinised to a deep depth; however, where they are shielded by overlying beds of quartzite they may still be usefully fossiliferous close to surface.”

“Quarries and roadworks within the study area, and within the district, have demonstrated that excavation into the Witpoort Formation not infrequently intercepts black shale layers and lenses that may be of great palaeontological value. Palaeontological investigations of these layers in the Grahamstown district have provided the world’s only window into high latitude conditions at the end of the Devonian, a time of extreme importance in understanding the process of vertebrate terrestrialisation and the lead up to the second global Mass Extinction Event.”

“There is therefore a reasonable chance that excavation of holes for casting wind tower footings (foundations) will intercept fossiliferous shales, which may contain important unique heritage material. Lag deposits, containing fossil stems and possibly bones, might also be found preserved within the quartzites.”

Recommendations:

- ❖ “All excavated holes for wind tower footings (foundations) should be examined by a palaeontologist after excavation and before casting of footings (concrete).”
- ❖ “All new access roads should simultaneously be inspected by a palaeontologist prior to any rehabilitation.”
- ❖ “Should any paleontologically important material be exposed, this should be sampled by a professional palaeontologist and accessioned into the collection of the Albany Museum in Grahamstown.”

Note: The specialist has confirmed that he requires the opportunity to inspect the sides and base areas of any excavation in which rock is encountered, before work continues to cover the exposed rock (with concrete, backfill or road stone, for instance). In addition, the excavated rock is to be retained, unused for any other purpose, on the site until such time as he has had an opportunity to inspect the rock for the presence of fossils.

(Pers comm, Dr Rob Gess, Albany Museum, Makhanda, (Grahamstown), 12th December 2018)

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Loss of palaeontological resources	LOW -ve	Unchanged
Operation		
No impacts identified		

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed. However, in light of the important fossil discoveries in the nearby excavation for the N2 highway cutting, since completion of the 2011 study, extra vigilance is recommended during excavations on the WEF site, including inspection of excavations in which rock is encountered immediately excavation is completed and before exposed rock faces are covered.

3.8 Socio-economics

The report included in the EIA submission – Socio-Economic Impact Assessment for the Proposed Plan-8 Infinite Energy Grahamstown Wind Energy Project, August 2013 – was prepared by Urban-Econ Development Economists. The report included in this Amendment Report – Socio-Economic Impact Assessment for the Proposed Plan 8 Infinite Energy Grahamstown Wind Energy Facility Project (2018 – Proposed Amendments), November 2018 – was also prepared by Urban-Econ Development Economists, and is included in full as Appendix H.

Key Observations:

The review of the most recent relevant policy documents at national, provincial and local levels indicated that utilisation of renewable energy sources in South Africa is considered to be an integral means of reducing South Africa's carbon footprint, diversifying the national economy, and reducing poverty. Any project contributing to the above-mentioned objectives can therefore be considered strategically important to South Africa. From a provincial and municipal policy perspective the facilitation of renewable energy projects and interventions that relate to the broader green economy are seen as a priority. The Eastern Cape Provincial Industrial Development Strategy makes particular reference to the need to develop green industries, which include renewable energies. Likewise, the Makana municipality has noted the importance of wind energy in its IDP and is actively seeking to promote such developments.

The review of the socio-economic landscape of the study area indicates that it has not changed significantly since 2013. Issues that were important in 2013, such as poverty, lack of skills and education, are still significant factors that define the socio-economic context of the study area. Updated socio-economic data for Makana Local and Sarah Baartman District municipalities was compared with 2011 Census data figures and to 2017 datasets where appropriate.

Comparing the results of surveys conducted in 2013 with the 2018 survey results shows that, despite the slight decrease in the number of surveyed farm owners, there has been a general reduction in the number of temporary farm workers, especially in the hunting/tourism industry and crop farming industry. There has, however, been a large increase in the number of permanent staff employed by these operations. Overall there was a ratio of 10.4 staff per farm owner in 2013, whilst in 2018 there has been found to be a ratio of 10.5, indicating that, while the permanent / temporary dynamic has changed dramatically, the overall number of staff per farmer has remained the same over this period.

A limited number of the assumptions about project impacts have changed between the 2013 and 2018 versions of this report as a result of new information in respect of, in particular, construction phase impacts in line with new CAPEX figures and operational phase impacts in line with new OPEX figures. The changes that have occurred are largely due to the increase in the total installed generating capacity of the facility from 66MW to 99MW as a result of the larger rotor technology to be employed. Other changes include:

- The anticipated date of the commencement of construction from 2015 to 2019,
- Increase in local spend during construction from R715 million (inflation adjusted to 2018 values) in 2013 to R952 million in 2018.
- Increase in labour required during construction from 142 to 307 Full Time Equivalent (FTE) positions
- The date of the commencement of operation from 2015 to 2022,
- Increase in local spend during operation from R7.6 million (inflation adjusted to 2018 values) in 2013 to R9.4 million in 2018.

The remaining assumptions, such as the number of persons to be employed during operations, remain the same as those used in the 2013 assessment.

In assessing the effect of the visual impacts of the proposed amendment to the project it was noted that a number of changes have occurred between 2013 and 2018 versions of this report. The 2018 version of this report recognises that the renewable energy landscape has changed significantly from 2013, when WEFs were uncommon in the Eastern Cape, compared to 2018 where a large number of WEFs have subsequently been developed and are now fully operational. The report also acknowledges that the Waainek WEF is also operating in the area. The presence of such a development will have likely changed perceptions towards WEFs and the renewable energy sector in the area. It is likely that fears over the presence of WEFs have been reduced as residents become more familiar with the changes in their surroundings. This is in keeping with academic literature which indicates that opposition to WEFs generally decreases after construction is completed largely as a result of a greater understanding of the nature of the WEFs.

Conclusions:

- ❖ The proposed amendments to the original design of the WEF proposed by Plan 8 are not likely to change the overall recommendations presented in the August 2013 SEIA. The proposed amendments have increased the overall positive impact on the economy during construction and operation as well as the number of FTE positions required during construction. The development will now inject a larger proportion of spend into the local economy which will create significant downstream impacts (presented in Chapters 4 and 5 of the report in Appendix H).
- ❖ Based on survey responses regarding visitor statistics, potential production losses to the local tourism sector associated with visual exposure are estimated at between R 0.1 million and R 6.8 million per year. These are to be compared with the proposed WEF's once-off direct capital injection of R 124 million into the Makana Local Economy. This is estimated as potentially creating a further R 187 million for the local economy through indirect and induced production effects and a further R 70.69 million through GDP-R impacts. Annual production impacts of the facility once operational are expected to exceed R 20 million per annum. These impacts are higher than those initially considered for the original application in 2013 when adjusted for inflation. It is also likely that because of the increasing occurrence of WEFs in the region, as well as the Eastern Cape as a whole, there may be a higher degree of acceptance of the facilities.
- ❖ Benefits accruing to the region from investments and activity in the tourism sector are thus outweighed by those that would arise from the construction and operation of a WEF. This report finds that the positive benefits anticipated from the WEF construction and operation will outweigh any potential negative losses within the local tourism industry, and this is in line with the recommendations given for the initial application in 2013.
- ❖ The measures proposed in the EMPr have not changed since the August 2013 SEIA Report.

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Temporary stimulation of the national and local economy	HIGH +ve	Unchanged
Temporary increase in employment, national and local economies	MODERATE +ve	Unchanged
Contribution to skills development: national and local economies	MODERATE +ve	Unchanged
Temporary increase in household earnings	MODERATE +ve	Unchanged
Temporary increase in government revenue	MODERATE +ve	Unchanged
Changes to the sense of place	MODERATE -ve	Unchanged
Impact on the local tourism, game industry and associated industries	LOW -ve	Unchanged
Temporary increase in social conflicts due to the influx of people	LOW -ve	Unchanged
Impact on economic and social infrastructure	LOW -ve	Unchanged

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Impact on real estate dynamics and business activity in the immediately affected area	MODERATE -ve	Unchanged
Operation		
Sustainable increase in production and GDP-R: national and local	MODERATE +ve	Unchanged
Creation of sustainable employment positions: national and local	MODERATE +ve	Unchanged
Skills development of permanently employed workers	MODERATE +ve	Unchanged
Improved standards of living for the benefiting households	MODERATE +ve	Unchanged
Sustainable increase in national and local government revenue	MODERATE +ve	Unchanged
Local economic and social development from project operations	HIGH +ve	Unchanged
Changes to the sense of place	MODERATE -ve	Unchanged
Impact on local tourism, game farming and associated industries	MODERATE -ve	Unchanged
Impact on the livelihoods of the household's dependant on the local tourism, game farming and association industries	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment remain valid, and no new measures were proposed.

3.9 Visual

The reports included in the EIA submission – Plan8 Grahamstown WEF, VIA Report, June 2012, and Revision 1, March 2013 – were prepared by MapThis (H Holland). At the commencement of this Amendment application Mr Holland informed us that he had left the field of VIAs some time previously, and was not available to assess the implications of the proposed amendments. He also informed us that he was no longer in possession of any of the data and information he had used for the original assessment for the EIA. The report included in this Amendment Report – Visual Impact Assessment of the Proposed Amendments, August 2018 – was prepared by Coastal and Environmental Services (M Johnson), and is included in full as Appendix I.

Key Observations:

As noted above, electronic data used in the original 2012/13 VIA to calculate the viewshed was not available from MapThis (Henry Holland), and it was necessary to recreate the viewshed for the approved turbines, from which it was determined that the turbines will be visible from a total of 3 282 buildings within 20km of the site boundary. This compares favourably with the 3 327 buildings calculated by MapThis in 2013. The difference is slight, and is attributed to the use of a more recent data set in this study – the Dwelling Frame Update dataset, 1st February to 31st March 2016, part of the South African Demographic and Health Survey, 2016, compiled by Stats SA – than used in the original study.

The viewshed created for the proposed larger turbines indicates that the turbines will be visible from a total of 3 363 buildings within 20km of the site boundary. In all cases the number of buildings includes all buildings, both occupied and unoccupied. High visual exposure to the approved (smaller) turbines and the proposed (larger) turbines was limited to 5% of the total number of buildings in both cases.

The change in turbine height and rotor diameter for the proposed Plan 8 WEF will not introduce any new visual impacts, nor significantly alter the visual impacts as assessed in the original

2012/2013 VIA Report, for which the original project received Environmental Authorisation. It was suggested that the significance of the visual impacts during construction of the facility, which will be of relatively short duration, could reasonably be reduced from High negative to Moderate negative, since the construction activity on the upgrading and realignment of the N2 highway have become a familiar occurrence in the area. The larger turbines will, however, increase the visibility, exposure and visual intrusion of the project.

Since the nearest wind energy facility (the Peddie WEF) is 25km away, the contribution of the amended Plan 8 facility to cumulative impacts in the broader area is considered to be negligible. Cumulative impacts will only become an issue if the much larger Albany WEF, which will comprise 66 turbines and is currently the subject of an ongoing EIA, is constructed between the Plan 8 site and Grahamstown.

Conclusions:

“The Plan 8 Grahamstown WEF will undoubtedly impact the visual landscape for nearby visual receptors. While the high residual visual impacts cannot be completely mitigated, these should be considered within the context of the relative impermanence of the facility, which could be successfully removed at the end of its operating life, and the local, regional and national environmental, social and economic gains in the form of economic investment, job creation and skills development, increased energy security, climate changes mitigation, and investment in local community development projects.”

“It is concluded that potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed changes. There is therefore no reason, in terms of visual concerns, why the amended project should not receive authorisation.”

Recommendations:

Mitigation measures proposed in the original 2012/2013 VIA for the visual impacts of construction activities, night lights on the turbines, and potential shadow flicker effect remain relevant and must be implemented

Impacts:

Comparison of impacts identified and assessed during the EIA process:

Impact assessed during EIA process	Significance after mitigation	Amendment Assessment
Construction		
Intrusion of construction activities on views of sensitive visual receptors	HIGH -ve	Reduced to MODERATE -ve
Operation		
Intrusion of large, highly visible wind turbines on the existing views of sensitive visual receptors	HIGH -ve	Unchanged
Potential landscape impact	MODERATE -ve	Unchanged
Impact of shadow flicker on residents close to wind turbines	LOW -ve	Unchanged
Impact of night lights of a wind farm on existing nightscape	MODERATE -ve	Unchanged

The specialist did not identify any new impacts as a result of the proposed changes to the dimensions of the turbines.

Mitigation Measures:

The mitigation measures proposed in the original assessment for the construction phase remain valid, and no new measures were proposed. No mitigation measures were proposed for the operational phase.

4. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENT

Advantages and disadvantages discussed below refer to a comparison between the approved project and the proposed amended project. As described in Chapter 2, the differences between the approved and proposed amended project can be summarised as follows:

- The project will be managed by a special purpose vehicle created for the sole purpose of developing, financing, constructing, managing and operating this project. (Part 1 Amendment.)
- The 22 proposed turbines will be larger (in terms of hub height and rotor diameter) than the 22 approved machines, will have increased generating capacity for the same turbine layout, but will remain in their approved locations. (Part 2 Amendment).

4.1 Advantages

4.1.1 Part 1 Amendment: Change of Ownership

Grahamstown Wind Farm (Pty) Ltd (GTWF) is a 100% owned subsidiary of Plan 8 Infinite Energy (Pty) Ltd, the current holder of the Environmental Authorisation. GTWF was set up to take responsibility for all aspects of the Grahamstown wind energy facility, including bidding the project into the Department of Energy's Renewable Energy Power Purchase Programme and, if the bid is successful, the financing, design, construction and operation of the facility. It will have its own revenues and balance sheet, separate from those of the parent company. It is therefore entirely appropriate for GTWF to be the holder of the environmental authorisation, and to be the beneficiary of all rights contained in the authorisation, and to be responsible for meeting all the associated obligations and conditions.

4.1.2 Part 2 Amendment: Increasing the size and generating capacity of the turbines

Compared with the approved project the amended project will have 50% greater installed generating capacity without significantly altering the footprint of the project, thereby avoiding the necessity of develop an additional facility at another site, elsewhere, to develop the increased generating capacity. The increased generating capacity will result in improved financial feasibility, increased revenue, and will therefore increase the financial contribution of the project to local development initiatives.

The project's contribution to local economic development will also increase via the provision of training and employment opportunities during the construction and operational phases, and increased improvements in household incomes.

The increased generating capacity of the turbines will increase the project's contribution of renewable energy for the South African grid by 50%, and further contribute to South Africa's targets for reduced carbon emissions.

Recent fossil discoveries at a nearby site indicate that excavations on the Plan 8 site may intercept fossiliferous black shales, the presence of which on the site was not foreseen during the original EIA study. These deposits may contain important and unique heritage material that may provide a further window into high latitude conditions at the end of the Devonian era.

4.2 Disadvantages

4.2.1 Part 1 Amendment: Change of Ownership

No disadvantages are foreseen.

4.2.1 Part 2 Amendment: Increasing the size and generating capacity of the turbines

The principal disadvantage of the larger turbines is their increased visibility in the surrounding landscape. However, it is important to note that the specialist concluded that the larger turbines will not introduce any new visual impacts, nor will they significantly alter the visual impacts as

assessed in the original visual impact assessment.

The specialist reports also indicate that there will be a slight reduction in grazing area and stock carrying capacity of the project area due to the increased size of the turbine bases and laydown/hardstanding areas, and slight increases in the noise levels at some sensitive receptors. The differences in these impacts between the approved project and proposed amended project are considered by the specialists to be negligible.

REVISED DRAFT FOR REVIEW

5. MITIGATION MEASURES

5.1 Mitigation measures proposed in the SFAEIAR and reflected in the SFAEMPr

The list of impacts and associated mitigation measures in Table 7.1 of the Second Final Amended EMPr includes all impacts and mitigation measures described in Chapter 7 of the Second Final Amended EIA Report, which provides details of the general and specific environmental specifications and their implementation in order to mitigate negative environmental impacts and enhance positive impacts.

5.2 Mitigation measures proposed by the specialists

None of the specialists proposed any new mitigation measures in respect of the proposed amendment. In some cases they emphasised the importance of measures they had proposed in their original studies for the EIA Report, and these are described in the following sections.

5.2.1 Chiroptera (bats)

The specialist emphasised the importance of previously-proposed measures, as follows:

- The sensitivity map (150m buffer zone around bat high-sensitivity areas, plus micro-siting of turbines to reduce encroachment of turbine blades into the buffer zones) must be adhered to.
- The adaptive mitigation measures recommended in the pre-construction monitoring programme must be adhered to.
- A bat mortality monitoring study must be conducted for a minimum duration of two years during the operational phase of the project. The mitigation and management measures specified in the EIA should apply to whichever turbines may be identified, during the operational monitoring study, to cause unsustainable numbers of bat mortalities.

5.2.2 Archaeology

The specialist recommended that

“SAHRA’s recommendations of 2012 should be incorporated in the Environmental Management Program for the development.”

These recommendations were as follows:

- (i) *The two unmarked graves must be clearly demarcated and fenced off at least temporarily during construction. A fence must be placed around them, at least 5m from the perimeter of the graves.*
- (ii) *A buffer zone of 50m should be respected between the fence around the graves and the closest wind turbines, this buffer area may be reduced to 20m in the case of access roads.*
- (iii) *The old plough may be fenced off with the graves, however its exposure to the elements will undoubtedly continue its degradation. It is suggested that, if possible and if the landowner deems it suitable, the plough be moved under a covered area or indoor.*
- (iv) *While the rock art site is located in a gorge, and therefore not easily accessible from the ridges where the turbines will be located, it is recommended that the work force at the wind energy facility understands both the importance of the site from an archaeological perspective and why it should not be damaged.*

Protection of archaeological, heritage and palaeontological sites are addressed in section 7.12 – *Areas of Specific Importance*, in the EMPr, but not at the level of detail suggested by SAHRA. This section of the EMPr should be augmented with SAHRA’s recommendations.

The specialist also recommended that *“An archaeological walk-down study of areas not covered during the original assessment should be undertaken prior to the construction phase of development ...”* (The specialist noted that this need not be a full Phase 1a Archaeological Impact Assessment). This requirement should be included as a requirement in the amended EMPr, and should be undertaken prior to the commencement of construction, once the site layout is

finalised.

Finally the specialist recommended that his addendum be submitted to ECPHRA for comment prior to submission of the Amendment Application to the DEA.

EAP's Note: ECPHRA was informed of the intention to submit an amendment application, and the specialist's entire report (2011 Scoping Report and 2018 Addendum Report) was submitted to the Agency shortly after the commencement of the amendment application process. Also, since SAHRA (Cape Town) reviewed the original (2011) report, and gave an opinion on it, the 2018 specialist report was uploaded to the South African Heritage Resources Information System (SAHRIS). (ECPHRA does not have access to SAHRIS.)

5.2.3 Palaeontology

The specialist recommended that, because of the likelihood of encountering fossiliferous shales in the substrate of the site, a palaeontologist should be given the opportunity to inspect all excavations in which rock is encountered before the exposed rock is covered with, for instance, concrete, backfill or road stone, and also to inspect excavated rock for evidence of fossils. Given the importance of the fossil materials found in the nearby N2 cutting, this requirement should be included in the amended EMPr.

5.3 Amendments required in the Environmental Authorisation

The requirements for the contents of an Environmental Management Programme in the 2017 version of the NEMA: Environmental Impact Assessment Regulations (GN R.326, April 2017) are essentially the same as those set out in the 2014 version of the Regulations (GN R.982, December 2014), except that the most recent edition includes the requirement for a consolidated sensitivity map of the site to be included in the EMPr. (The consolidated sensitivity map was included in the SFEAIR as Figure 8.1, and is included for information in this report as Figure 5.1. Note that the width of the buffer zone around high bat-sensitivity areas is 150m on the map.)

The EMPr must be also amended to include all the items specified in paragraphs 15 to 19 of the Environmental Authorisation (*Conditions of this Environmental Authorisation, Scope of authorisation*, pp 12-13), and submitted to DEA before construction may commence.

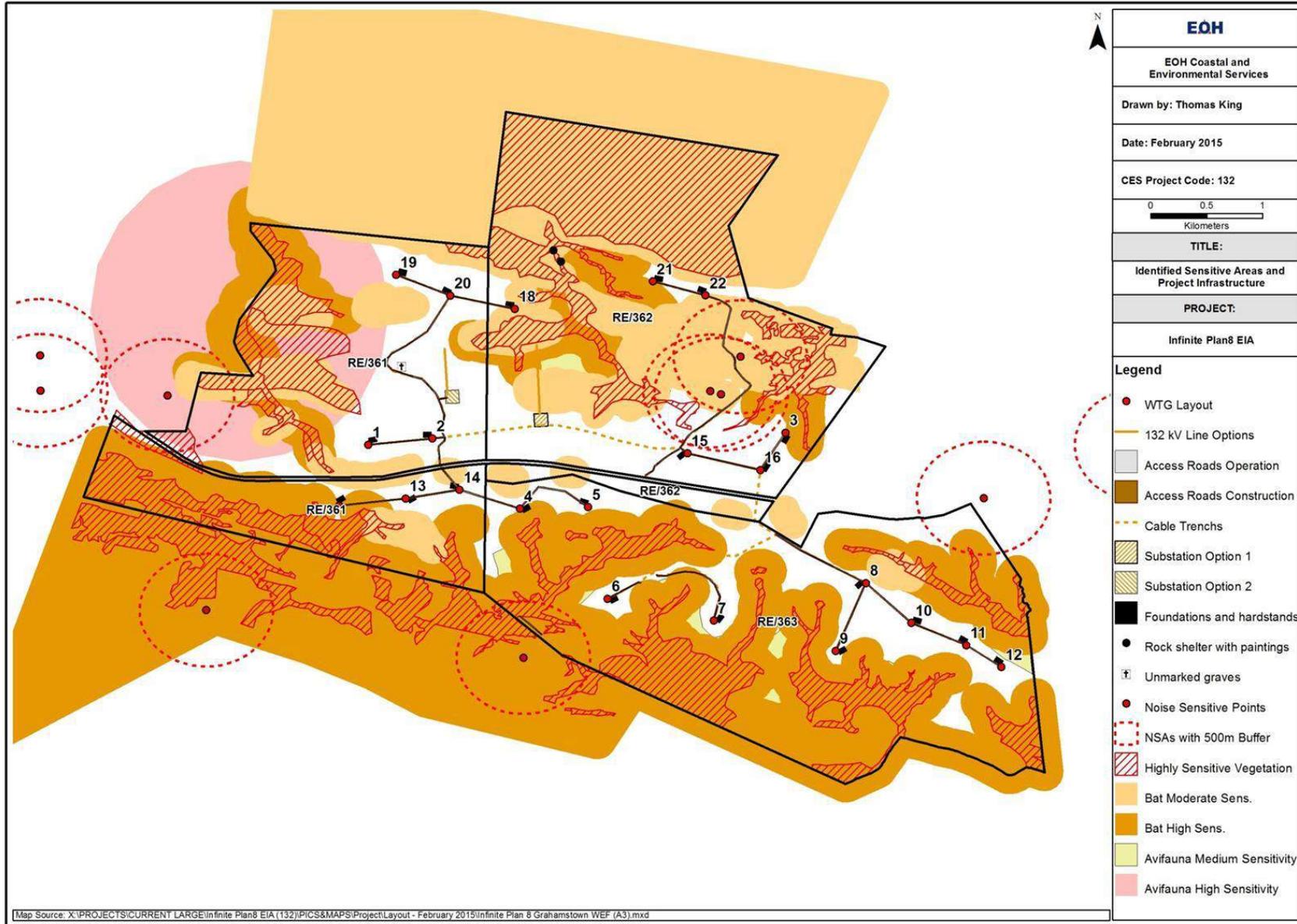


Figure 5.1: Layout of project infrastructure in relation to sensitive areas

6. PUBLIC PARTICIPATION

The requirements for the public participation process in respect of a Part 2 amendment application are set out in Chapter 6 – **Public participation** - of the Environmental Impact Assessment Regulations, 2014, as amended in April 2017.

6.1 I&AP Database

The database of interested and affected parties is included as Figure 6.1 at the end of this chapter. The list has been updated from the one compiled during the appeals process in 2015, and augmented by information from the socio-economic specialist's contact list.

6.2 Notices and Notifications

6.2.1 Site Notices

Site notices were placed at the same three locations where site notices were placed before commencement of the EIA in 2011.

Text of site notice:

NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED AMENDMENT TO THE ENVIRONMENTAL AUTHORISATION ISSUED FOR THE PLAN 8 INFINITE ENERGY (PTY) LTD GRAHAMSTOWN WIND ENERGY FACILITY

DEA REFERENCE NUMBER: 12/12/20/2523

The Department of Environmental Affairs (DEA) issued an Environmental Authorisation to Plan 8 Infinite Energy (Pty) Ltd (Plan 8) for the construction of the Grahamstown Wind Energy Facility (WEF) on 22nd October 2015. Two Appeals against the Environmental Authorisation were submitted to the Minister and both were dismissed (30th September 2016 and 16th March 2017).

The WEF will be situated on Farms Gilead, Peynes Kraal and Tower Hill, between 25 and 31km east of Makhanda (Grahamstown) along the N2 highway.

Plan 8 now intend to submit an application to DEA for an Amendment of the Environmental Authorisation. The application will be conducted in terms of and as required by Chapter 5 of the Environmental Impact Assessment Regulations, 2014, as amended by GN R. 326, published in Government Gazette No 40772 on 7th April 2017.

The proposed Amendment will be in two parts:

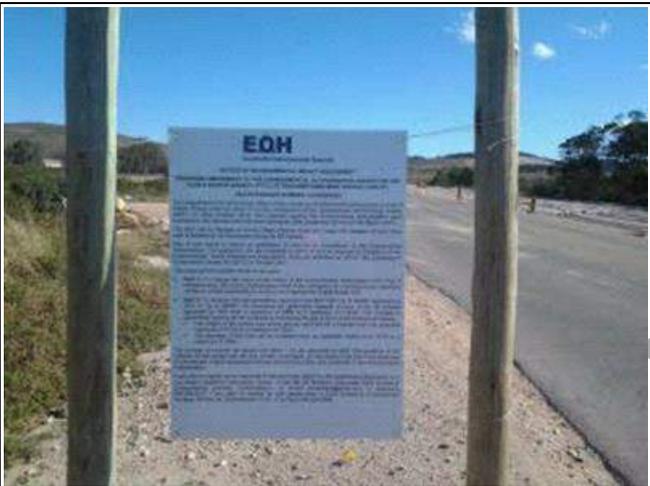
- **Part 1:** To change the name of the holder of the Environmental Authorisation from Plan 8 Infinite Energy (Pty) Ltd to Grahamstown Wind Farm Company Ltd, a wholly-owned subsidiary of Plan 8 created specifically to construct and operate the Grahamstown WEF.
- **Part 2:** To increase the total generating capacity of the WEF from “up to 66MW” approved by DEA to “up to 99MW”, by increasing the generating capacity of each of the 22 turbines approved by DEA from a maximum of 3MW to a maximum of 4.5MW. The increase in generating capacity will be achieved by increasing the size of each of the turbines as follows:
 - The height of the turbine hub above ground level will be increased from the approved maximum of 91.5m to a maximum of 125m.
 - The diameter of the rotor will be increased from an approved maximum of 117m to a maximum of 149m.

The number of turbines will remain the same – 22, as approved by DEA. The locations of the turbines on the project site will also remain unchanged, as described in the 2nd Final Amended Environmental Impact Assessment Report approved by DEA, and confirmed in the Environmental Authorisation.

If you wish to register as an Interested & Affected Party (I&AP) for the Amendment Application, or if you require additional information, please contact Mr Bill Rowlston (Associate: EOH Coastal & Environmental Services, Grahamstown), on e-mail billrowlston@gmail.com, or telephone 082 808 0413. If you wish to register by post please write to EOH Coastal & Environmental Services, PO Box 94, Grahamstown, 6140, or by fax to 046 622 6564.



Site notice erected at the entrance to the Farm Gilead. (GPS co-ord 33.282154 S; 26.83058 E)



Site notice erected at the entrance to the Farm Tower Hill. (GPS co-ord 33.285775 S; 26.862073 E)



Site notice erected at the entrance to the Farm Peynes Kraal (GPS co-ord 33.283142 S; 26.847159 E)

6.2.2 Newspaper Advertisement

4
NEWS
Grocott's Mail 14 SEPTEMBER 2018

RAINFALL 6 - 12 SEPTEMBER

Park Rd 47.2mm
TEMP 4.5-26.5°C

CBD 38.8mm

Sunnyside 36.9mm

HAVE YOUR SAY

Pride and understanding

Wednesday marked 41 years since Steve Biko died at the hands of apartheid. How should we honour his memory? Lindani Donyeli asked.

MASIXOLE HESHU
ARTIST

We need to understand what he stands for. If we do, we won't be lost.

ZODIDI BATYI
ENTREPRENEUR

Help street kids, the orphan who could be better, rather than just celebrating.

LEE ABDUL
FIELD MARKETER

The man gave his life to this country. It should be a public holiday.

NOLUYOYO MAGAGULA
STUDENT

Celebrating with each other, being part of Black culture, laughing, loving.

birch's

Church Square Tel: 046 622 7010

Cricket season is almost upon us and our new stock has arrived. Pop in and check out the latest styles and trends.

Come in and browse

Rates debate kicks off series

STAFF REPORTER

The 2019 national elections are expected to be held towards the middle of 2019 and to help Makana voters decide where to put their X on the big day, four local media organisations have teamed up with the Rhodes Politics Department in a series of studio panel discussion and live debates.

Grocott's Mail, Radio Grahamstown, RMR and the Rhodes School of Journalism and Media Studies and Department of Political and International Studies are partners in #TheDebate2019.

With the aim of encouraging informed participation in the 2019 national elections, expert speakers will present on the big national issues of Land; Education; Economy; Health and Safety and Security. In each debate of the series, after the panel's opening presentation and debate, we'll invite participation from the audience.

As with our 2016 Election Connection local government election debates, #TheDebate2019 will take place in various public venues across Makana. And as in 2016, we expect lively and enthusiastic participation from residents. Makana should residents withhold rates?

The mid-month debates start in the Albany Recreation Hall at 6pm on Wednesday 19 September with the topic: Makana: should residents withhold rates?

Rates and constitutional responsibilities are the local starting point for a discussion about governance, intergovernmental relations, service delivery and accountability. Issues raised by the hot topic include Constitutional responsibility, along with citizen responsibility and recourse.

As with the 2016 debates, #TheDebate2019 will be recorded, edited and broadcast. The debate on Wednesday 19 September will be broadcast live on RMR. Panelists include a senior Makana official; PSAM (the Public Service Accountability Monitor) and citizen group the GRA.

The next debate will be on 17 October, with a focus on youth wellness as the starting point for a discussion on how well our health policies are working in practice. Crime and safety are always on residents' minds and the last debate topic of 2018, on 21 November, is safety and security.

The themes of Land, Education and the Economy follow in 2019, in the final countdown to the national elections.

EOH
Coastal & Environmental Services

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- * Part 2: To increase the total generating capacity of the WEF from "up to 66MW" approved by DEA to "up to 99MW", by increasing the generating capacity of each of the 22 turbines approved by DEA from a maximum of 3MW to a maximum of 4.5MW. The increase in generating capacity will be achieved by increasing the size of each of the turbines as follows:
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 - The diameter of the rotor will be increased from an approved maximum of 117m to a maximum of 149m.

The number of turbines will remain the same – 22, as approved by DEA. The locations of the turbines on the project site will also remain unchanged, as described in the 2nd Final Amended Environmental Impact Assessment Report approved by DEA, and confirmed in the Environmental Authorisation.

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Leadership for Sustainability

2019 ADMISSIONS OPEN

Please join the Director of Rhodes Business School
at an **information evening** regarding our
Master of Business Administration,
Postgraduate Diploma in Enterprise Management and the
***NEW* Postgraduate Diploma in Business Analysis.**

When & Where:

- **East London**
Wednesday, 19 September 2018, 17:30 at the East London Golf Course
- **Port Elizabeth**
Tuesday, 25 September 2018, 17:30 at the Summerstrand Hotel
- **Grahamstown**
Thursday, 27 September 2018, 17:30 at the Rhodes Business School

CONTACT
Ms Aviwe Petsha Tel: 046 603 8617; E: a.petsha@ru.ac.za
www.ru.ac.za/businessschool

Our MBA is AMBA accredited.

EOH Coastal & Environmental Services
34
Plan 8 Infinite Energy (Pty) Ltd

6.2.3 Notifications

Text of notification sent by e-mail between 11th and 15th September 2018 advising I&APs and key stakeholders of the impending amendment application

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PROPOSED AMENDMENT TO THE ENVIRONMENTAL AUTHORISATION ISSUED FOR THE PLAN 8 INFINITE ENERGY (PTY) LTD GRAHAMSTOWN WIND ENERGY FACILITY

DEA REFERENCE NUMBER: 12/12/20/2523

The Department of Environmental Affairs (DEA) issued an Environmental Authorisation to Plan 8 Infinite Energy (Pty) Ltd (Plan 8) for the construction of the Grahamstown Wind Energy Facility (WEF) on 22nd October 2015. Two Appeals against the Environmental Authorisation were submitted to the Minister and both were dismissed (30th September 2016 and 16th March 2017).

The WEF will be situated on Farms Gilead, Peynes Kraal and Tower Hill, between 25 and 31km east of Makhanda (Grahamstown) along the N2 highway.

Plan 8 now intend to submit an application to DEA for an Amendment of the Environmental Authorisation. The application will be conducted in terms of and as required by Chapter 5 of the Environmental Impact Assessment Regulations, 2014, as amended by GN R. 326, published in Government Gazette No 40772 on 7th April 2017.

The proposed Amendment will be in two parts, as follows:

- **Part 1:** To change the name of the holder of the Environmental Authorisation from Plan 8 Infinite Energy (Pty) Ltd to Grahamstown Wind Farm Company Ltd, a wholly-owned subsidiary of Plan 8 created specifically to manage the Grahamstown WEF.
- **Part 2:** To increase the total generating capacity of the WEF from “up to 66MW” approved by DEA to “up to 99MW”, by increasing the generating capacity of each of the 22 turbines approved by DEA from a maximum of 3MW to a maximum of 4.5MW. The increase in generating capacity will be achieved by increasing the size of each of the turbines as follows:
 - The height of the turbine hub above ground level will be increased from the approved maximum of 91.5m to a maximum of 125m.
 - The diameter of the rotor will be increased from an approved maximum of 117m to a maximum of 149m.

The number of turbines will remain the same – 22, as approved by DEA. The locations of the turbines on the project site will also remain unchanged, as described in the 2nd Final Amended Environmental Impact Assessment Report approved by DEA, and confirmed in the Environmental Authorisation.

If you wish to register as an Interested & Affected Party (I&AP) for the Amendment Application, or if you require additional information, please contact Mr Bill Rowlston (Associate: EOH Coastal & Environmental Services, Grahamstown), on e-mail billrowlston@gmail.com, or telephone 082 808 0413. If you wish to register by post please write to EOH Coastal & Environmental Services, PO Box 94, Grahamstown, 6140, or fax to 046 622 6564.

Text of notification sent by e-mail on 4th January 2019 advising I&APs and key stakeholders of the availability of the Draft Amendment report for review and comment

Plan 8 Ght WEF Amendment Application: Notification of availability of Draft Amendment Report

Dear I&AP / Stakeholder,

My previous e-mail to you, dated <between 11th & 15th September 2018> refers.

This message is to notify you that the Draft Amendment Report for the proposed amendment to the environmental authorisation for the Plan 8 Grahamstown Wind Energy Facility is now available for review and comment.

The Draft Report and its Appendices can be downloaded from EOH Coastal & Environmental Services' website at <http://www.cesnet.co.za/plan-8-infinite-energy-pty-ltd>. The report is available in full (8.8Mb), and also in three smaller parts to facilitate downloading (main text, 1.5Mb;

Appendices A to G (7 of 9 specialist reports), 4Mb; Appendices H to N (2 of 9 specialist reports plus supporting documentation), 3.6Mb).

The approved Environmental Impact Assessment Report, Addendum Report, Environmental Management Plan and all original specialist reports, are also available on the website for reference purposes, together with the Minister's decisions on the appeals.

The Draft Amendment Report will be available for review and comment from Monday 7th January 2019 until Wednesday 6th February 2019.

Please submit your written comments on the Draft Amendment Report to me at e-mail billrowlston@gmail.com, or by fax to 046 622 6564 for attention Ms Louise van Aardt.

Any other enquiries about the report or any other aspect of the amendment process should, please, be directed to me.

Sincerely,

Bill Rowlston

Associate: EOH Coastal & Environmental Services

+27 (0)82 808 0413

The above comment and review period is not considered to be valid in terms of the EIA Regulations, because DEA was not afforded an opportunity to comment on the Draft Report. Nevertheless, a number of I&APs and representatives of key stakeholders responded to the invitation to comment, and these inputs are recorded below

6.3 Comments and Issues raised by I&APs

This section tabulates all written comments received from by I&APs during the invalid 30-day review and comment period, which ran from Monday 7th January 2019 to Wednesday 6th February 2019, together appropriate responses from the EAP and / or project proponent.

Note that letters giving Conditional Approval for the amended facility have already been received from Telkom and SENTECH, and these are included as Appendices J and K respectively.

Approval from the Department of Mineral Resources in terms of s53 of the MRPDA, together with a letter of no objection from the owners of kaolin quarries on the site, is included as Appendix M.

A letter giving conditional approval from SANRAL was received during the public review and comment period. The text of the letter is included in Table 6.1, and a copy of the letter is included as Appendix M.

Table 6.1: Comments from I&APs and EAP's responses

Commentator	Comment	EAP's Response
Mr Morne Erwee: Farm Tower Hill (e-mail 06Jan19)	On the site layout the farm names Towerhill and Peynes Kraal must change. Wayne Nortier's farm is Peynes Kraal and Morne Erwee's farm is Towerhill.	Thank you for pointing this error out, which has been corrected on Figure 2.3
Mr CS Reddy: Eskom, Gen Man Distribution EC (e-mail 07Jan19)	I am no longer in the Eastern Cape but forwarded your email to the new GM for the Eastern Cape Operating Unit – Mr. Mandla Gobingca.	Thank you very much for informing me of your move out of the Eastern Cape, and especially for forwarding the information to your successor.
Mr H Dippenaar: CellC, Senior Project Manager (e-mail 07Jan19)	I have moved function in Cell C and would recommend that you deal with Mr Harrish Kasseepursad from regulatory in copy.	Thank you for informing me of your change of focus in CellC, and especially for forwarding my message to your colleague Mr Kasseepursad.
Mr C. Njingana: SANRAL, for M.S. Peterson, Regional	Your email received on the 04 January 2019, requesting comments on the above mentioned matter, refers.	Conditions noted.

Commentator	Comment	EAP's Response
<p>Manager: Southern Region (e-mail 10Jan19)</p>	<p>The South African National Roads Agency (SOC) Limited (SANRAL) have the following comments with regards to the proposed Grahamstown Wind Energy Facility:</p> <ul style="list-style-type: none"> • The wind turbines must be erected at least 200 metres from the National Road Reserve boundary. If this requirement cannot be met, then a good motivation has to be submitted to SANRAL as to why the wind turbines should be erected closer. • All other buildings / structures should be erected at least 60 metres from the National Road Reserve boundary and / or 500 metres from any intersection. • If access is required from the National Road, an approval from SANRAL is required, otherwise access can be obtained from the nearest numbered route. • A formal application together with the plans of the proposed wind farm must be submitted to SANRAL for approval. • Southern Region 20 Shoreward Drive, Bay West, Port Elizabeth, 6025 PO Box 24210, Bay West, Port Elizabeth, South Africa, 6034 Tel +27 (0) 41 398 3200 Fax +27 (0) 41 492 0201 Email info@sanral.co.za Visit us at www.sanral.co.z3 • No installation of any infrastructure inside the Road Reserve. • Construction of all work may only commence after written approval has been obtained from SANRAL 	
<p>Mr L Shaw: Telkom, Senior Manager: Access Master Planning (e-mail 10Jan19)</p>	<p>Noted, thank you.</p>	<p>Acknowledgement noted.</p>

6.4 Extended Review and Comment Period

All I&APs and key stakeholders will be notified of the opportunity to review and comment this Revised Draft Amendment Report, which will also be formally submitted to DEA for comments. As before the review and comment period will be 30 days.

Plan 8 Grahamstown Wind Energy Facility – Amendment of Environmental Authorisation

NAME	OCCUPATION/AFFILIATION	CONTACT			PHYSICAL/POSTAL ADDRESS
		Telephone	Mobile	Email	
Immediate Landowners					
Gavin Dixon	Farmer. Gilead Farm	046 622 7758	084 767 5097	gbd@geenet.co.za	PO Box 6292 Grahamstown, Market Square 6141 (owns farm but does not reside there)
Morne and Marda Erwee	Tower Hill Farm		082 300 7730 (Morne)	erweemorne@gmail.com	Fairview farm, Koondesvalley, Grahamstown
Wayne Nortier	Peynes Kraal Farm	046 636 1810	082 319 3207 (Wayne) 079 527 4335 (Felicity)	NortierW@saps.gov.za waynenortier@gmail.com felicity@deklerk-devilliers.co.za	PO BOX 19 Grahamstown 6139 / Hourkers farm Albany District Grahamstown
Surrounding Landowners					
Glyn Dixon	Chairman - Coombs Farmers Association	046 622 7776	072 764 1303	claypits@geenet.co.za	
Orgie Crous	Farmer - Honeykop No361	046 622 8474	082 660 9974	ecbackloads@yahoo.com	PO BOX 362, Grahamstown, 6140
Jeremy Allan			082 784 6805	jjrallan@yahoo.com	17 Milner str Grahamstown
Gilbert Coetzee	Coombsvale		082 808 5961	gmd@geenet.co.za	PO BOX 2204 Grahamstown 6140
James Williamson	Glenboyd		082 441 2055	james@geenet.co.za	45 Kingsview Estate Miles rd Grahamstown
Andre Coetzee			082 659 2710		No longer interested in this project: has no objections
Fred Pittaway	Valleyview, Kaasvlei	046 622 3663	083 479 2762	valleyview@xsinet.co.za	PO BOX 2225 Ght
Gcobani Dyantyi	Outspan Farm		082 637 8632	amangwevu@yahoo.com	262B Grahamstown
Murray Crous	Honeykop		083 446 8256	bushmansgorge@hotmail.com	P.O. Box 362 , Grahamstown, 6140
Glen Coetzee	Blydemoed, Percival (Coombs)		082 722 0620	info@kellys.co.za	
John Coetzee	Woodgate, Glen Dew, Portsmouth	046 622 4412 (B)	082 553 4983	connocks@albanynet.co.za	PO Box 233 Ght 6140
Dave Young	Chertsey Game farm	046 624 1103 (B)	082 779 1372	dave.young@buco.co.za davey@datimbers.co.za	
Cecile Brown	Elephant Park				Farm 220, Kap River Nature Reserve, Elephant Park
Gary Terblanche	Widcombe and others		081 041 1994	gary@kwandwe.co.za	
Pete Moll	Trimpeters Drift and others Sold, moved to PE	046 622 5731	082 804 1669 / 083 446 8256	aaacim@intekom.co.za	PO Box 6105, Market Square, Grahamstown 6141
Adri Tim	Hunts Hoek	046 622 5984	083 631 8714	adrit@vincemus.co.za	
Ryan Mackie	Kwandwe Pvt NR		021 794 9050	africa@golfing-safaris.com	
Owen Poultney	Lanka Safaris	040 639 2756	083 772 2275	safari@glenmelville.co.za	
Dick Palmer	Bridgewater	046 622 2183	083 294 7827	rip2269@gmail.com	PO Box 2269 Ght 6140
Kevin Eke	Munster and others	041 486 1001 (B) DNE	082 551 5755 DNE	kevin@truckingonline.co.za	
Nolan Sparg	Glenmelville - Munster Trust		072 297 5629	safari@glenmelville.co.za	PO Box 618 Ght 6140:
	Drivebush	039 727 3586 (B)	078 837 3978	Move-ited@hotmail.com	
Andrew Smailes	Glendowan	046 622 7257	083 633 7029	smailes@lantic.net	
Alroy vd Merwe	Bakers farm		082 712 2359	alroysautoservices@gmail.com	
Roy Bowles	Percival (Coombs)		083 331 2143	roy@border.co.za	
Paul Webber	Connaught and others	046 622 2363	082 524 8373		No longer interested in this project: has no objections
Rodney randall	Sutherland	043 642 1720 (H)	082 773 7111	rodney@randrtrust.co.za	
George Penacchini	Percival (Coombs)		082 578 2320	george@pennacchini.co.za	
Kim Sansom	Southey's Hoek	043 781 1746		jrsansomfarming@gmail.com	
Adv Dave de la Harpe, Kai-Uwe Kuhl, Barnara Schneider	Governor's Kop and others			groupofadvocates@roundbar.co.za kuk@premiumjagd.de Barb-Schneider@t-online.de	
Lionel Wicks	Southey's Hoek	046 622 8750 (H)	083 395 1442	lyssossafaris@telkomsa.net	
Botha van N8iekerk	Spekboomvale		082 851 6851	development@property-pro.co.za	36 Waterberg Ave, Langenhovenpark, Bloemfontein 9330
Oivind Tidemandsen, Tom Haugen	Glenboyd			Tom.H@Dolphin-holdings.no oivind.t@dolphin-holdings.no	
Norman Bibbey	Elephant Park (new owner)			bibbey20@icloud.com	
Aidan & Morgan Sparrow	Trumpeters Drift		083 406 0305	amsparrow@igen.co.za	

Government, Statutory Bodies, Other Organisations					
Makana LM	Municipal Manager: Mr M Mene	046 622 6132		roxop@makana.gov.za	
Ward Councillor Ward 13	Clr N Masoma			nmasoma@makana.gov.za	
Ndlambe LM	Adv Rolly Dumezweni: Municipal Mngr	046 604 5566 / 5566	072 520 9923	rdumezweni@ndlambe.gov.za	Part of NLM is visually affected by the project
DEDEAT	Mr Leon Els: Regional Director	041 508 5808	082 776 9573	leon.els@dedea.gov.za	
DEA	Fao Chief Director: Integrated Environmental Authorisations			callcentre@environment.gov.za Sdlomo@environment.gov.za	
Dept Mineral Resources EC	Ms Brenda Ngebulana: Regional Mngr	047 532 4488		Brenda.Ngebulana@dmr.gov.za	
Dept of Energy				info@energy.gov.za mokgadi.mathekgana@energy.gov.za	
Dept Water & Sanitation	Ms P Makhanya Chief Director: EC	043 604 5400	083 728 9916	MakhanyaP@dws.gov.za	
Dept Ag For & Fish	Delegate of the Minister: Soil and Land Use Management			MashuduMa@daff.gov.za thokob@daff.gov.za	
SANRAL	Ms Chunisa Njingana			njinganac@nra.co.za	
SAHRA	Admin Natasha Higgitt Nonvameko Mlungwana (assist upload)	021 462 4502 / 8660	082 507 0378	info@sahra.org.za nhiggitt@sahra.org.za nmlungwana@sahra.org.za	
ECPHRA	Mr Lennox Zote Mr Sello Mkhanya			info@ecphra.org.za smkhanya@ecphra.org.za	
Eskom	Mr CSReddy: GenMan Distribution EC	043 703 2385 Comms		reddycs@eskom.co.za	Comms: Mr Ayf Mabusela
Sentech	Ms Alishea Viljoen	011 471 4540	082 777 8506	viljoena@sentech.co.za	Site Acquisition and Environmental Specialist
Telkom	Mr Leonard Shaw	012 311 2012		Shawls@telkom.co.za	Senior Manager: Access Master Planning
Vodacom	Mr Andre Barnard			andre.barnard@vodacom.co.za	
MTN	Mr Krishna Chetty			krishna.chetty@mtn.com	
Cell C	Mr Hugo Dippenaar			hdippenaar@cellc.co.za	
	Mr Rudi Liebenberg			RLiebenberg@cellc.co.za	
	Mr Wiaan Vermaak			wvermaak@cellc.co.za	
	Mr Dirk Van Der Walt			DVanDerWalt@cellc.co.za	
	Mr Joshua Engelbrecht			Joshua.Engelbrecht@cellc.co.za	
Civil Aviation Authority	Ms Lizelle Stroh			StrohL@caa.co.za	
				info@ecpta.co.za	
Eastern Cape Parks and Tourism Agency (ECPTA)	Ms Shane (October) Gertze Mr Sithembiso Mhlongo.	043 492 0719	082 555 1081	shane.october@ecpta.co.za Sithembiso.Mhlongo@ecpta.co.za	Environmental Planner Reserve Manager, Thomas Baines
SANParks	Ms Fay Roush			fayroush.ludick@sanparks.org	Communications: Frontier Region
WESSA	Jenny Gon Ted Botha			j-gon@intekom.co.za bothated@gmail.com	
Previously Registered I&APs or attended meetings					
Mario Hockley			082 923 2883		PO Box 2273 Grahamstwn
K Rawstron			083 703 1740		The Hills Game Estate
Derek				derekzim@worldonline.co.za	Private Bag X40106, Walmer, 6056
Kim Crous		046 622 8471			PO Box 362 Grahamstown
Mr A Oswald			084 663 2043	eoswald@nordex-online.com	
MS Miller			082 592 1664/9		
P de Lklerk			082 809 3425		PO Box 160, Grahamstown, 6140
Rob Cooper		046 622 5753	082 747 1888	robc@terrapower.co.za	No longer interested in this project: has no objections
N.D Smith	Smith, Ndlovu and Summers Attorneys	-	-	nicks@law.co.za	-
AVDS Environmental Consultants	Rep by Mr Andre van der Spuy			avdspuy@iafrica.com	Not madated to represent anyone, but wishes to be registered as an IAP for this "unsustainable project"

Figure 6.1: I&AP database (updated October 2018)

7. EAP'S OPINION AND RECOMMENDATION

The specialist reports indicate that the proposed increase in the turbine hub height and rotor diameter will not significantly alter the findings of the specialist studies that were undertaken for the environmental impact assessment.

Although the locations of the turbine bases outside the 150m buffer zone around the high bat-sensitivity areas comply with the prevailing requirements at the time the Environmental Authorisation was issued, judicious micro-siting of the turbines closest to the edges of the buffer zone can be used to ensure that no part of any turbine blade encroaches into the buffer zone. In the single case where this is not possible adaptive mitigation management measures can be adopted in the event of unacceptable numbers of bat mortalities during operation.

Accordingly it is the EAP's opinion that the proposed amendments to the environmental authorisation should be authorised, and the Environmental Management Programme amended in accordance with the recommendations of the specialist and the relevant specifications in the existing Environmental Authorisation.

REVISED DRAFT FOR REVIEW

8. REFERENCES

CES 2015a: Second Final Amended Environmental Impact Assessment Report: Proposed Plan 8 Grahamstown Wind Energy Project, Makana Municipality. Volume 3, CES, Grahamstown, April 2015.

CES 2015b: Addendum to Second Final Amended EIA Report, CES, Grahamstown, April 2015.

CES 2015c: Environmental Management Programme: Proposed Plan 8 Grahamstown Wind Energy Project, Makana Municipality, Volume 4, CES, Grahamstown, April 2015.

DEA 2015: Environmental Authorisation in terms of Regulation 36 of the Environmental Impact Assessment Regulations, 2010, Establishment of the Plan 8 Grahamstown Wind energy Facility (WEF) and its associated infrastructure within the Makana Local Municipality, Eastern Cape, Cacadu District Municipality, Department of Environmental Affairs, 22nd October 2015.

DEA 2018: Application Form for Amendment of an Environmental Authorisation, 1st September 2018, Department of Environmental Affairs, Pretoria.

MoEA 2016: Appeal against an Environmental Authorisation granted to Plan 8 Infinite Energy (Pty) Ltd for the proposed construction of the Plan 8 Grahamstown Wind Energy Facility, within the Makana Local Municipality, in the Eastern Cape Province. Appeal Decision, Reg LSA 149001, Minister of Environmental Affairs, 30th September 2016.

MoEA 2017: Appeal against an Environmental Authorisation granted to Plan 8 Infinite Energy (Pty) Ltd for the proposed construction of the Plan 8 Grahamstown Wind Energy Facility, within the Makana Local Municipality, in the Eastern Cape Province. Appeal Decision, Reg LSA 149001, Minister of Environmental Affairs, 16th March 2017.

Nordex 2017: General documentation: Foundations, Wind turbine class Nordex Delta4000, Doc E0004109735, Revision 03 / 14th September 2017, Nordex Energy GmbH, Engineering, September 2017.

Plan 8, July 2018: Personal communications via e-mail, Zuben Jessa, July 2018.

SABAA 2014: Sowler *et al*, South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction, Third Edition, South African Bat Assessment Association, February 2014.

SABAA 2016: Sowler *et al*, South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction, Third Edition, South African Bat Assessment Association, September 2016.

SABAA 2017: Sowler *et al*, South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction, Third Edition 4.1, South African Bat Assessment Association, October 2017

APPENDIX A: AGRICULTURE SPECIALIST OPINION

PLAN 8 GRAHAMSTOWN WIND ENERGY FACILITY PROPOSED AMENDMENT: REV 1 – 14TH AUGUST 2018

OPINION ON THE INCREASED IMPACT ON THE NATURAL AGRICULTURAL RESOURCES

Chris Bradfield
isi-Xwiba Consulting CC | PO Box 2097, Komani 5322 E-mail: isix@lcom.co.za Mobile: 083 441 1189

INDEPENDENCE & DECLARATION OF INTEREST

The requirement for independence of the environmental consultant is to reduce the potential for bias in the environmental process. isi-Xwiba Consulting does not have any current interest in secondary or downstream developments that may arise out of the authorisation of the proposed project. Individual project members do not have any personal or business interests in the development except as part of their functions as described in their employment agreement with isi-Xwiba Consulting.

1 INTRODUCTION

The Environmental Authorisation in terms of Regulation 36 of the Environmental Impact Assessment Regulations, 2010 for the establishment of the Plan 8 Grahamstown Wind Energy Facility (WEF) and its associated infrastructure located within the Makana Local Municipality, Cacadu District Municipality, Eastern Cape Province was issued on 22nd October 2015 by the Department of Economic Development, Environmental Affairs & Tourism.

The developer intends making changes to the design of the turbines, thus requiring a submission of an application for an amendment to the Environmental Authorisation issued in October 2015.

1.1. TERMS OF REFERENCE

The proposed changes to the development require that the impact on the natural agricultural resources be re-assessed to determine whether the changes will result in a significant increase in the impact on the natural agricultural resources and ultimately on the land use operations and economic viability of the farms.

This assessment is based on the I desktop study and follow up field investigations conducted for the original impact assessment, referenced:

- Agricultural Resources Desktop Assessment Infinite8 Grahamstown Wind Park - December 2011
- Infinite8 Grahamstown Wind Park – Agricultural Resources Desktop Assessment – Addendum 2 – Soil Assessment - March 2012
- Infinite8 Grahamstown Wind Park: Agricultural Resources Desktop Assessment - Impact rating on the Agricultural Resources - April 2012

2 APPROVED DEVELOPMENT & PROPOSED AMENDMENTS

2.1 CONSTRUCTION ACTIVITIES

2.1.1 Farm Properties

The three properties on which the wind turbines are to be erected remain as per the Environmental Authorisation as listed below, with the total area of the three properties being approximately ±2 550ha

- Farm Gilead 361 (SG C00200000000036100000)
- Farm Tower Hill 363 (SG C00200000000036300000)
- Farm Peynes Kraal 362 (SG C00200000000036200000)

2.1.2 Number of Turbines

No planned change to the approved number of 22.

2.1.3 Turbine Locations

As approved, with no change.

2.1.4 Total Generating Capacity

Amendment requested to increase each turbine from 2.5–3MW to 4.5MW with the total capacity increased from 66MW to 99MW.

2.1.5 Hub height

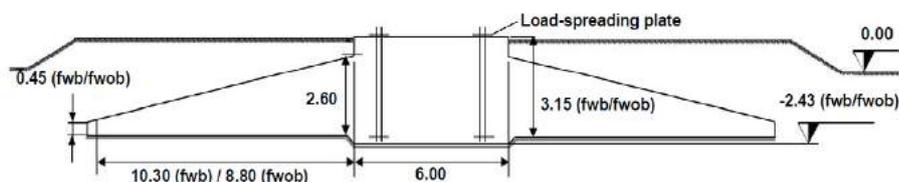
Amendment requested to increase the hub height from a maximum of 91.5m above ground level to a height up to 125 m above ground level.

2.1.6 Rotor Diameter

Amendment requested to increase the rotor diameter from 100m–117m to a maximum of 149m.

2.1.7 Foundation Size:

Amendment requested to increase the foundation size from 20m x 20m (400 m²) to a circular plan size of 26.5m Ø (550 m²). The base thickness was approved as being 2m to 6m deep and this is revised to be “determined during construction” as excavation will depend on the substrate conditions.



Base thickness will affect the construction footprint, as deeper excavations require a larger area of excavation (provide a stable side slope during construction – OHSA), but will not affect the total operational footprint after backfilling and surface rehabilitation. It is important to note that only the 6m Ø pedestal will be visible after backfilling and reinstatement, including re-vegetation as permanent, compacted backfill, up to 5cm below the pedestal over the slab is an essential part of the foundation, and must not be removed.

2.1.8 Turbine Interconnections

Positioning of underground cables connecting the wind turbines is unchanged. Cables will follow the routes of access roads between wind turbines.

2.1.9 Access and Site Roads

Internal site roads are between 4.7m and 8m wide and the width and distance of roads is unchanged.

2.1.10 Substation

Position unchanged and plan area remains ±100m x 65m, as approved

2.1.11 Evacuation Power Line

No amendment requested.

2.2 DEVELOPMENT FOOTPRINT (DISTURBED AREA)

Amendment requested for an increase in the disturbed area from 9.8ha to 18.34ha (0.72% of total project area).

The total disturbed area during construction of all infrastructure was underestimated in the planning phase and it was also assumed that the laydown areas/hard-standings would be removed after completion of construction, and the disturbed areas rehabilitated, which is not the case.

The disturbed area is calculated as follows:

- Turbine bases: 22 x circular bases 26.5m Ø = **1.21ha**
- Laydown areas/hard-standings: 22 x laydown areas/hard-standings each 80m x 50m (includes 25m² for turbine transformer) = **8.8ha**
- Roads: 16.35km of roads average width 4.8m = **7.68ha**
- Substation: 100m x 65m (operations instrument/control centre and store) = **0.65ha**

It is important to note that in the case of the turbine bases (22 x 26.5m Ø = 1,21ha) only the 6m Ø pedestal will be visible after backfilling and reinstatement, including re-vegetation. The disturbed area around the turbines after successful rehabilitation (assume 5 years depending on climatic condition) will only be in the region of 414m² to 500m². However for the purposes of this study the impact at the turbine bases will be based on 1.21ha as this will be disturbed over the medium term (3 to 5 years).

3 SUMMARY OF AMENDMENTS RESULTING IN INCREASED IMPACT ON THE NATURAL AGRICULTURAL RESOURCES

ITEM TO BE AMENDED	INCREASED IMPACT	COMMENT
Farm Properties (2.1.1)	None	None
Number of Turbines (2.1.2)	None	None
Laydown areas/hard-standings (2.1.2)	Yes – Direct impact	Not included in previous assessment as it was thought that these would be removed – now to be retained for use during maintenance – 8.8ha in extent
Turbine Locations (2.1.3)	None	None
Total Generating Capacity (2.1.4)	None	None
Hub Height (2.1.5)	Yes - In-direct impact	Hub height affects foundation size
Rotor Diameter (2.1.6)	Yes - In-direct impact	Rotor diameter affects foundation size
Foundation Size (2.1.7)	Yes – Direct impact	Approved footprint for foundations was 0.88ha and increased to 1.21ha. The disturbed area around the turbines after successful rehabilitation (assume 5 years depending on climatic condition) will only be in the region of 414m ² to 500m ² .
Turbine Inter-connections (cables) (2.1.8)	None	None
Access and Site Roads (2.1.9)	None	Approved 7.68ha
Sub-station (2.1.10)	None	Approved 0.65ha
Evacuation Power Line (2.1.11)	None	None
Development Footprint (disturbed area) (2.2)	Yes – Direct impact	Increase in the disturbed area from 9.8ha to 18.34 ha, an increase of 8.54ha

4 IMPACT ON THE AGRICULTURAL RESOURCES RESULTING FROM THE AMENDMENT

Impact 1: Loss of vegetation & effect on carrying capacity

The construction of infrastructure for the erection of the turbines will impact on the current land use and vegetation. The client has advised that the total area impacted upon by construction and “lost” to agriculture is 18.34ha viz. 0.75% of the total area of the three farms.

Mitigation and Management

The conservation status of the three vegetation biomes is *least threatened*. There may, however, be listed vegetation species in these vegetation biomes, and such plants should be identified and protection measures included in the construction regime. Permits may be required for the removal and transplanting of such species, if necessary.

The report writer has consulted with Mr. Norton Thompson (Cell No. 082 781 2473), who is a renowned stud breeder of Bonsmara cattle in the Komga District. Wind turbines were constructed on two of Mr. Thompson’s properties, viz. Lilyvale and Thorn Park, and the turbines have been operational for approximately five (5) years. Mr. Thompson advises that the turbines have had no impact on the utilisation of the grazing by livestock, and he has noted cattle and sheep grazing up to the foundation bases. It can therefore be safely accepted that construction areas where rehabilitation is

successfully carried out can be returned to the farm management system after the grass component has re-established, which should be in the region of 3 – 5 years, depending on the management regime set out in the EMPR. Prevailing climatic conditions, particularly rainfall will determine the extent of the rehabilitation period and the land owner will need to manage the rehabilitation of these areas accordingly.

Existing cultivated arable lands are not impacted upon. The total area permanently lost to grazing by livestock is 18.34ha of the ±2 550 ha. The grazing capacity over the study area varies from 4 – 7 ha for the plateau areas and southern slopes to 11 – 13 ha for the northern aspect (drier). Assuming an average of 6 ha per Large Stock Unit (LSU) one can determine that the current carrying capacity will be reduced by 3.05 LSU. The original study pertaining to the current Environmental Authorisation indicated a loss of 2 LSU. The amendment being considered increases the loss in carrying capacity by 1.05 LSU, in practice 1 LSU. A reduction in the overall carrying capacity of 3.05 LSU is not considered to be significant in terms of the overall carrying capacity on the remaining 2 531 ha.

Significance Statement

RATING		Temporal Scale		Spatial Scale		Severity of Impact		Risk Likelihood or		Total
	Without Mitigation	Permanent	4	Study area	2	Moderate	2	May occur	2	10
With Mitigation	Short term	1	Study area	2	Slight	1	May occur	2	6	
Overall Significance without mitigation									Moderate	
Overall Significance with mitigation									Low	

5 OPINION

The construction of the twenty two (22) wind turbines and associated permanent infrastructure will impact on both the natural vegetation through the removal of 18.34 ha of grazing area and on the grazing capacity of the properties with a decrease of 3.05 LSU in the number of livestock that can be run on the three properties.

It is our opinion that the increase in the development footprint that will occur as a result of the envisaged application for an amendment, will not have a significant impact on the economic viability or long-term carrying capacity of the three commercial farms in the study area or on the natural vegetation component, the conservation status of which, is **least threatened**.

APPENDIX B: AVIFAUNA SPECIALIST OPINION



Mr Bill Rowlston
EOH-Coastal & Environmental Services

18 August 2018

RE: GRAHAMSTOWN PLAN8 WIND ENERGY FACILITY – AMENDMENT– AVIFAUNAL STATEMENT

1. BACKGROUND

WildSkies Ecological Services (Pty) Ltd (hereafter WildSkies) was previously contracted by EOH-Coastal & Environmental Services (EOH-CES) to conduct the avifaunal impact assessment for the Grahamstown Plan8 Wind Energy Facility (Smallie, 2011). Subsequent to that WildSkies also conducted 12 months of pre-construction bird monitoring on site under contract to Plan8 (Smallie, 2015).

In August 2018 an amendment to the authorisation has been presented for assessment. WildSkies was appointed by EOH-CES to determine the effect this amendment might have on the significance ratings for the impacts on avifauna as previously assessed.

The proposed amendment changes are summarised in Table 1 below

Table 1. Summary of amendments on the Grahamstown Plan8 Wind Farm project.

Aspect	Original EA	Proposed amendment
Affected properties	Farm Gilead 361 (SG C00200000000036100000) Farm Tower Hill 363 (SG C00200000000036300000) Farm Peynes Kraal 362 (SG C00200000000036200000) Total area of properties is approximately 2 550ha	No Change
No Turbines	Up to 22	No change

Aspect	Original EA	Proposed amendment																																																																					
Turbine locations	<table border="1"> <thead> <tr> <th>Turbine No</th> <th>Latitude (°S)</th> <th>Longitude (°E)</th> </tr> </thead> <tbody> <tr><td>1</td><td>33° 16' 50.06" S</td><td>26° 49' 29.08" E</td></tr> <tr><td>2</td><td>33° 16' 48.24" S</td><td>26° 49' 47.62" E</td></tr> <tr><td>3</td><td>33° 16' 46.58" S</td><td>26° 51' 29.70" E</td></tr> <tr><td>4</td><td>33° 17' 08.37" S</td><td>26° 50' 12.87" E</td></tr> <tr><td>5</td><td>33° 17' 07.94" S</td><td>26° 50' 32.60" E</td></tr> <tr><td>6</td><td>33° 17' 34.26" S</td><td>26° 50' 38.22" E</td></tr> <tr><td>7</td><td>33° 17' 40.50" S</td><td>26° 51' 08.92" E</td></tr> <tr><td>8</td><td>33° 17' 29.75" S</td><td>26° 51' 52.93" E</td></tr> <tr><td>9</td><td>33° 17' 49.21" S</td><td>26° 51' 44.26" E</td></tr> <tr><td>10</td><td>33° 17' 41.18" S</td><td>26° 52' 06.07" E</td></tr> <tr><td>11</td><td>33° 17' 47.59" S</td><td>26° 52' 22.01" E</td></tr> <tr><td>12</td><td>33° 17' 53.91" S</td><td>26° 52' 32.16" E</td></tr> <tr><td>13</td><td>33° 17' 05.47" S</td><td>26° 49' 39.80" E</td></tr> <tr><td>14</td><td>33° 17' 02.96" S</td><td>26° 49' 55.44" E</td></tr> <tr><td>15</td><td>33° 16' 52.52" S</td><td>26° 51' 01.32" E</td></tr> <tr><td>16</td><td>33° 16' 57.28" S</td><td>26° 51' 22.41" E</td></tr> <tr><td>17</td><td>33° 17' 07.54" S</td><td>26° 49' 20.57" E</td></tr> <tr><td>18</td><td>33° 16' 11.01" S</td><td>26° 50' 11.37" E</td></tr> <tr><td>19</td><td>33° 16' 01.21" S</td><td>26° 49' 37.07" E</td></tr> <tr><td>20</td><td>33° 16' 07.21" S</td><td>26° 49' 52.78" E</td></tr> <tr><td>21</td><td>33° 16' 03.14" S</td><td>26° 50' 51.31" E</td></tr> <tr><td>22</td><td>33° 16' 07.17" S</td><td>26° 51' 06.54" E</td></tr> </tbody> </table>	Turbine No	Latitude (°S)	Longitude (°E)	1	33° 16' 50.06" S	26° 49' 29.08" E	2	33° 16' 48.24" S	26° 49' 47.62" E	3	33° 16' 46.58" S	26° 51' 29.70" E	4	33° 17' 08.37" S	26° 50' 12.87" E	5	33° 17' 07.94" S	26° 50' 32.60" E	6	33° 17' 34.26" S	26° 50' 38.22" E	7	33° 17' 40.50" S	26° 51' 08.92" E	8	33° 17' 29.75" S	26° 51' 52.93" E	9	33° 17' 49.21" S	26° 51' 44.26" E	10	33° 17' 41.18" S	26° 52' 06.07" E	11	33° 17' 47.59" S	26° 52' 22.01" E	12	33° 17' 53.91" S	26° 52' 32.16" E	13	33° 17' 05.47" S	26° 49' 39.80" E	14	33° 17' 02.96" S	26° 49' 55.44" E	15	33° 16' 52.52" S	26° 51' 01.32" E	16	33° 16' 57.28" S	26° 51' 22.41" E	17	33° 17' 07.54" S	26° 49' 20.57" E	18	33° 16' 11.01" S	26° 50' 11.37" E	19	33° 16' 01.21" S	26° 49' 37.07" E	20	33° 16' 07.21" S	26° 49' 52.78" E	21	33° 16' 03.14" S	26° 50' 51.31" E	22	33° 16' 07.17" S	26° 51' 06.54" E	No change
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Generating capacity	Each turbine 2.5–3MW; total up to 66MW	Each turbine up to 4.5MW; total up to 99MW																																																																					
Hub height	Up to 91.5m above ground	Up to 125m above ground																																																																					
Rotor diameter	100-117m	Up to 149m																																																																					
Lower blade tip height above ground	33m	50.5m																																																																					
Upper blade tip height above ground	150m	199.5m																																																																					
Foundation size	Plan Size: 20m x 20m Base Thickness: 2 – 6m	Circular base 26.5m diameter (550 square metres). Assumed Base Thickness: Will depend on substrate conditions. Base thickness will affect the construction footprint because deeper excavations require a larger area of excavation, but will not affect the total operational footprint after backfilling and surface rehabilitation																																																																					
Turbine interconnections	Underground cables connecting the wind turbines	No change																																																																					
Access and site roads	Internal site roads between 4.7 and 8m wide	No change																																																																					
Substation	Alternative, Option 2: Centre point 33.276784°S, 26.831437°E Plan area approximately 100m by 65m	No change																																																																					
Development footprint	As described in the Second Final EIA Report and Addendum, total disturbed area during construction of all infrastructure was estimated to be 9.8ha, but this underestimated the areas of the laydown areas / hardstands required for construction of the turbines.	Estimated area of disturbance 18.35ha (0.72% of total project area). Total disturbed area for the proposed amendment is about 45% greater than the approved project, which is accounted for by the increased area of the laydown areas/hardstands and the larger turbine bases.																																																																					

Aspect	Original EA	Proposed amendment
Evacuation power line	Alternative, Option 2: Start: 33°16'34.59"S, 26°49'51.89"E End: 33°16'23.56"S, 26°49'51.17"E Connection, via 132kV overhead power line 350m long, to existing Eskom 132kV overhead line from Pembroke to Albany sub-station	No change

1.1. Terms of Reference

WildSkies was asked by EOH-CES to compile a statement with regard to the effects that the proposed amendment may have on avifauna, as per the following terms of reference:

- » Undertake a review of the original specialist report with respect to the proposed changes shown in the above table.
- » Compile a short report / statement describing whether the proposed change in the wind turbine envelope would result in a change to impact significance ratings as contained in the original assessment, and if so, to update the impact assessment table by applying the assessment methodology used in the original EIA.
- » Where required provide any additional mitigation measures / recommendations for inclusion into the EMP to address any concerns associated with the revised turbine envelope.

2. RESULTS

2.1. Habitat destruction

Original finding: Habitat destruction during construction will be of LOW significance, both pre and post mitigation. It has been established in this statement that the previous EIA underestimated the amount of habitat destruction by approximately 45%. However in absolute terms this is only approximately 8.5ha more. The three farms on which the project is situated total 2 550 ha in area, so the affected area is a small proportion of this. Given that the habitat is not particularly unique and none of the priority bird species relevant to the study are habitat specialists we do not believe this warrants an increase in significance from LOW to MODERATE.

2.2. Disturbance of birds

Original finding: Disturbance of birds during construction will be of LOW significance both pre and post mitigation. This is unchanged by the proposed amendment.

2.3. Disturbance & displacement

Original finding: Disturbance & displacement of birds during operations will be of LOW significance pre and post mitigation. This is unchanged by the proposed amendment.

2.4. Collision & electrocution

Original finding: Collision and electrocution of birds with and on the grid connection power line will be of MODERATE significance, but can be mitigated to LOW significance. This is unchanged by the proposed amendment.

2.5. Collision of birds with turbine blades

Original finding: Collision of birds with turbine blades during operations will be of MODERATE significance, and remains of MODERATE significance post mitigation. See below discussion for any change.

Two aspects of the proposed change are relevant: a. the change in height above ground; and b. the change in overall risk area presented by the rotor.

a. Change in height above ground of rotor

Smallie (2015) recorded 15 bird species flying on the Grahamstown Plan8 site during the four seasons of

pre-construction bird monitoring. These are presented in Table 2 below. For each species the mean recorded flight height and % of recorded flight time spent at rotor height is presented along with a comment on the implications of the amendment.

Table 2. Priority bird species recorded flying on site during pre-construction bird monitoring (Smallie 2015).

Species	Smallie, 2015	Implications of proposed amendment (change in height of rotor zone only)
Jackal Buzzard	Mean flight height of 63.36m, 96.5% of flight time at rotor height	Mean flight height still within rotor height. No change.
Rock Kestrel	Mean flight height of 33.47m, 89.4% of flight time at rotor height	Mean flight height was previously within rotor but now below. Slight decrease in collision risk with amendment.
Booted Eagle	Mean flight height of 63.17m, 89.5% of flight time at rotor height	Mean flight height still within rotor height. No change.
Martial Eagle	Mean flight height of 120m, 18.7% of flight time at rotor height	Mean flight height still within rotor height. No change.
Peregrine Falcon	Mean flight height of 50.5m, 95.2% of flight time at rotor height	Mean flight height is now only on the edge of rotor zone, so slight decrease in collision risk.
African Fish-Eagle	Mean flight height of 147.14m, 54.9% of flight time at rotor height	Mean flight height still within rotor height. No change.
Lanner Falcon	Mean flight height of 80.71m, 83.5% of flight time at rotor height	Mean flight height still within rotor height. No change.
Black Harrier	Mean flight height of 19.67m, 21.9% of flight time at rotor height	Mean flight height still below rotor height. No change.
African Crowned Eagle	Mean flight height of 160m, 22.4% of flight time at rotor height	Mean flight height now within rotor zone so slight increase in collision risk.
Amur Falcon	Mean flight height of 16.25m, 100% of flight time at rotor height	Mean flight height still below rotor height. No change.
African Harrier-Hawk	Mean flight height of 116.67m, 0% of flight time at rotor height	Mean flight height still within rotor height. No change.
Black-shouldered Kite	Mean flight height of 36.67m, 0% of flight time at rotor height	Mean flight height is now below rotor zone, so slight decrease in collision risk.
Steppe Buzzard	Mean flight height of 50m, 50% of flight time at rotor height	Mean flight height is now only on the edge of rotor zone, so slight decrease in collision risk.
Yellow-billed Kite	Mean flight height of 56.67m, 0% of flight time at rotor height	Mean flight height still within rotor height. No change.
African Marsh-Harrier	Mean flight height of 10m, 100% of flight time at rotor height	Mean flight height still below rotor height. No change.

Of the fifteen priority species, no change in risk is expected for ten species, a slight increase in risk for one species and a slight decrease in risk for four species. We conclude that the change in turbine blade height above ground does not materially change the collision risk posed to birds, and hence would not affect our original findings (Smallie, 2011).

b. Change in overall risk window presented by rotor

The turbine envelope authorised originally had a 117m maximum rotor diameter and presented a collision risk window of 10 751.32m² per turbine. The proposed change to a 149m rotor diameter will increase the collision risk window presented by each turbine to 17 436.62m². This represents an increase in the area of

collision risk window (per turbine) of 62%. Since the number of turbines remains unchanged at a maximum of 22, the overall collision risk window posed by the wind farm could increase by 62% if the increase in rotor zone is evenly distributed across the heights at which birds fly. However this is not the case, as illustrated in Figure 1 most of the increase in collision risk envelope comes at the upper blade tip (raised from 150 to 199.5m), which is above the height at which most bird flights were recorded. Only one of the priority species recorded flying on site had average flight heights in this height range (African Crowned Eagle - 160m) (See Table 2).

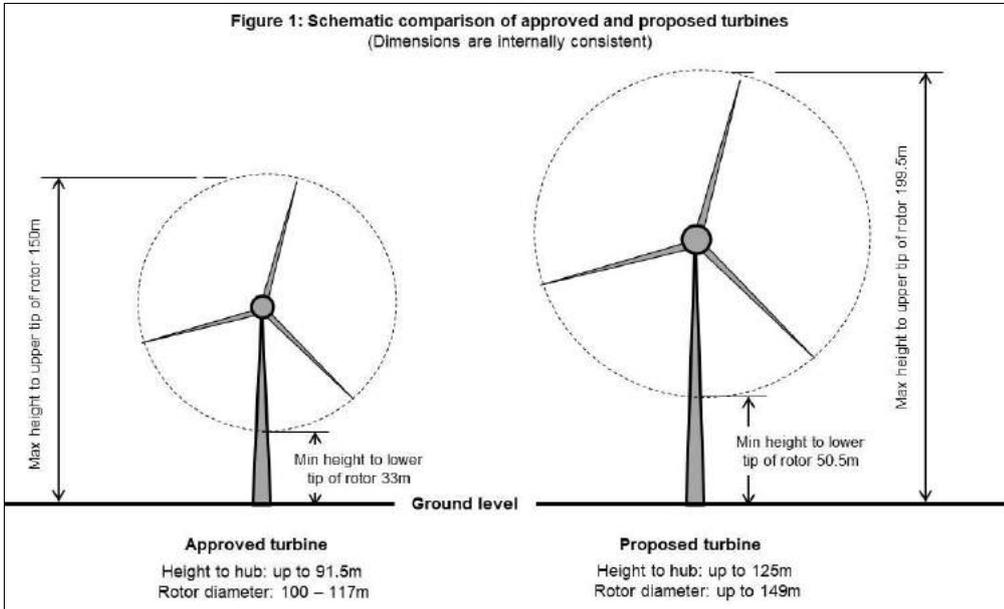


Figure 2. Indicative diagram of the original and proposed rotor swept areas (EOH-CES).

In our opinion, the actual realised increase in collision risk area to the relevant bird species flying on the Grahamstown Plan8 site will not be sufficient to warrant a change from MODERATE to HIGH significance.

3. CONCLUSIONS

We conclude that the proposed amendment does not substantially alter the risk to avifauna, and does not change the significance of the impacts as previously assessed. The raising of the rotor zone higher above ground level has a net beneficial effect for avifauna, and the increased absolute collision risk envelope is mostly at altitudes too high to be of concern for most bird species. In addition it must be remembered that the species considered most at collision risk by the original assessment are not regionally Red Listed, and so the significance of any impacts on them is diminished. As a result there is no need for additional mitigation due to the proposed amendment.

Please don't hesitate to contact us if you require further clarity in this regard.

Kind regards

Jon Smallie

References

Smallie, 2011. Grahamstown Wind Energy Facility – Eastern Cape – Plan8 Infinite Energy – Avifaunal Impact Assessment. Unpublished report submitted to EOH-CES.

Smallie, 2015. Grahamstown Wind Energy Facility - Plan8 Infinite Energy (Pty) Ltd. Final pre-construction bird monitoring report. Unpublished report submitted to Plan8.

APPENDIX C: CHIROPTERA SPECIALIST OPINION

www.animalia-consult.co.za • werner@animalia-consult.co.za • Somerset West, Cape Town • 2015/564493/07

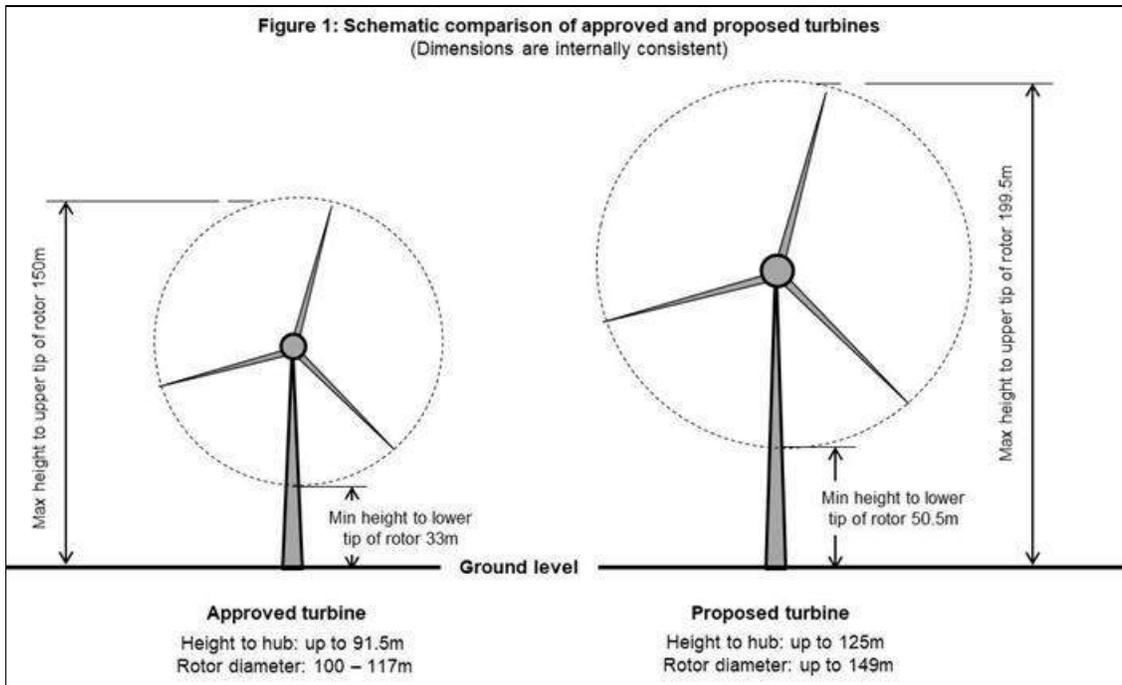
11 February 2019

Proposed amendment to the environmental authorisation for the Plan 8 Grahamstown Wind Energy Facility in the Eastern Cape, and the impacts on bats: TURBINE DIMENSIONS

Animalia Consultants (Pty) Ltd undertook the impact assessment and pre-construction bat monitoring for the Grahamstown Wind Energy Facility (WEF) in 2012 and 2014/2015 respectively. The Grahamstown WEF wishes to undertake an amendment to expand the turbine envelope and allow for possible use of the newer, larger turbines that are now available in the market place. The original Environmental Authorisation (EA) is founded on a rotor diameter of 100m–117m and a hub height of up to 91.5m. The current amendment is proposing an increase to a maximum rotor diameter of 149m and a hub height of up to 125m. These changes are summarized in **Table 1** and **Figure 1**, which also indicates the minimum rotor swept height above ground. All other aspects such as the number of turbines, etc. remain as approved.

Table 1: Originally authorized and proposed amendments.

Aspect	Approved	Proposed
Rotor diameter	100m - 117m	Up to 149m
Hub height	Up to 91.5m	Up to 125m
Lowest rotor swept height above ground	33m	50.5m
Generating capacity per turbine	2.5 – 3MW	Up to 4.5MW
Development footprint	As described in the Second Final EIA Report and Addendum (CES 2015a, CES 2015b) Total disturbed area during construction of all infrastructure was estimated to be 9.8ha, but this underestimated the areas of the laydown areas / hardstandings required for construction of the turbines. (Areas on plan are shown to be 60mx45m, a total disturbed area of 5.94ha compared to 2ha quoted in CES 2015a.) Actual disturbed area was 13.7ha). It was also assumed that the laydown areas/hardstandings would be removed after completion of construction, and the disturbed areas rehabilitated.	<ul style="list-style-type: none"> – Turbine bases: 22No circular bases 26.5m dia – total area 1.21ha – Laydown areas/hardstandings: 22No laydown areas/hardstandings 80mx50m (includes 25m² for turbine transformer) – total area 8.8ha – Roads: 16.35km of roads average width 4.8m – total area 7.68ha – Substation: 100mx65m (includes operations instrument/control centre and store) – total area 0.65ha <p>Estimated area of disturbance 18.35ha (0.72% of total project area)</p> <p>Assumes laydown areas/hardstandings used during construction will remain in place as hardstandings during operation to facilitate repairs and maintenance activities.</p> <p>The total disturbed area for the proposed amendment is about 34% greater than the approved project, which is accounted for by the increased area of the laydown areas/hardstandings and the larger turbine bases.</p>



During the preconstruction assessment bat activity was found to be significantly higher at 10m than at 50m. The advantage of the proposed amendment is that it will increase the rotor swept height above ground and therefore decrease the likelihood of impacts on bats, but the disadvantage is that it will also result in a larger airspace of moving blades, although the larger airspace of moving blades is in a lower risk zone, higher above ground level. The proposed increased development footprint is still relatively small (0.72% of total project area), and the impact of loss of foraging habitat therefore remains as assessed in the bat EIA study.

However, due to more recent insights gained in the industry, the sensitivity map that was used in the EIA phase (with a 50m-wide buffer zone around high bat-sensitivity areas) is deemed to be insufficient by the specialist, and may not adequately minimise risks of impacts to bats. The revised sensitivity map now includes additional areas that are recently considered as high-risk areas for impacts on bats (**Figure 2**).

The bat preconstruction EIA study was conducted from 2014 to 2015, when the 2014 South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction were in force (Sowler & Stoffberg, Third Edition 2014), which did not specify specific buffer requirements. The current 2017 version of the Best Practice Guidelines (Sowler, *et al.*, 2017) recommend that the whole of the turbine rotor swept area should be kept outside high sensitivity buffers. This means that the centre of the turbine base must be no closer than 74.5m from the edge of any high-bat sensitivity buffers, considering the proposed rotor diameter of 149m. This is not considering elevation differences between turbine blade tips and the edge of a high sensitivity area. It is therefore recommended to keep turbine blades outside high sensitivity buffers, as far as practically possible.

Turbines may be placed in the moderate bat sensitivity areas, as well as 100m moderate sensitivity buffers, but this should preferably be avoided where technically feasible. According to the revised sensitivity map the turbines with blades intruding into the high sensitivity buffer zones are **Turbines 3, 4, 5, 9, 17, 18, 19 and 21**. However, it should be noted that all turbine bases are outside the high sensitivity buffers, as required by the 2014 Guidelines that were in force when the study was undertaken.

Due to a 200m SANRAL buffer along the N2, Turbines **13 and 14** may need to move a few metres south closer to a high sensitivity bat buffer. However, the alignment of the N2 has recently been moved a few metres north, which will negate the need to micro-site Turbines **13 and 14**. Grahamstown WEF agreed to micro-site Turbines **3, 4, 5, 18, 19 and 21** to maintain turbine blades outside the high sensitivity buffers. When considering the elevation difference between the high bat sensitivity area and the turbine blade tip for **Turbine 9**, then the current approved location for this turbine is sufficient to keep the turbine blades outside the high bat sensitivity buffer. **Turbine 17** cannot be micro-sited without violating the N2 road reserve buffer, and when considering the difference in elevation between the turbine blade tip and the bat high sensitivity, the blades still encroach onto the buffer. However, the location of this turbine satisfied minimum requirements at the time that the study was conducted (that is, the turbine base is outside the high bat-sensitivity buffer zone), and Grahamstown WEF is committed to adaptive mitigation management measures on any of the turbines that cause unacceptable numbers of bat mortalities, as per the data of the operational bat mortality study. The adaptive mitigation measures set out in the preconstruction bat study form the basis of the adaptive mitigation plan, and **Turbine 17** should receive special attention during the operational bat mortality monitoring study.

The mitigation and management measures specified in the EIA are sufficient and remain unchanged. Except they should not be limited to specific turbines only, but rather apply to whichever turbines are identified as causing unsustainable numbers of bat mortalities during the operational monitoring study.

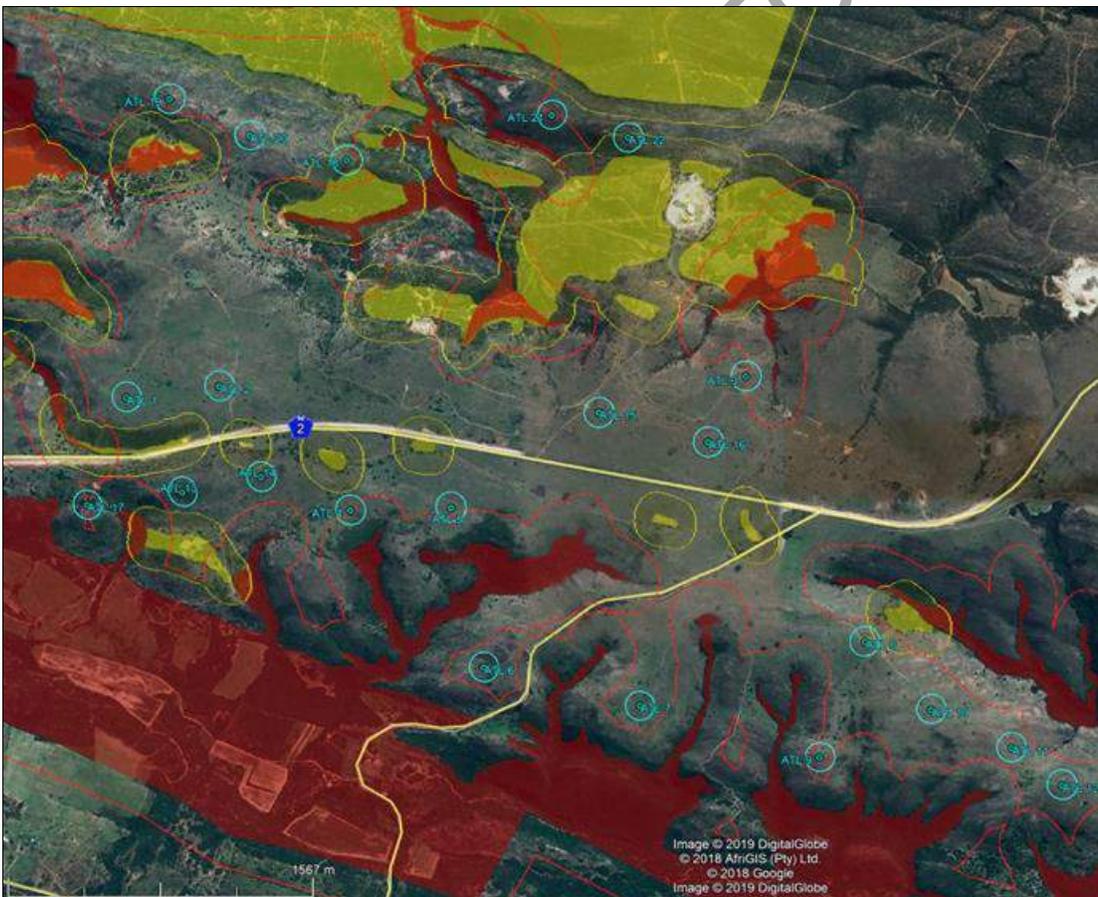


Figure 2: Revised bat sensitivity map.

Notes:

- (i) Blue dots = approved turbine base locations;

- (ii) Blue circles around turbine base points = maximum horizontal sweep of 149m diameter rotor blades
- (iii) Opaque red shading = high bat-sensitivity areas
- (iv) Solid red line = 150m-wide high bat-sensitivity buffer
- (v) Green line = 74.5m distance (blade length) from high sensitivity buffer
- (vi) Opaque yellow shading = moderate bat-sensitivity areas
- (vii) Solid yellow line = 100m-wide moderate bat-sensitivity buffer.

In summary, the proposed amendment is acceptable from a bat sensitivity perspective if the revised sensitivity map is adhered to, the recommended adaptive mitigation measures are adhered to, and a bat mortality monitoring study is conducted for a minimum duration of two years during the operational phase.

If there are any queries, please do not hesitate to contact me.



Werner Marais
Managing Director
werner@animalia-consult.co.za
Pr.Sci.Nat. (Zoological Science) 400169/10

REVISED DRAFT FOR REVIEW

APPENDIX D: ECOLOGY SPECIALIST OPINION

Coastal & Environmental Services

05 October 2018

Attention: Bill Rowlston

Project Manager

Plan 8 Grahamstown Wind Energy Facility

AMENDMENT APPLICATION FOR THE PROPOSED PLAN 8 GRAHAMSTOWN WIND ENERGY FACILITY CLOSE TO THE TOWN OF GRAHAMSTOWN, EASTERN CAPE: COMMENT FROM THE ECOLOGICAL SPECIALIST

The amended infrastructure layout received in September 2018 for the proposed Plan 8 Grahamstown Wind Energy Facility was assessed to

- Determine the impact of the proposed changes on the surrounding ecological landscape.
- Describe any changes to the significance ratings in the original EIA, and the adequacy of the associated mitigation measures.
- Describe any additional mitigation measures needed to address the proposed changes.

Table 1. Proposed specification changes to the Plan 8 Grahamstown Wind Energy Facility

Previous specifications (from the 2015 EIA)	Proposed new specifications
Total Generating Output:	
Total generating output of up to 66MW (2.5-3MW per turbine for up to 22 turbines)	Total generating output of up to 99MW (4.5MW per turbine for up to 22 turbines)
Hub height:	
Up to 91.5m above ground level	Up to 125m above ground level
Rotor diameter:	
100-117m	Up to 149m
Foundation size:	
Plan size = 400m ² Base thickness = 2-6m	Plan size = 550m ² Base thickness = unknown at this point
Development footprint:	
Total area disturbed = 9.8ha (However, total disturbed area during construction of all infrastructure was estimated to be 9.8ha, but this underestimated the areas of the laydown areas / hardstandings required for construction of the turbines. Total disturbed area 13,7ha)	Total area disturbed = 18.35ha

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 reg no: 2012/151672/07
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Directors: A Bohbot, JW King, and AM Ayis

The following specifications will remain the same:

Table 2. Unchanged specifications for the Plan 8 Grahamstown Wind Energy Facility

Previous specifications (from the 2015 EIA)		
Farm properties:		
<ul style="list-style-type: none"> • Farm Gilead 361 (SG C00200000000036100000) • Farm Tower Hill 363 (SG C00200000000036300000) • Farm Peynes Kraal 362 (SG C00200000000036200000) Total area of properties is approximately 2 550ha		
Number of turbines:		
Up to 22 new turbines		
Turbine locations:		
1	33° 16' 50.06" S	26° 49' 29.08" E
2	33° 16' 48.24" S	26° 49' 47.62" E
3	33° 16' 46.58" S	26° 51' 29.70" E
4	33° 17' 08.37" S	26° 50' 12.87" E
5	33° 17' 07.94" S	26° 50' 32.60" E
6	33° 17' 34.26" S	26° 50' 38.22" E
7	33° 17' 40.50" S	26° 51' 08.92" E
8	33° 17' 29.75" S	26° 51' 52.93" E
9	33° 17' 49.21" S	26° 51' 44.26" E
10	33° 17' 41.18" S	26° 52' 06.07" E
11	33° 17' 47.59" S	26° 52' 22.01" E
12	33° 17' 53.91" S	26° 52' 32.16" E
13	33° 17' 05.47" S	26° 49' 39.80" E
14	33° 17' 02.96" S	26° 49' 55.44" E
15	33° 16' 52.52" S	26° 51' 01.32" E
16	33° 16' 57.28" S	26° 51' 22.41" E
17	33° 17' 07.54" S	26° 49' 20.57" E
18	33° 16' 11.01" S	26° 50' 11.37" E
19	33° 16' 01.21" S	26° 49' 37.07" E
20	33° 16' 07.21" S	26° 49' 52.78" E
21	33° 16' 03.14" S	26° 50' 51.31" E
22	33° 16' 07.17" S	26° 51' 06.54" E
Turbine interconnections:		
Underground cables connecting all turbines		
Access and site roads:		
Internal roads between 4.7 and 8m wide		
Substation:		
Alternative Option 2: Centre point 33.276784°S, 26.831437°E		

Evacuation power line:
Alternative, Option 2: <input type="checkbox"/> Start: 33°16'34.59"S, 26°49'51.89"E <input type="checkbox"/> End: 33°16'23.56"S, 26°49'51.17"E Connection, via 132kV overhead power line 350m long, to existing Eskom 132kV overhead line from Pembroke to Albany sub-station

Ecological specialist comments:

The following comments are made to each change in specification as listed in Table 1:

Table 3. Comments on the proposed specification changes to the Plan 8 Grahamstown Wind Energy Facility

Previous specifications (from DEA 2015)	Proposed new specifications	Comment from the Ecological specialist
Total Generating Output:		
Total generating output of up to 66MW (2.5-3MW per turbine for up to 22 turbines)	Total generating output of up to 99MW (4.5MW per turbine for up to 22 turbines)	<ul style="list-style-type: none"> All impacts identified in the original Ecological Report are still valid for this change. There are no additional impacts identified for this change
Hub height:		
Up to 91.5m above ground level	Up to 125m above ground level	<ul style="list-style-type: none"> All impacts identified in the original Ecological Report are still valid for this change. There are no additional impacts identified for this change
Rotor diameter:		
100-117m	Up to 149m	<ul style="list-style-type: none"> All impacts identified in the original Ecological Report are still valid for this change. There are no additional impacts identified for this change
Foundation size:		
Plan size = 400m ² Base thickness = 2-6m	Plan size = 550m ² Base thickness = unknown at this point	<ul style="list-style-type: none"> All impacts identified in the original Ecological Report are still valid for this change. There are no additional impacts identified for this change
Development footprint:		
Total area disturbed = 9.8ha (Total disturbed area during construction of all infrastructure was estimated to be 9.8ha, but this underestimated the areas of the laydown areas/hardstandings required for construction of the turbines. The actual disturbed area was 13.7ha).	Total area disturbed = 18.35ha	<ul style="list-style-type: none"> All impacts identified in the original Ecological Report are still valid for this change. There are no additional impacts identified for this change

Ecological specialist opinion:

The proposed changes to the layout will have no additional impact on the ecological landscape and therefore no additional issues were identified when compared to the final Ecological Impact Assessment (2012) for the proposed Plan 8 Grahamstown Wind Energy Facility, dated January 2012.

All issues identified in the 2012 Ecological Impact Assessment remain valid and all recommended mitigation measures identified must still be implemented for all phases of the wind farm.

This Letter of Opinion is not a standalone document and the conclusions made must be read in conjunction with the 2012 Ecological Impact Assessment.

Yours faithfully



Roy de Kock Ecological Specialist

References:

DEA 2015: Environmental Authorisation in terms of Regulation 36 of the Environmental Impact Assessment Regulations, 2010,: Establishment of the Plan 8 Grahamstown Wind energy Facility (WEF) and its associated infrastructure within the Makana Local Municipality, Eastern Cape, Cacadu District Municipality, Department of Environmental Affairs, 22nd October 2015.

2009 Ecological Report: Environmental Authorisation in terms of Regulation 36 of the Environmental Impact Assessment Regulations, 2010,: Establishment of the Plan 8 Grahamstown Wind energy Facility (WEF) and its associated infrastructure within the Makana Local Municipality, Eastern Cape, Cacadu District Municipality, Department of Environmental Affairs, 22nd October 2015.

Ecological specialist details:

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Roy is a Principal Consultant holding a BSc Honours in Geology and an MSc in Botany from the Nelson Mandela University in Port Elizabeth. He has recently started a PhD in Botany focussing on the impact of fracking fluids on vegetation and soils in the Karoo Basin. He has been working for EOH since 2010, and is based at the East London branch where he focuses on Vegetation, Biodiversity, Ecological and Agricultural Assessments, Geological and Geotechnical analysis, Environmental Management Plans, mining applications and various environmental impact studies. Roy has worked on numerous projects in South Africa and Africa at large. Roy is registered with the South African Council for Natural Scientific Professional (SACNASP).

Relevant recent projects Roy on which has worked include:

Name of project	Description of responsibility	Date completed
Waterfall Citrus Farm EIA for the development of a new citrus farm outside Peddie, Eastern Cape	Ecological Impact Assessment	April 2018
Indwe Biodiversity Study on the development of a new essential oils farm outside Kidds Beach, East London, Eastern Cape	Biodiversity study for an essential oils farming development	December 2017
Earth Free (Pty) Ltd Biodiversity study for a housing development in Kei Road, Eastern Cape	Biodiversity study for a housing development extension	October 2017
City of Johannesburg Biodiversity Assessment and Conservation management Plans for 4 Nature Reserves	Vegetation and Ridgeline Biodiversity Study	January - April 2017
Terreco Butterworth Bypass Alternatives EIA (EC)	Botanical Impact Assessment	Oct 2016
Terreco Idutywa Bypass Alternatives EIA (EC)	Botanical Impact Assessment	Oct 2016
SANRAL N2 between Tetyana & Sitebe Komkulu EIA (EC)	Ecological Impact Assessment	June 2015
Laman Mining renewal of Mining License (EC)	Botanical Impact Assessment	February 2015
ACSA East London Airport Vegetation Study (EC)	Botanical Impact Assessment	February 2014
SANRAL R61 Baziya to Mthatha EIA (EC)	Ecological Impact Assessment	November 2014
SANRAL Rehabilitation of the N9, Middelburg (EC)	Ecological Impact Assessment	June 2013

I, Roy de Kock, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

REVISED DRAFT FOR PREVIEW

APPENDIX E: ARCHAEOLOGY SPECIALIST OPINION

Note that the specialist included the original Archaeological Impact Assessment Report, December 2011, with the October 2018 assessment of the impacts of the proposed amendment as an Addendum.

Scoping Archaeological Impact Assessment With ADDENDUM for Amendment Application, 2018

Proposed development of the Plan 8 Grahamstown Wind Energy
Project: including Farms Gilead 361, Peynes Kraal 362 and Tower Hill
363, Grahamstown, Makana Municipality, Eastern Cape Province

prepared for

Mr. Hylton Newcombe, Coastal & Environmental Services, 67 African Street, PO Box
934, Grahamstown, 6140, Tel: 046 622 2364/7, Fax: 046 622 6564, h.newcombe@cesnet.co.za

prepared by



Nilssen Archaeological Resources Management

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15 December 2011

With ADDENDUM for Amendment Application, 2018

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Executive Summary

Because the above-named proposed development triggers the National Heritage Resources Act (Act 25 of 1999), Mr Hylton Newcomb of Coastal & Environmental Services - on behalf of Plan 8 (Pty) Limited - appointed the author to conduct a Scoping Archaeological Impact Assessment (SAIA). The SAIA focused on the areas affected by the provisional layout and placement of wind turbines. Wind turbine sites coincide with high lying areas on the farms Gilead 361, Peynes Kraal 362 and Tower Hill 363. The aim of the SAIA was to determine the archaeological sensitivity of the high lying parts of the affected properties. Results of the scoping study would also provide information regarding potential sites for the placement of wind turbines and associated services and facilities as well as the way forward regarding archaeological assessment and mitigation.

The high lying areas are relatively flat and consist of gently undulating hills that slope steeply toward small ravines and gorges. Overall, the area is very rocky and not suitable for cultivation. The higher lying areas are vegetated with grasses, bushes and shrubs while ravines and gorges include trees and thicket. Due to dense vegetation cover, archaeological visibility is generally poor. Nevertheless, sufficient ground surfaces were inspected to determine the overall archaeological sensitivity of the affected properties.

The main restriction to the archaeological investigation was poor visibility of ground surfaces and inaccessibility due to dense vegetation cover. Apart from two unmarked graves and an old horse/oxen drawn plough, no material culture or structural remains of historical significance were observed in the studied area. Two isolated artefacts of Stone Age origin were recorded and a cave with rock paintings occurs in one of the gorges. Because shales occur in the study area, the potential for the occurrence of fossils calls for palaeontological input. Additionally, the affected areas border on the N2 and therefore, visual impact must be considered.

Based on results from the current study it is recommended that;

- Because of the overall lack in archaeological remains, it is suggested that – from an archaeological perspective - the proposed development may move beyond the scoping phase of assessment,*
- Surveyed areas (walk tracks) – with the exception of waypoints 1 and 34-35 – are suitable for the proposed activities,*
- Any areas outside the surveyed tracts might be archaeologically sensitive and therefore, placement of any activities outside the studied areas will require further archaeological investigation and assessment,*
- Once the final layout and placement of wind turbines and associated facilities and services are determined, an Archaeological Impact Assessment focusing on the affected areas should be undertaken,*

- *Because shales occur in the study area the presence of fossils cannot be ruled out and therefore, a Palaeontological Impact Assessment (Desktop Study) should be conducted, and*
- *The affected properties border on the N2 and therefore it is suggested that a Visual Impact Assessment may be necessary.*

Note that;

- *In the event that vegetation clearing and earthmoving activities expose archaeological materials, such activities must stop and the South African Heritage Resources Agency must be notified immediately.*
- *If archaeological materials are exposed during vegetation clearing and/or earth moving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.*
- *In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency (Mrs. Colette Scheermeyer) and will require a professional archaeologist to undertake mitigation if needed.*

1. Introduction

1.1 Background

Because the above-named proposed development triggers the National Heritage Resources Act (Act 25 of 1999), Mr Hylton Newcomb of Coastal & Environmental Services and on behalf of Plan 8 (Pty) Limited, appointed the author to conduct a Scoping Archaeological Impact Assessment (SAIA). The SAIA was conducted on 29 and 30 November 2011 and focused on the areas affected by the provisional layout and placement of wind turbines. Wind turbine sites coincide with high lying areas on the farms Gilead 361, Peynes Kraal 362 and Tower Hill 363, Grahamstown in the Makana municipality, Eastern Cape Province (Figures 1, 2 and 3). The aim of the SAIA was to determine the archaeological sensitivity of the high lying parts of the affected properties. Results of the scoping study would also provide information regarding potential sites for the placement of wind turbines and associated services and facilities as well as the way forward regarding the archaeological component of the broader Environmental Impact Assessment.

The proposed project will entail the construction and operation of up to 32 wind turbines each generating 2.5MW of power with a total generation capacity of 67.5MW. The proposed activity includes the installation of wind turbines and associated structures, services and facilities. The final specifications and scope of the activity will be determined by results from various specialist studies and when further wind data has been obtained from the existing wind mast. For further details contact Mr Hylton Newcombe (details on title page). A layout plan of the project is shown in Figure 2 and the main boundary of the study area is shown in Figure 3. Coordinate data for the provisional turbine localities are given in Table 1 (also see Figures 2 & 3).

Table 1. Coordinate data for provisional turbine localities.

Name	Description	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 SA National	Grid:
T1	turbine locality	S33.26570 E26.82321	27 Y0016472 X3682229	
T10	turbine locality	S33.26978 E26.83614	27 Y0015266 X3682680	
T11	turbine locality	S33.26257 E26.83655	27 Y0015266 X3682680	
T12	turbine locality	S33.26340 E26.84072	27 Y0015230 X3681881	
T13	turbine locality	S33.27550 E26.84192	27 Y0014727 X3683314	
T14	turbine locality	S33.26808 E26.84932	27 Y0014039 X3682490	
T15	turbine locality	S33.26835 E26.85320	27 Y0013677 X3682520	
T16	turbine locality	S33.28137 E26.84518	27 Y0014422 X3683964	
T17	turbine locality	S33.28101 E26.85399	27 Y0013602 X3683924	
T18	turbine locality	S33.27979 E26.85873	27 Y0013161 X3683787	
T19	turbine locality	S33.28916 E26.83585	27 Y0015290 X3684830	
T2	turbine locality	S33.26848 E26.82906	27 Y0015926 X3682537	
T20	turbine locality	S33.28690 E26.84219	27 Y0014700 X3684579	
T21	turbine locality	S33.29021 E26.84655	27 Y0014294 X3684945	
T22	turbine locality	S33.28998 E26.85632	27 Y0013383 X3684918	
T23	turbine locality	S33.29077 E26.86412	27 Y0012656 X3685005	
T24	turbine locality	S33.29319 E26.84325	27 Y0014600 X3685276	
T25	turbine locality	S33.29726 E26.86203	27 Y0012850 X3685725	
T26	turbine locality	S33.29566 E26.87112	27 Y0012004 X3685546	
T27	turbine locality	S33.29866 E26.87630	27 Y0011521 X3685878	
T3	turbine locality	S33.27560 E26.82921	27 Y0015911 X3683327	
T4	turbine locality	S33.28001 E26.81270	27 Y0017448 X3683819	
T5	turbine locality	S33.27952 E26.81828	27 Y0016929 X3683764	
T6	turbine locality	S33.27919 E26.82460	27 Y0016340 X3683726	
T7	turbine locality	S33.27880 E26.83236	27 Y0015617 X3683681	
T8	turbine locality	S33.28608 E26.82284	27 Y0016503 X3684490	
T9	turbine locality	S33.28639 E26.83226	27 Y0015625 X3684523	

Development activities will include earthmoving operations that could have a permanent negative impact on archaeological and tangible heritage related resources.

1.2. Purpose and Scope of the Study

Objectives of the Scoping Archaeological Impact Assessment are:

- To assess an adequate portion of the study area for traces of archaeological and heritage related resources to determine the archaeological sensitivity of the proposed site;
- To identify options for archaeological mitigation and further assessment in order to minimize potential negative impacts;
- To make recommendations for archaeological mitigation where necessary and the way forward for the archaeological component of the EIA process; and
- To identify heritage resources and issues that may require further attention.

Terms of Reference (ToR):

- Locate boundaries and extent of the study area.
- Conduct a survey of a portion of the study area to identify and record archaeological and heritage related resources.
- Assess the impact of the proposed development on above-named resources.
- Recommend mitigation measures and additional assessment where necessary.
- Prepare and submit a report to the client that meets standards required by the South African Heritage Resources Agency in terms of the National Heritage Resources Act, No. 25 of 1999.

1.3 Study Area

The study area is comprised of the farms Gilead 361, Peynes Kraal 362 and Tower Hill 363, Grahamstown (Figures 1, 2 and 3). Some 2500ha in extent, the site is situated approximately 30km east of Grahamstown and immediately north and south of the N2 (Figures 1 & 3). The study

area was accessed by vehicle from the N2.

The high lying areas are relatively flat and consist of gently undulating hills that slope steeply toward small ravines and gorges. Overall, the area is very rocky and not suitable for cultivation. The higher lying areas are vegetated with grasses, bushes and shrubs while ravines and gorges include trees and thicket. Due to dense vegetation cover, archaeological visibility is generally poor. Nevertheless, sufficient ground surfaces were inspected to determine the overall archaeological sensitivity of the affected properties. Modern human activities in the studied area consist mostly of vehicle tracks, and two large clay quarries were noted. Evidence for burrowing by large and smaller mammals was also seen. Examples of the affected environment – vegetation, topography, exposed surfaces and so on - are shown in Plates 1 through 5.

1.4 Approach to the Study

A review of earlier archaeological work conducted in the area is beyond the scope of this report, but see references given below. Grahamstown and its surroundings contain a rich and varied archaeological record from the Stone Age through the historic period. The Howiesons Poort Type site is situated in the Grahamstown area. Stone Age sites include caves and rock shelters, open air artefact scatters and rock paintings while the historic period is represented by numerous buildings with Provincial and National Heritage Site status.

On behalf of Plan 8 (Pty) Limited, Mr Hylton Newcombe of Coastal & Environmental Services provided a locality and layout map as well as coordinate data for provisional turbine sites (Figure 2 and Table 1). Mr Newcombe also provided contact details of the farm owners. Permission to access farms Gilead, Peynes Kraal and Tower Hill was obtained from Mr Gavin Dixon, Mr Wayne Nortier and Mr Morne Erwee respectively. Farm Gilead was first visited with Mr Dixon who indicated the farm boundaries as well as two unmarked graves. Mr Michael Nortier kindly showed me the boundaries of Peynes Kraal as well as a rock shelter with rock paintings. The study was then conducted independently and mostly on foot with small portions covered by vehicle. For the most part, archaeological visibility is poor.

The aim of the scoping study was to determine the archaeological sensitivity of the proposed areas for wind turbine placement and not to record all archaeological and tangible heritage related occurrences. To this end, the field work focused on high lying areas as well as the provisional turbine localities. Some turbine localities were not accessible due to impenetrable vegetation.

Survey tracks were fixed with a hand held Garmin Camo GPS to record the search area (Figure 3, gpx tracking file is available from the author). The position of identified archaeological occurrences and photo localities were fixed by GPS (Figure 3, Plates 1 through 8 and Table 2). Digital audio notes and a comprehensive, high quality digital photographic record were also made (full data set available from author). In this report, localities of archaeological occurrences and photograph localities are established by matching the numbers on photographs with those of waypoints in Figure 3 (also see Table 2). Directions of photographic views are indicated with compass bearing names like E is east; WSW is west south west, and so on. Bearing names on panoramic views indicate the bearing at the position of the label on the photograph.

2. Results

On 29 and 30 November 2011- in 2 days of survey - a distance of 38km was walked and 6km traversed by vehicle, covering an area of about 250ha of which an average of some 30% provided good archaeological visibility (Figure 3 and Plates 1 through 8).

Two unmarked graves are situated at **Waypoint 1** (Plate 6 [1], Figure 3 and Table 2). Because the substrate is very rocky, the graves are likely to be very shallow and this would also explain why the burials are covered with substantial stone piles. Both burials are west-east aligned and the ovals measure some 2m in length and about 80cm in width. According to Mr Dixon, they are the graves of two farm workers who lived nearby in wattle and daub structures which have

since disintegrated. The burials are thought to be at least 80 years old.

Significance and Recommendation:

Human burials are protected by law, are normally considered to be of significance and are archaeologically sensitive. As such, it is recommended that the burials not be disturbed and that a buffer zone of at least 15m in radius should be put in place in the form of a balustrade or suitable wooden palisade fencing.

An isolated Later Stone Age core/scrapper was identified at **Waypoint 5** (Plate 6[5], Figure 3 and Table 2). The stone artefact is in quartzite and one surface is retouched to produce a scraper edge.

Significance and Recommendation:

Because this specimen occurs in isolation and is in secondary context, it is of no scientific value and is considered to be of no archaeological significance. No further mitigation measures are necessary.

An isolated Stone Age flake of indeterminate age was recorded at **Waypoint 8** (Plate 7[8], Figure 3 and Table 2). The specimen is in quartzite and is not retouched.

Significance and Recommendation:

Because this specimen occurs in isolation and is in secondary context, it is of no scientific value and is considered to be of no archaeological significance. No further mitigation measures are necessary.

An old and rusted horse/oxen drawn plough is located at **Waypoint 13** (Plate 7[13], Figure 3 and Table 2).

Significance and Recommendation:

Examples of this type of plough are relatively common on South African farms and the implement is of no particular historic value. Nevertheless, it forms part of the history of agricultural implements and machinery used in South Africa. Since the implement is in close proximity to the unmarked graves at waypoint 1, it is suggested that it be included in the buffer zone that will protect the graves.

Waypoints 34 and 35 represent the location of a cave with rock paintings (Plate 8, Figure 3 and Table 2). The site is situated in a gorge and is not readily visible until one is relatively close to it. Without the guidance of Michael Nortier, the site would not have been found since the focus of the study was on the higher lying ground. Within the drip-line the cave is approximately 8 meters in length and about a maximum of 5 meters deep. The most common paintings are hand prints in red ochre. Most paintings are in red or orange ochre and no polychromes were identified. However, the presence of “hook heads” suggests that human faces were probably painted in lighter colours which have since faded. A few depictions of antelope and thereanthropes were also seen.

Significance and Recommendation:

The rock art site is considered to be of high significance, but it will not be directly impacted by the proposed activity because it is situated in a gorge and because wind turbine sites occur on high lying areas. It may be best not to draw any attention to the site because it is not readily visible and therefore it is not easily stumbled upon. No mitigation measures are necessary.

Shales were seen in several locations including **Waypoints 29 and 31** (Plate 5[29&31], Figure 3 and Table 2). The presence of sedimentary geological deposits suggests that fossiliferous sediments may occur in the study area.

Significance and Recommendation:

If the shales proved to be fossil bearing, then these occurrences will be of high significance. It is recommended that a Palaeontological Impact Assessment (Desktop Study) be conducted to establish whether or not the shales in the study area are potentially fossil bearing.

Because the affected properties lie immediately north and south of the N2 (scenic route) it is recommended that a Visual Impact Assessment be undertaken.

Table 2. Coordinate and descriptive data for photo localities and archaeological occurrences (see Figure 3 and Plates 1 through 8).

Name	Description img=image snd=sound	Datum: WGS 84 Lat/Lon dec.degrees	Datum: WGS 84 SA National	Grid:	meters above sea level
1	unmarked graves img4178-82 snd4812	S33.27430 E26.82743	27 Y0016078	X3683183	521 m
2	img4183-6 snd4186 panorama NW-NE	S33.27311 E26.82898	27 Y0015933	X3683051	497 m
3	img4187-90 snd4190 panorama W-N & veg	S33.26912 E26.82989	27 Y0015849	X3682608	500 m
4	img4191-4 snd4194 panorama N-E	S33.26520 E26.82300	27 Y0016492	X3682175	489 m
5	isolated LSA artefact img4195-4201 snd4201	S33.26554 E26.82401	27 Y0016397	X3682212	494 m
6	exposures img4202 snd4202	S33.26832 E26.83053	27 Y0015790	X3682520	509 m
7	exposures img4203-4 snd4204	S33.26671 E26.82685	27 Y0016133	X3682342	502 m
8	isolated flake age indet. img4205-8 snd4208	S33.26845 E26.82930	27 Y0015904	X3682534	516 m
9	img4209-10 snd4210 W	S33.26979 E26.83665	27 Y0015219	X3682682	491 m
10	img4211-5 snd4215 panorama NE-SW	S33.27003 E26.83742	27 Y0015147	X3682708	489 m
11	exposures img4216-7 snd4217	S33.27524 E26.82942	27 Y0015892	X3683287	525 m
12	img4218-23 snd4223 panorama S-N old kraals & dip	S33.27527 E26.82851	27 Y0015977	X3683290	525 m
13	old horse/oxen drawn plough img4224-6 snd4226	S33.27514 E26.82801	27 Y0016023	X3683276	526 m
14	exposures SW img4227-8 snd4228	S33.27785 E26.82674	27 Y0016141	X3683576	525 m
15	exposures E 4229-30 snd4230	S33.27900 E26.82301	27 Y0016488	X3683704	510 m
16	img4231-5 snd4235 panorama SSE-NW T8	S33.28427 E26.82418	27 Y0016378	X3684289	510 m
17	img4237-7 snd4327 veg cover & rocky	S33.28446 E26.82524	27 Y0016279	X3684310	516 m
18	img4238-9 snd4239 T8	S33.28636 E26.83233	27 Y0015618	X3684520	503 m
19	img4240 snd4240 veg & rocky - T19	S33.28866 E26.83533	27 Y0015339	X3684775	509 m
20	img4241-3 snd4243 veg cover - T20	S33.28669 E26.84171	27 Y0014745	X3684555	527 m
21	img4244-7 snd4247 panorama NW-NE - T5	S33.28109 E26.81821	27 Y0016935	X3683937	489 m
22	img4248-9 snd4249 veg cover - T4	S33.27994 E26.81308	27 Y0017413	X3683811	489 m
23	rocky exposure img4250 snd4250	S33.28291 E26.84692	27 Y0014260	X3684136	555 m
24	img4251-2 snd4252 E veg cover	S33.28059 E26.85210	27 Y0013778	X3683877	549 m
25	img4253-4 snd4254 ENE - T18	S33.28029 E26.85624	27 Y0013392	X3683843	539 m
26	img4255-9 snd4259 panorama NE-SW - T18	S33.27975 E26.85872	27 Y0013161	X3683784	513 m
27	exposure img4260-2 snd4262	S33.26874 E26.85317	27 Y0013680	X3682563	488 m
28	img4263-8 snd4268 panorama S-N	S33.26802 E26.84990	27 Y0013985	X3682484	499 m
29	shale outcrop exposure img4269-71 snd4271	S33.27281 E26.85280	27 Y0013714	X3683014	473 m
30	veg cover - panorama N-E img4272-6 snd4276	S33.26519 E26.84081	27 Y0014832	X3682171	351 m
31	shale outcrop img4277-9 snd4279	S33.26274 E26.84416	27 Y0014520	X3681899	330 m
32	img4280-4 snd4284 low point in gorge	S33.26335 E26.84043	27 Y0014868	X3681967	312 m
33	img4284-9 snd4289 low part of gorge - vegetation approximate locality of rock shelter with paintings img4290-4310 snd4310	S33.26247 E26.83647	27 Y0015237	X3681869	308 m
34	approximate locality of rock shelter with paintings img4290-4310 snd4310	S33.26506 E26.83960	27 Y0014945	X3682156	316 m
35	approximate locality of rock shelter with paintings img4290-4310 snd4310	S33.26596 E26.84020	27 Y0014889	X3682257	334 m
36	img4311-4 snd4314 low lying area S of T13	S33.27644 E26.84176	27 Y0014742	X3683419	498 m
37	veg cover img4317 snd4317	S33.28856 E26.85964	27 Y0013074	X3684760	551 m
38	img4318-22 snd4322 panorama E-W - T23 veg cover - stony	S33.29078 E26.86403	27 Y0012665	X3685006	539 m
39	veg cover - high ground - T26 img4323-4 snd4324	S33.29570 E26.87109	27 Y0012007	X3685550	475 m
40	veg cover - T27 img4325-6 snd4326 veg cover - high ground - T27 panorama S-NW img4327-32 snd4332	S33.29797 E26.87511	27 Y0011632	X3685802	452 m
41	veg cover - W - T25 img4333 snd4333	S33.29870 E26.87646	27 Y0011506	X3685883	457 m
42	veg cover - W - 10m E of T25 img4334-5 snd4335	S33.29674 E26.86664	27 Y0012421	X3685666	460 m
43	50m E of T21 - low lying area img4336-41 snd4341	S33.29723 E26.86221	27 Y0012834	X3685722	462 m
44		S33.29048 E26.84679	27 Y0014271	X3684974	489 m
45	img4342-3 snd4342 somewhat lower lying ground - T25	S33.29311 E26.84327	27 Y0014598	X3685266	478 m

3. Sources of Risk, Impact Identification and Assessment

The proposed development will involve considerable earthmoving activities for the construction and installation of wind turbines and associated services and facilities. These activities can have a permanent negative impact on archaeological resources in the study area. The SAIA showed that overall, and with a few exceptions, the studied area is not archaeologically sensitive.

To minimize and/or avoid negative impacts, recommendations for mitigation and further assessment are made below. Provided that recommendations and mitigation measures - as approved by the South African Heritage Resources Agency - are implemented, there are no objections to the authorization of the proposed development. Table 3 summarizes the potential impact of the proposed development on archaeological resources with and without mitigation.

Table 3. Significance Statement: Potential impact on and loss of archaeological resources with and without mitigation.

RATING		Temporal Scale		Spatial Scale		Severity of Impact		Risk or Likelihood		Total
	Without Mitigation	permanent	4	regional	3	unknown		probable	3	10
With Mitigation	permanent	4	localized	1	slight	1	unlikely	1	7	
Overall Significance without mitigation									MODERATE	
Overall Significance with mitigation									LOW	

4. Recommended and Required Mitigation Measures

Based on results from the current study it is recommended that;

- Because of the overall lack in archaeological remains, it is suggested that – from an archaeological perspective - the proposed development may move beyond the scoping phase of assessment,
- Surveyed areas (walk tracks) – with the exception of waypoints 1 and 34-35 – are suitable for the proposed activities,
- Any areas outside the surveyed tracts might be archaeologically sensitive and therefore, placement of any activities outside the studied areas will require further archaeological investigation and assessment,
- Once the final layout and placement of wind turbines and associated facilities and services are determined, an Archaeological Impact Assessment focusing on the affected areas should be undertaken,
- Because shales occur in the study area the presence of fossils cannot be ruled out and therefore, a Palaeontological Impact Assessment (Desktop Study) should be conducted, and
- The affected properties border on the N2 and therefore it is suggested that a Visual Impact Assessment may be necessary.

It is required that;

- In the event that vegetation clearing and earthmoving activities expose archaeological materials, such activities must stop and the South African Heritage Resources Agency must be notified immediately.
- If archaeological materials are exposed during vegetation clearing and/or earth moving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.
- In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency (Mrs. Colette Scheermeyer) and will require a professional archaeologist to undertake mitigation if needed.

References

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Figures and Plates

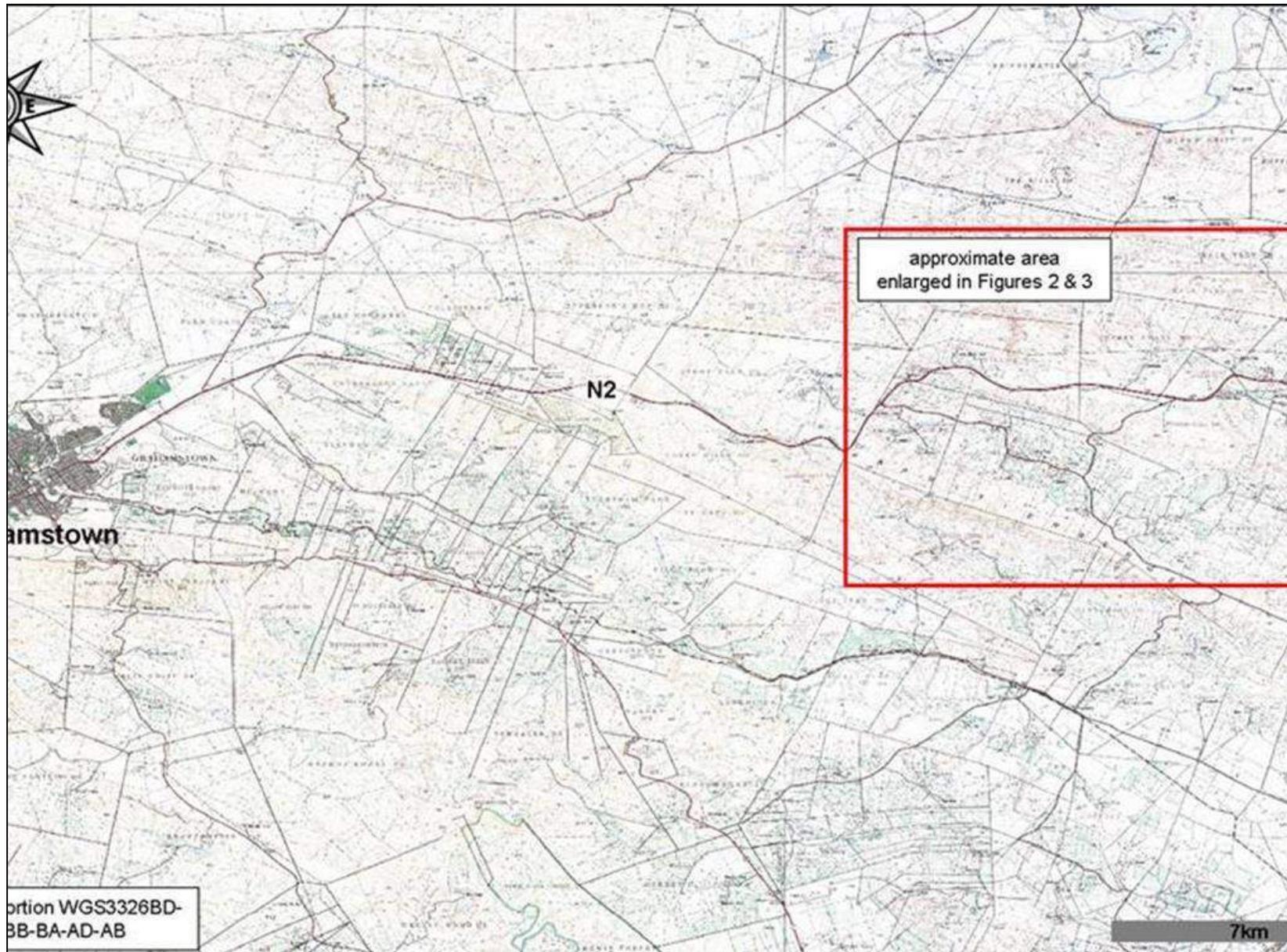


Figure 1. Location of the study area relative to Grahamstown, Makana Municipality, Eastern Cape Province. (Map courtesy of The Chief Directorate, Surveys & Mapping, Mowbray).

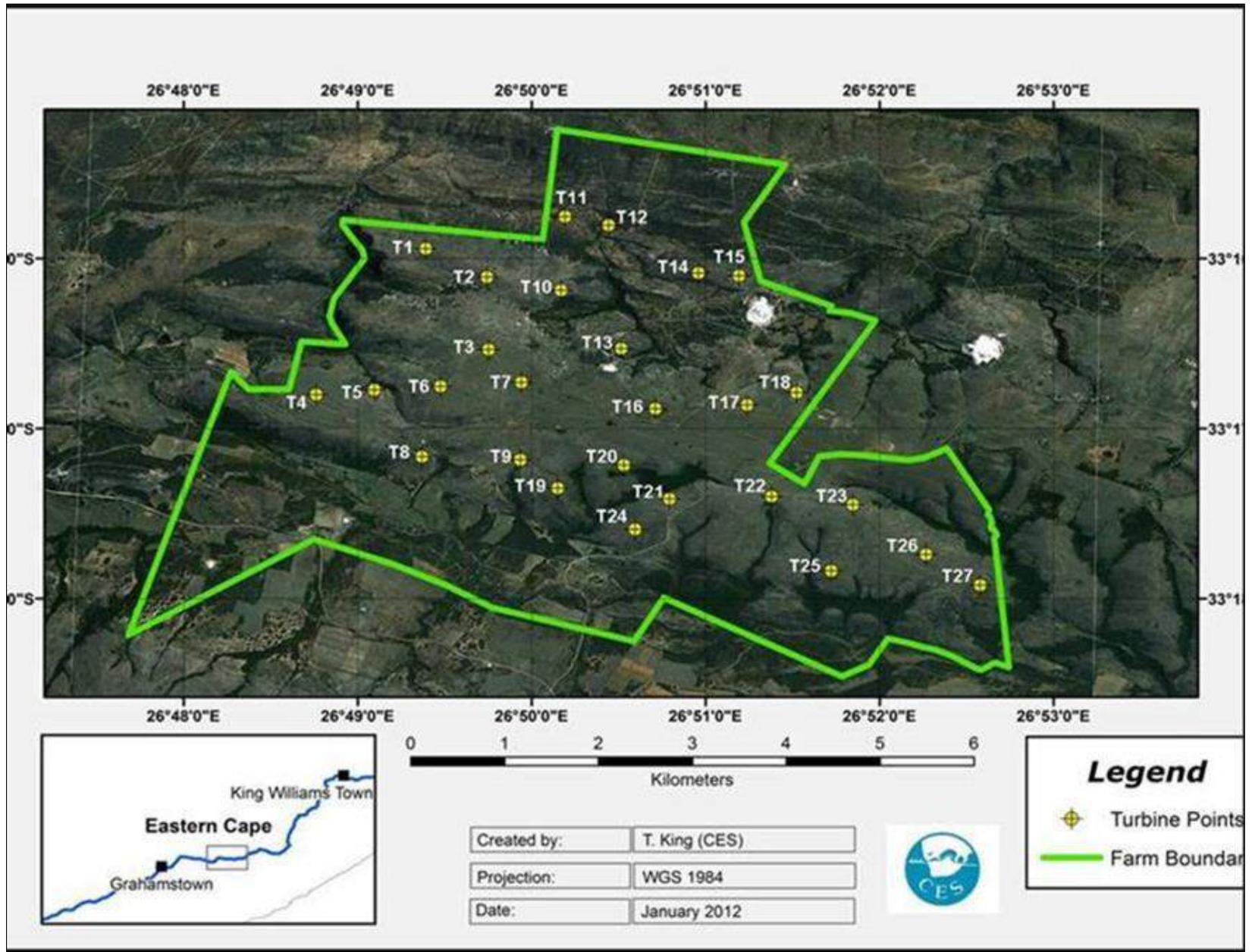


Figure 2. Layout plan for the proposed development of the Plan 8 Grahamstown Wind Energy Project (courtesy of the client).

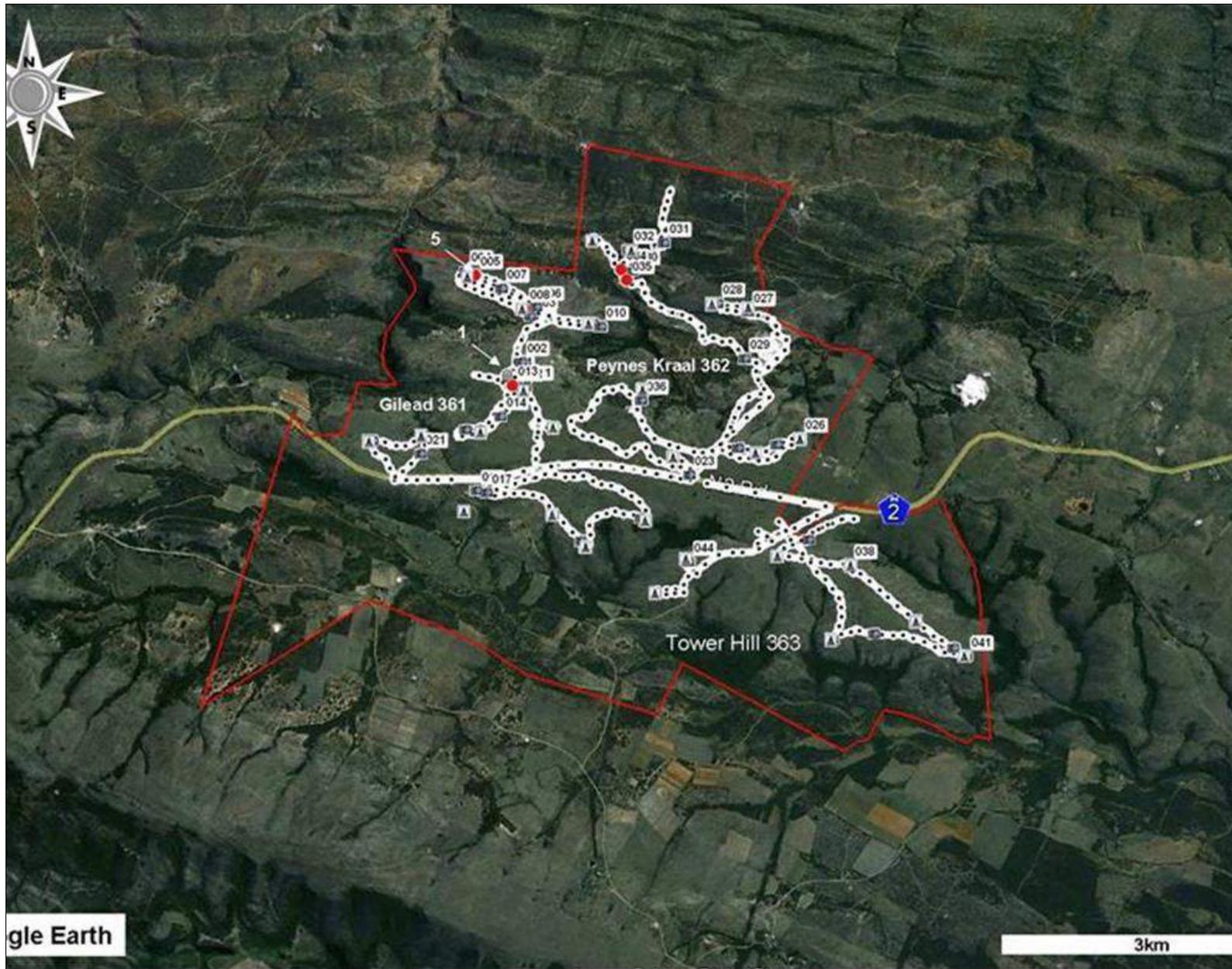


Figure 3. Enlarged area indicated in Figure 1 with walk tracks (white), waypoints (red dots) and photo localities (camera icons).



Plate 1. Examples of the surrounding environment, exposures, topography and vegetation cover (see Figure 3 and Table 2).



Plate 2. Examples of the surrounding environment, exposures, topography and vegetation cover (see Figure 3 and Table 2).



Plate 3. Examples of the surrounding environment, exposures, topography and vegetation cover (see Figure 3 and Table 2).



Plate 4 Examples of the surrounding environment, exposures, topography and vegetation cover (see Figure 3 and Table 2).

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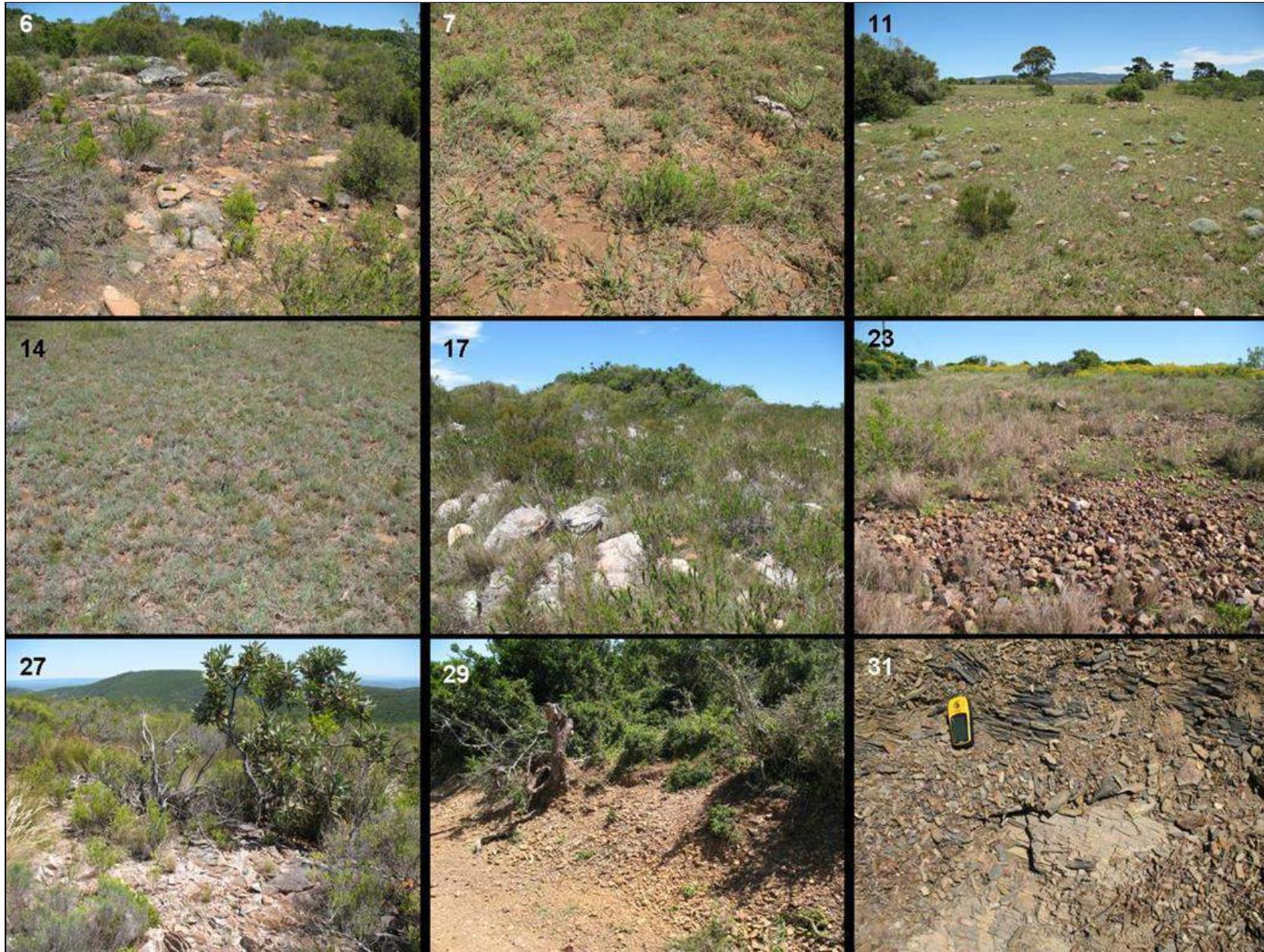


Plate 5 Examples of exposed surfaces and shale outcrops at waypoints 29 & 31 (see Figure 3 and Table 2).



Plate 6 Examples of contexts and archaeological finds. Top images are of two unmarked graves and bottom images are of a Later Stone Age core/scrapper (see Figure 3 and Table 2).

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Plate 7 Examples of contexts and archaeological finds. Top images are of an unretouched flake of indeterminate age (see Figure 3 and Table 2).

REVISED



Plate 8 Rock shelter with paintings including hand prints, hunter with “hook head”, antelope and thereanthropic depictions (see Figure 3 &*Table 2)

Addendum for Amendment Application 2018

Addendum

1 October 2018, by Dr P. Nilssen

Archaeological Inputs to the Proposed Amendment to Authorized Development

Background

The proposed Plan8 Grahamstown Wind Energy Facility (WEF) received a positive comment from the South African Heritage Resources Authority (SAHRA) in July 2012 and Environmental Authorisation from the Department of Environmental Affairs (DEA) in 2015. It is noted that the development layout assessed in 2011 by this author and commented on by SAHRA is notably different from the development layout that received EA from the DEA in 2015 (compare Figures 2 and 4).

In July 2018 I was approached by Bill Rowlston on behalf of Coastal and Environmental Services in connection with the Amendment Application, to consider expressing an opinion on the impacts on archaeological resources of the proposed amendment of the turbine sizes approved by DEA for the Plan 8 Grahamstown WEF.

The changes that potentially impact the archaeological record are points 7 and 11 given in “Details of proposed Amendment: Rev 1 – 14th August 2018”. These are essentially increases in sizes of impact areas. Although there are only minor changes from the approved layout that could impact archaeological resources, I proposed the following scope of works to provide input to the amendment application process: 1) review the proposed changes in detail (including inspection of Google Earth imagery), 2) review SAHRA’s comment on the original heritage reports and how the proposed changes might make a difference to their comments & recommendations, determine if the layout and changes require any further field work, 3) write a report on how the proposed changes affect or do not affect the original archaeological assessment.

Initial Observations

It is noted at the outset that the original archaeological assessment of 2011 was a scoping study rather than a full impact assessment. Requirements for EIAs and heritage components for EIAs have changed significantly since 2011, and while SAHRA provided comments in 2012, the Amendment Application will need to be submitted to the Eastern Cape Provincial Heritage Resources Authority (EC PHRA) for comment. Because the original scoping study only assessed the turbine localities, the proposed changes may result in the requirement for a full assessment of all impact areas including roads, cable routes, lay-down areas, infrastructure etc., which were not assessed in the original study. Note in the executive summary above that I recommended that the placement of any activities outside the studied areas will require further archaeological investigation and assessment and, once the final layout and placement of wind turbines and associated facilities and services are determined, an Archaeological Impact Assessment focusing on the affected areas should be undertaken.

Review of Proposed Changes & SAHRA’s comments

While the changes indicated in the “Details of proposed Amendment: Rev 1 – 14th August 2018” are not major, the desktop review (Google Earth, GPX data, SAHRA comment & this 2011 report) of the initial turbine layout, the areas covered during the archaeological scoping study and the latest development layout show that the SAHRA comment was based on the archaeological study of a layout that is significantly different from that which received EA from the DEA in 2015. Note that the assessed layout included turbine localities only and no other development impacts such as roads, lay-down areas, substation site, and so on. With reference to Figure 4 below, it is clear that the following proposed development impact areas have not received archaeological assessment:

turbine localities 1, 2, 4, 5, 6, 7, 10, 13, 14, 15, 16, 17, 15 & 21, the substation site and off-road power line route, as well as several stretches of internal roads.

How Changes Affect Original Assessment

The above make it clear that the main concern is not with the proposed amendments to the approved development layout and turbine specifications, but rather with the fact that considerable areas within the development footprint have not been assessed from an archaeological standpoint. Note that the input and recommendations given here are for archaeological resources only and do not cover any other heritage-related resources.

Recommendations:

- It is recommended that SAHRA's recommendations of 2012 be incorporated in the Environmental Management Program for the development.
- That an archaeological walk-down study of areas not covered during the original assessment should be undertaken prior to the construction phase of development and that this study need not be a full Phase 1a Archaeological Impact Assessment.
- That this addendum be submitted to EC PHRA for comment prior to submission of the Amendment Application to the DEA.

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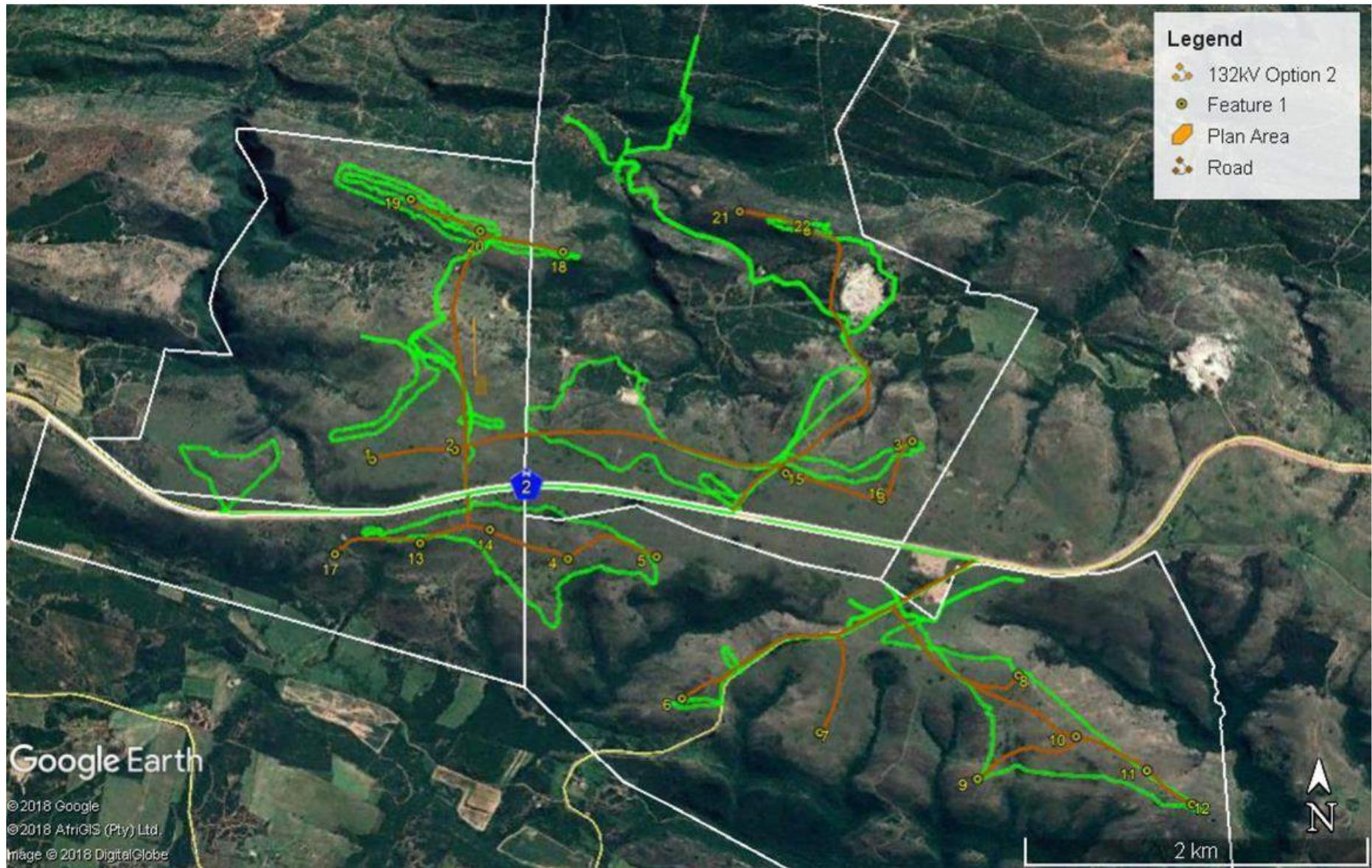


Figure 4: Latest development layout for Plan8 Grahamstown WEF with overlay of archaeological survey tracks (green) from the 2011 scoping study. Note turbine localities, substation site, grid connection and road sections not covered during the 2011 study.

APPENDIX F: NOISE SPECIALIST OPINION



ENVIRONMENT
HEALTH
SAFETY



18th September 2018

Mr B. Rowlston
Coastal & Environmental Services
P.O. Box 934
Grahamstown
6140

Dear Mr Rowlston

RE-MODELLING OF NOISE IMPACT ASSESSMENT – PLAN8 WIND ENERGY PROJECT

As per our recent correspondence, please find attached the re-modelling report for the Plan 8 Wind Farm near Grahamstown in the Eastern Cape.

This report is to be viewed as an addendum to the main Noise Impact Report that was issued in February 2014 (Version 8). The methodologies used to conduct the remodelling, identification of noise sensitive areas and the project description is described in the main report and is not repeated here.

Terms of Reference

The purpose of this report is to determine if the revised turbine specifications for the proposed 22 turbines will comply with the noise emission limits as contained in the Department of Environmental Affairs - Environmental Authorisation (12/12/20/2523) issued in 2015. The revised turbine specification has necessitated a remodelling of the layout. The results of the modelling are presented below.

Yours sincerely

A handwritten signature in black ink, appearing to read "Brett Williams".

Dr Brett Williams

1. Noise Sensitive Areas (NSA)

The following noise sensitive areas have been identified during the 2014 noise assessment and reused in the remodelling:

Table 1 – Noise Sensitive Areas

NSA #	Type	UTM		Nearest WTG	Distance to Nearest WTG
		X	Y		
1.	Jakkelsdraai Farm House	26°52'27.01"	33°17'05.37"	8	1855
2.	Honeykop Lodge	26°48'30.98"	33°16'35.96"	1	1564
3.	Honeykop Farmhouse	26°47'54.10"	33°16'24.43"	1	2346
4.	Peynes Kraal Farm House	26°51'11.05"	33°16'35.54"	3	556
5.	Workers House - Peynes Kraal	26°51'16.66"	33°16'24.79"	22	592
6.	Workers House - Honeykop	26°47'54.32"	33°16'34.47"	1	2453
7.	Workers House - Peynes Kraal	26°51'07.93"	33°16'34.61"	15	578
8.	Fairview Farm House	26°50'13.90"	33°17'51.16"	6	816
9.	Coombs Vale House	26°48'42.22"	33°17'37.54"	17	1356
10.	Jakkelsdraai Farmhouse (Main)	26°53'12.67"	33°16'50.10"	8	2503

2. Wind Turbine Generators (WTG)

The wind turbine generator that was modelled is described in Table 2 below. This turbine was chosen to represent the worst-case scenario of a wind turbine up to 4.5 MW and 125m hub height. This model of turbine was chosen as it has published noise data in the WindPro catalogue of wind turbines. Furthermore, the noise data has been tested according to the methods described in IEC 61400-11 and are thus traceable. If a lower final hub height is chosen, the noise impacts could be reduced. Furthermore, if the final turbine that is chosen has a maximum sound power level that is similar or lower than the turbine modelled in this report, it can be assumed that the noise impacts will be similar or lower, irrespective of the turbine manufacturer.

Table 2 - Proposed Turbine Specifications

Manufacturer	Nordex*
Type / Version	N149/4.0-4.5
Rated Power	4.5 MW
Rotor Diameter	149m
Tower	Tubular
Grid Connection	50 Hz
Maximum Sound Power Level	108.1 dB
Hub Height	125m

Sound Power Level dB(A) reference to 1pW from WindPro 3.2 Catalogue

*The specifications of this turbine model were used as the data is available in WindPro. This does not bind the applicant

to this specific model, but allows the developer to choose any turbine model with similar turbine specifications. An equal or lower maximum sound power level would be acceptable for the site.

The sound power levels at lower and higher wind speeds as stated above were interpolated from the published data. **The actual sound power levels may thus be less than those stated when the final turbine is selected. The levels used in the re-modelling are thus a worst-case scenario.**

The turbine positions are recorded in Annexure A are a record of what informed the noise modelling assessment.

3. Modelling Results

The masking effect of the wind noise will mitigate the noise impact. However, the results are based on NO wind noise masking, which in reality rarely occurs when the turbines are operational. The maximum noise rating limit as the DEA Environmental Authorisation is 45 dB(A). The noise impacts were modelled in WindPro Version 3.1 using the above data. The results area as follows:

Table 3 - Modelling Results
Environmental Authorisation Limit = 45dB(A)

Sensitive Receptor	Wind speed [m/s]	Noise from WTGs [dB(A)]	
Jakkeldraai Farm House	3	27.8	
	4	29.2	
	5	34.2	
	6	38.2	
	7	38.9	
	8	39.0	
	9	39.0	
	10	39.0	
	11	39.0	
	12	39.0	
	Honeykop Lodge	3	23.7
		4	25.1
5		29.9	
6		33.9	
7		34.6	
8		34.7	
9		34.7	
10		34.7	
11		34.7	
12		34.7	
Honeykop Farmhouse	3	18.9	
	4	20.3	
	5	24.8	
	6	28.8	
	7	29.5	
	8	29.7	
	9	29.7	
	10	29.7	

Sensitive Receptor	Wind speed [m/s]	Noise from WTGs [dB(A)]
	11	29.7
	12	29.7
Peynes Kraal Farm House	3	34.9
	4	36.3
	5	41.5
	6	45.5
	7	46.2
	8	46.2
	9	46.2
	10	46.2
	11	46.2
	12	46.2
Workers House - Peynes Kraal	3	33.2
	4	34.6
	5	39.7
	6	43.7
	7	44.4
	8	44.5
	9	44.5
	10	44.5
	11	44.5
	12	44.5
Workers House - Honeykop	3	19.1
	4	20.5
	5	25.0
	6	29.0
	7	29.7
	8	29.8
	9	29.8
	10	29.8
	11	29.8
	12	29.8
Workers House - Peynes Kraal	3	34.4
	4	35.8
	5	41.0
	6	45.0
	7	45.7
	8	45.8
	9	45.8
	10	45.8
	11	45.8
	12	45.8
Fairview Farm House	3	29.0

Sensitive Receptor	Wind speed [m/s]	Noise from WTGs [dB(A)]	
	4	30.4	
	5	35.3	
	6	39.3	
	7	40.0	
	8	40.1	
	9	40.1	
	10	40.1	
	11	40.1	
Coombs Vale House	3	24.1	
	4	25.5	
	5	30.3	
	6	34.3	
	7	35.0	
	8	35.1	
	9	35.1	
	10	35.1	
	11	35.1	
	12	35.1	
	Jakkeldraai Farmhouse (Main)	3	20.2
		4	21.6
5		26.2	
6		30.2	
7		30.9	
8		31.0	
9		31.0	
10		31.0	
11		31.0	
12		31.0	

4. Discussion

The modelling results indicate that the Environmental Authorisation Limit of 45 dB(A) limit will not be exceeded at any of the noise sensitive areas except for the Main Farm House and Workers House on the Farm Peynes Kraal. The modelling indicates that the noise limit will only be exceeded above 6m/s and will not be more than 46.2 dB(A).

It is highly likely that the wind noise will provide a masking effect as the predicted noise is only one decibel above the limit. Furthermore, the modelling assumes the receiver is outdoors at all times.

5. Conclusion

The overall environmental noise impact significance remains low taking into account the changes to the turbine specifications. The amended project description will slightly exceed the current Environmental Authorisation limit of 45 dB(A) at two of the noise sensitive receptors using the data that was modelled. The specific conditions as set in the Environmental Authorisation are thus partially complied with. It is my recommendation that, based on the results and information presented here, the granting of an amended Environmental Authorisation with respect to the noise impacts is recommended.

Please feel free to contact us should you have any further requirements. Assuring you of our best attention at all times.

Yours sincerely



Dr Brett Williams

Annexure A – WTG Positions

WTG #	X UTM	Y UTM
1	26°49'29.08"	33°16'50.06"
2	26°49'47.62"	33°16'48.24"
3	26°51'29.70"	33°16'46.58"
4	26°50'12.87"	33°17'08.37"
5	26°50'32.60"	33°17'07.94"
6	26°50'38.22"	33°17'34.26"
7	26°51'08.92"	33°17'40.50"
8	26°51'52.93"	33°17'29.75"
9	26°51'44.26"	33°17'49.21"
10	26°52'06.07"	33°17'41.18"
11	26°52'22.01"	33°17'47.59"
12	26°52'32.16"	33°17'53.91"
13	26°49'39.80"	33°17'05.47"
14	26°49'55.44"	33°17'02.96"
15	26°51'01.32"	33°16'52.52"
16	26°51'22.41"	33°16'57.28"
17	26°49'20.57"	33°17'07.54"
18	26°50'11.37"	33°16'11.01"
19	26°49'37.07"	33°16'01.21"
20	26°49'52.78"	33°16'07.21"
21	26°50'51.31"	33°16'03.14"
22	26°51'06.54"	33°16'07.17"

APPENDIX G: PALAEOLOGY SPECIALIST OPINION

Palaeontological Heritage Impact assessment for a proposed 88-99 MW windfarm, 30km east of Grahamstown.

Prepared for: Coastal & Environmental Services
67 African Street
Grahamstown

Compiled by: Dr Robert Gess

Rob Gess Consulting, Box 40, Bathurst, 6166

Research Fellow of the Albany Museum, Somerset Street,
Grahamstown

robg@imagnet.co.za

September 2018

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Conclusions and Recommendations.....	103

Background

Coastal and Environmental Services have been appointed to carry out an Environmental Authorisation Amendment application for an 88 to 99 MW (up to 4.5 MW turbines) windfarm approximately 30 km east of Grahamstown.

Rob Gess Consulting was contracted to conduct a phase one Palaeontological Impact Assessment for this proposed development. The Terms of Reference were to:

- Review the details of the proposed amendment
- Conduct a site visit
- Prepare maps
- Review and revise where necessary the impacts of the amended project on palaeontological resources
- Prepare a revised report.

Geology and Palaeontology

The area intended for development overlies strata of the upper portion of the Cape Supergroup and lowermost portion of the unconformably overlying Karoo Supergroup. In addition, portions of the Cape Supergroup rocks are capped by relict patches of Silcrete formed as a product of deep leaching during the Cretaceous.

Cape Supergroup rocks represent sediments deposited in the Agulhas Sea, which had opened to the south of the current southern African landmass, in response to early rifting between Africa and South America during the Ordovician.

The Witteberg Group is the uppermost of three subdivisions of the Cape supergroup and was laid down during the Late Devonian.

The stratigraphically lowest Witteberg Group strata present belong to the Late Devonian (Famennian), 359 to 372 million years old **Witpoort Formation (Witteberg Group, Cape Supergroup)**, which are exposed at the centre of an anticline. This largely quartzitic unit represents mature sandy strata deposited along a linear barrier island type coast. Particularly around Grahamstown black shale lenses, interpreted as estuarine deposits preserved during brief transgressive events, have proved remarkably fossiliferous.

A series of lenses at Waterloo Farm, to the south of Grahamstown, have provided southern Africa's most important Late Devonian locality, which has yielded at least 20 taxa of fossil fish (including jawless fish (Agnatha), armoured fish (Placodermi), spiny sharks (Acanthodii), sharks (Chondrichthyes), ray finned fish (Actinopterygii) and lobe finned fishes (Sarcopterygii) including Coelacanths (Actinistia), lungfish (Dipnoi) and Osteolepiformes). In addition, it has provided evidence for Africa's earliest tetrapod (four-legged animal) remains by 80 million years, *Tutusius mlambo* and *Umzantsia amazana*. Dozens of plant and algal taxa, remains of giant eurypterids and other arthropods as well as abundant trace fossils have also been collected. As yet 21 taxa new to science have been described from Waterloo Farm, though many more await description. Those already described also include the world's oldest lamprey fossil, *Priscomyzon riniensis*, Africa's earliest coelacanth from the world's oldest known coelacanth nursery, *Serenichthys kowiensis* and the oldest known terrestrial animal from the supercontinent Gondwana, *Gondwanascorpio emzantsiensis*. The top of the Witpoort Formation coincides with the end of the Devonian and is similar in age to the end-Devonian extinction event. Witpoort Formation quartzites have yielded a range of plant stem taxa and trace fossils. Lag deposits of bone have not, as yet, been discovered, but may be expected.



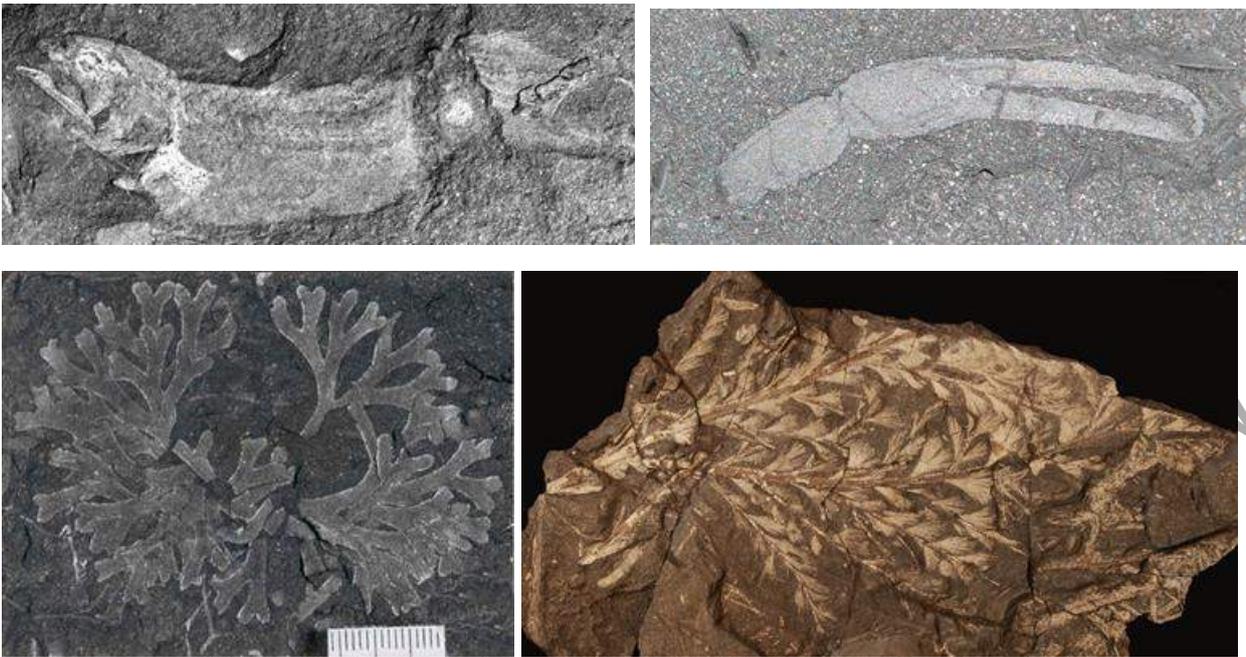


Figure 1: Selection of fossils recovered from a black shale lens at Waterloo Farm: *top left*, 4.2 cm long *Priscomyzon riniensis* (the world's oldest fossil lamprey); *top middle*, 6.5 cm long head and trunk armour of a young *Bothriolepis africana* antiarch placoderm fish; *top right*, 2.5 cm long neonatal *Groenlandaspis riniensis*, an arthrodire placoderm fish; *middle left*, 5.5 cm long type specimen of the coelacanth *Serenichthys kowiensis*; *middle right*, 3,4 cm long pincer of the scorpion, *Gondwanascorpio emzantsiensis* (the oldest known terrestrial animal from Gondwana); *bottom left*, 7 cm across tuft of the seaweed *Hungerfordia fionae*; *bottom right*, 30 cm long fronds of the progymnosperm tree *Archaeopteris notosaria* (the oldest known species of woody tree from southern Africa).



Figure 2: Fossils in quartzites at Waterloo Farm: left lycopod *Leptophloem rhombicum* stems; right, progymnosperm *Archaeopteris* trunk.

In 2015 roadworks at Coombs Hill and Rabbit Ridge, 5-10 kilometres south west of the present study area (see Fig.6) uncovered a number of palaeontologically important black shale lenses within the Witpoort Formation. Those along Rabbit Ridge represented exposure of an extensive vertically tilted black shale horizon that yielded evidence for a monotaxic assemblage of lingulid brachiopods in a back-barrier mud flats environment. This provided the first record of predominantly marine invertebrate shells within the Witpoort Formation. These sites also produced fragmentary plant remains and extensive trace fossils.



Figure 3: *left*, Lingulid brachiopods and a lycopod stem on a slab from Rabbit ridge; *right*, Chris Harris, chief excavator of Rabbit Ridge and Coombs Hill at a shale outcrop on Rabbit Ridge in 2015.

The roadworks at Coombs Hill revealed a number of black shale horizons, which contained more than one species of bivalve, in addition to a wealth of plant fossils, some of which are remarkable well preserved. Plant fossils included lycopod taxa new to science and the best preserved fronds of the progymnosperm tree, *Archaeopteris notosaria* known.



Figure 4: Black shale and fossils from Coombs Hill: *top left*, black shale disturbed during roadworks at Coombs Hill, *top right*, new species of lycopod plant; *bottom*, frond of *Archaeopteris notosaria*.

The early to mid-Carboniferous is represented by overlying mudstone and sandy units of the **Lake Mentz Subgroup (Witteberg Group, Cape Supergroup)**. These were deposited as sediment during the last phase of the Agulhas Sea, by which time it was much restricted and was possibly (at least partially) cut off from the open sea. The **Waaipoort Formation (uppermost Lake Mentz Subgroup Witteberg Group, Cape Supergroup)** provides evidence for a post-extinction Agulhas Sea fauna, dominated by a range of ray-finned-fish (Actinopterygii), but also containing a relict shark and 2 types of spiny sharks (Acanthodii).

The strata of the **Karoo Supergroup** were deposited within the Karoo sedimentary Basin, which resulted from shortening and thickening of the southern margin of Africa, with coeval folding and uplift of the Cape Supergroup strata along its southern margin. Lowermost Karoo strata of the Dwyka and lower Ecca Groups were affected by folding in the vicinity of the Cape Fold Belt.

The **Dwyka Group (Karoo Supergroup)**, particularly here in the south of the basin, consists almost exclusively of diamictite known as the Dwyka tillite. This is a distinctive rock type which, when freshly exposed, consists of a hard fine-grained blueish-black matrix in which abundant roughly shaped clasts are embedded. These vary greatly in both lithology and size. During the formation of the Dwyka, beginning in the late Carboniferous, southern Africa drifted over the south pole, whilst simultaneously, the world was experiencing a cold episode. Glaciers flowing into the flooded Karoo basin broke up, melted and discharged a mixture of finely ground rock flour and rough chunks of rock. These formed the matrix and clasts of the Dwyka tillite. Within the study area fossils are not known from the **Dwyka Group (Karoo Supergroup)**.

During the Cretaceous and early Tertiary Periods much of Africa was weathered down to a number of level horizons collectively known as the African Surface. The area in the vicinity of Grahamstown was reduced to a flat plain close to sea level, remnants of which are referred to as the Grahamstown Peneplane. During the Tertiary, mudstones, shales and diamictites were leached to considerable depth, transforming them into soft white kaolin clay. Silica, iron and magnesium from these rocks was carried in solution by groundwater and deposited near the ground surface due to steady evaporation of mineral rich waters. This led to the formation of a hard mineralised capping layer, often consisting of silicified soil. Resultant silcretes are referred to as the **Grahamstown Formation**. Though occasional occurrences of root and stem impressions have been recorded from the Grahamstown Formation it is generally considered unfossiliferous.

With subsequent reduction of the relative sea level, deep valleys have carved back from the retreating coastline, cutting deep valleys and catchment areas into the African Surface.

GROUP	SUBGROUP	FORMATION	THICKNESS (metres)	AGE	
WITTEBERG	LAKE MENZ SUBGROUP	WAAIPOORT	35	WISEAN	CARBON-IFEROUS
		FLORISKRAAL	70	TOURNASIAN	
		KWEEKVLEI	50		
	WITPOORT	310	FAMMENIAN		
	WELTEVREDE SUBGROUP	SWARTRUGGENS	450	FRASNIAN	
		BLINKBERG	80		
WAGEN DRIFT		70			
BOKKEVELD	BIDOUW SUBGROUP	KAROOPOORT	50	GIVETIAN	DEVONIAN
		OSBERG	55		
		KLIPBOKKOP	170		
		WUPPERTAL	65		
		WABOOMBERG	200		
	CERES SUBGROUP	BOPLAAS	30	EIFELIAN	
		TRA-TRA	85		
		HEX RIVER	100		
		VOORSTEHOEK	115		
		GAMKA	135	EMSIAN	
		GYDO	160		
		RIETVLEI	150		
		SKURWEBERG	206		
TABLE MOUNTAIN	NARDOUW SUBGROUP	GOUDINI	120	PRAGIAN	SILURIAN
		CEDARBERG	120	HIRNANTIAN	ORDOVICIAN
		PAKHUIS	40		
	PENINSULA	1550			
	GRAAFWATER	150			
	PIEKENIERSKLOOF	390			

REVIEW

Figure 5: Stratigraphic column of the Cape Supergroup modified after Theron and Thamm (1990) following Cotter (2000). Green area indicates strata directly impacted by the development.

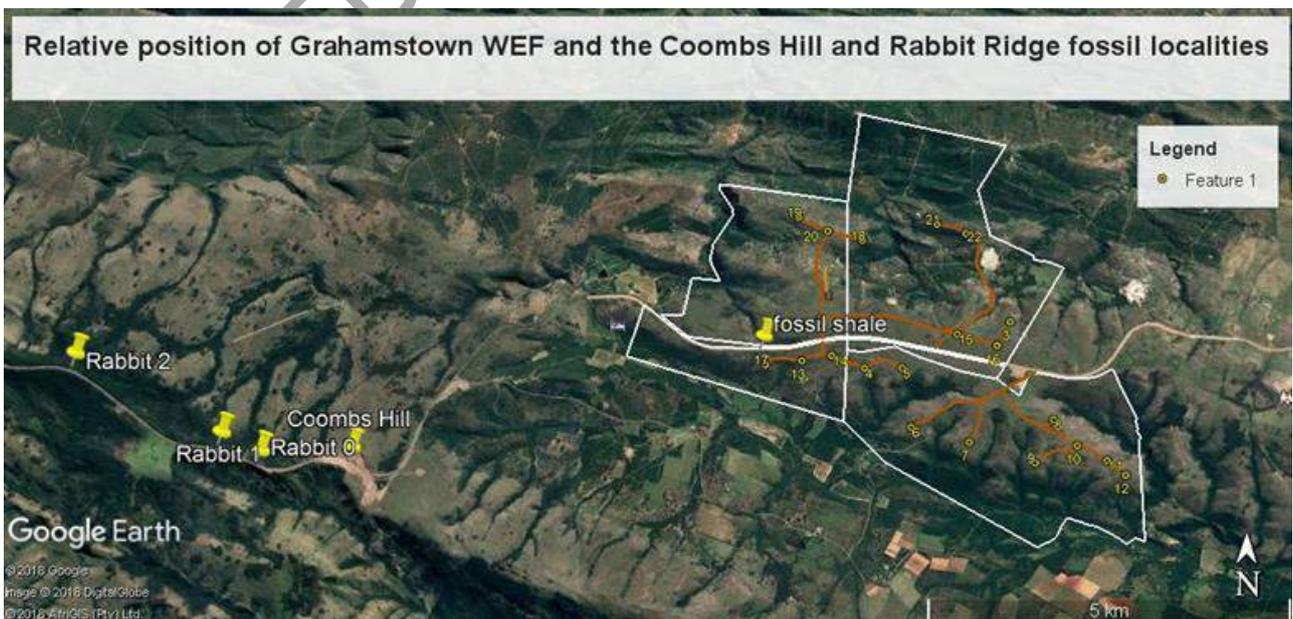


Figure 6: Relative position of proposed WEF, Coombs Hill and Rabbit Ridge fossil localities as well as

fossiliferous shale located during PIA survey.

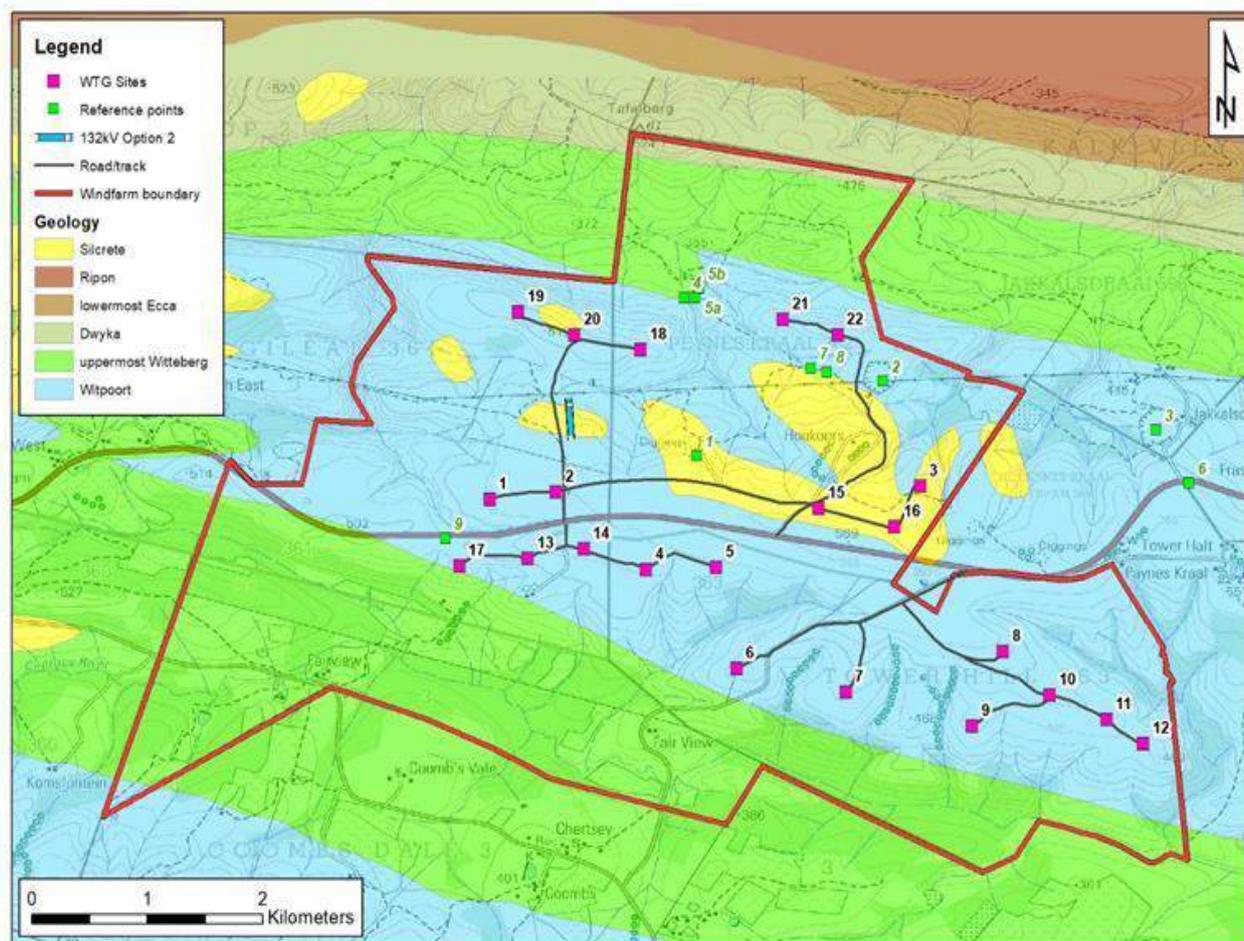


Figure 7: Geological map of the study area based on geological survey data overlain on topography, with positions of proposed wind towers marked as pink squares and points referred to in the text marked as green squares.

Site Visit

The proposed development area was surveyed with a vehicle and on foot, with particular attention being paid to those areas which will be affected by the development.

The development is to be situated on a series of quartzitic hills in the centre of the study area. These result from erosion of Witpoort Formation Witteberg quartzite strata upwardly folded in a large asymmetrical east-west trending anticline. Partial loss of the uppermost quartzitic strata, that once comprised the top of the fold arch, occurred during erosion of the Cretaceous to Tertiary African Surface. This exposed, towards the northern side of the fold, a thick horizon of black carbon-rich shaly mudstone interbedded within the upper Witpoort Formation. This black mudstone may be stratigraphically equivalent to the Rabbit Ridge mudstone or possibly one of the other important black shales exposed at Waterloo Farm and Coombs Hill.

Unfortunately (from a palaeontological perspective), deep weathering of this carbonaceous shale, during the Tertiary, reduced the shale to a fine quality kaolin clay capped by silcrete of the Grahamstown Formation. Subsequent differential weathering of this soft clay led to the development of an east-west trending valley towards the north of the fold, hemmed in by quartzitic hills. Nonetheless significant deposits of clay remained along the sides of valley and where

protected by remnants of silcrete. These deposits were utilised in precolonial times and a number of large quarries were exploited during the 20th century (Fig. 7. Points 1-3). One of these (Fig. 7. Point 2) appears to have begun as exploitation of a silcrete capped “sugarloaf hill” and continued downwards until weathered remains of the original black shale were encountered. Where exposed by the quarry these strata were carefully examined, during the survey, but no fossil material was located. Thin veins of fine red ochre were also seen in this quarry - identical to ochre pieces noted in a rock shelter adjacent to San rock art within the study area.



Fig. 8: View eastwards from point 2 to point 3 (fig. 7) showing valley carved into kaolin.

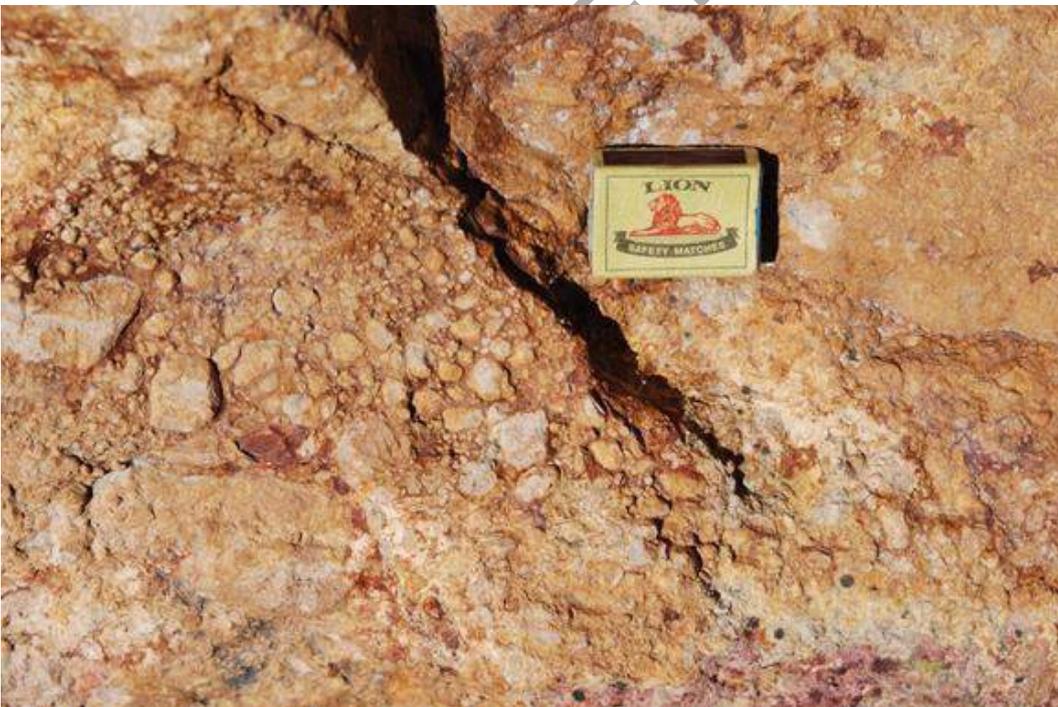


Fig. 9: Black Witpoort Formation clay underlying kaolin clay deposit at point 2 (fig.7).



Scale = 5 cm

Fig. 10: Close up of black Witpoort Formation shales exposed at point 2 (fig. 7)



Scale = 5cm

Figure 11: Silcrete capping material of the Tertiary Grahamstown Formation discarded at point 2 (Fig. 7)

The Witpoort Formation quartzites, which stratigraphically overlie the black shales, are well exposed in valleys and roadcuttings throughout the area but are weathered to smooth heath-covered surfaces on many of the hill crests intended for the installation of turbines. Where they are well

exposed they comprise stacked packages of cross bedded mature sandstones with shallow-water ripple surfaces (Fig. 12) and ropy horizontal trace fossils (Fig. 13).



Scale = 5cm

Figure 12: Shallow water ripples in uppermost Witpoort Formation quartzites at point 5a (fig. 7).



Figure 13: Horizontal invertebrate feeding traces in uppermost Witpoort Formation quartzites exposed at point 5b (fig.7).

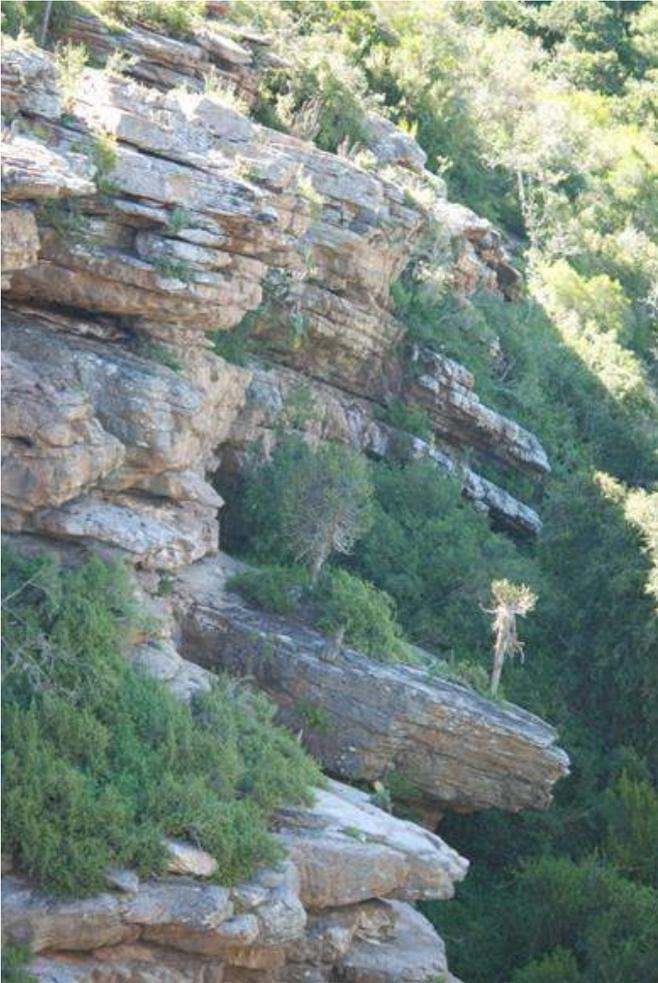


Figure 14: Stacked layers of Witpoort Formation quartzites at point 4 (fig. 7).



Figure 15: Trough cross bedding in Witpoort Formation quartzites at point 6 (fig. 7).



Scale = 5cm

Figure 16: Shallow water ripples in Witpoort Formation quartzites at point 6 (fig. 2).

Roadworks in 2018, immediately adjacent to the study site, have revealed new outcrops in a roadcutting at point 9 (Figure 7), approximately 250 metres north of wind tower position 17. These represent the uppermost part of the Witpoort formation, perhaps approximately stratigraphically equivalent to strata at Waterloo Farm. The roadcutting exposes silty and muddy finely cross bedded strata capped by a massive erosionally based transgressive quartzitic sandstone which has partially protected underlying strata from leaching. Small grey mudstone lenses were found to contain fossilised transported plant fragments reminiscent of more fragmentary material from Waterloo Farm and Coombs Hill.



Figure 17: Abundant fossilised plant fragments in dark grey uppermost Witpoort Formation mudstones exposed in new roadworks at point 9 (Figure 7).

The Witpoort Formation is stratigraphically overlain by fine grained brown shales of the Lake Mentz Subgroup. These outcrop to the north and to the south of the quartzite ridge. On the south (sea facing) slopes, the high rainfall has reduced almost all outcrop to smooth, steep, vegetated slopes. To the north of the ridge the outcrop falls within a rainshadow caused by the ridge. Here the vegetation is more arid, the soil thinner and crumbly patches of outcrop may be found. The contact is more uneven than is indicated by the survey map and upper Lake Mentz Subgroup shales are found at points 7 and 8 (Fig. 7) (Figs 17-18).



Figure. 18: Small road aggregate quarry in upper Lake Mentz Subgroup shale. Point 7 (fig. 7)



Scale = 3.5cm

Figure 19: Plant fragments in upper Lake Mentz Subgroup shale. Point 8 (fig. 7)

Although plant fragments were noted in shale at point 8, they did not constitute a significant palaeosite.

Dwyka diamictite crops out in the extreme north of the study area which will not be affected by the development. It does not contain fossils.

Conclusions and Recommendations.

It is the nature of palaeontological resources that important sites may be spatially very limited, yet they may prove to be of international significance. Discovery of such resources during development may be of great permanent benefit to the scientific community. Their destruction represents a severe permanent loss, which may be of international significance.

The development area is focussed on Witpoort Formation quartzite ridges which were not, at surface, found to be significantly fossiliferous. Potentially important interbedded black shales within the quartzites are sometimes kaolinised to a deep depth; however, where they are shielded by overlying beds of quartzite they may still be usefully fossiliferous close to surface.

Quarries and roadworks within the study area and within the district have demonstrated that excavation into the Witpoort Formation not infrequently intercepts black shale layers and lenses that may be of great palaeontological value. Palaeontological investigations of these layers, in the Grahamstown district, have provided the world's only window into high latitude conditions at the end of the Devonian, a time of extreme importance in understanding the process of vertebrate terrestrialisation and the lead up to the second global Mass Extinction Event.

There is therefore a reasonable chance that excavation of holes for casting wind tower footings will intercept fossiliferous shales, which may contain important unique heritage material. Lag deposits, containing fossil stems and possibly bones might also be found preserved within the quartzites.

It is therefore recommended that:

- 1) All excavated holes for wind tower footings should be examined by a palaeontologist after excavation and before casting of footings.**
- 2) All new access roads should simultaneously be inspected by a palaeontologist prior to any rehabilitation.**
- 3) Should any paleontologically important material be exposed this should be sampled by a professional palaeontologist and accessioned into the collection of the Albany Museum in Grahamstown**

APPENDIX H: SOCIO-ECONOMICS SPECIALIST OPINION

**SOCIO-ECONOMIC IMPACT ASSESSMENT
FOR THE PROPOSED PLAN 8 INFINITE ENERGY
GRAHAMSTOWN WIND ENERGY FACILITY PROJECT
(2018 – PROPOSED AMENDMENTS)**

November 2018

Report prepared for:

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CHAPTER 1 INTRODUCTION

EOH Coastal Environmental Services (EOH CES) is undertaking an Environmental Impact Assessment (EIA) for the proposed amendment of the Plan 8 Grahamstown Wind Energy Facility (WEF) East of Makhanda (formerly known as Grahamstown) in the Eastern Cape Province on behalf of Plan 8 Infinite Energy (Pty) Ltd (Plan 8). This socio-economic impact assessment (SEIA) is an update based on the amendments proposed by Plan 8, and forms part of a range of specialist studies that make up part of the EIA process. This document discusses activities undertaken to evaluate the nature of socio-economic impacts associated with the proposed Plan 8 WEF.

The proposed amendments to the project comprises increasing the generating capacity of each of the turbines from a maximum of 3MW to a maximum of 4.5MW, thereby increasing the total installed generating capacity of the facility from a maximum of 66MW to a maximum of 99MW. This is to be achieved by increasing the hub height of the turbines from a maximum of 91.5m to a maximum of 125m above ground level and increasing the diameter of the rotor from maximum of 117m to a maximum of 149m. The number of turbines remains unchanged at 22, and the locations of the turbines on the site will also not change (except for possible pre-construction micro-siting). Because the bases of the turbines and

the hardstanding areas will be larger, the footprint of the facility will increase from 13.7ha to 18.9ha, an increase of about 34%. The increased footprint will be about 0.72% of the total area of the site.

This socio-economic impact assessment (SEIA) is an update based on the amendments proposed by Plan 8, and forms part of a range of specialist studies that make up part of the EIA process. This document discusses activities undertaken to evaluate the nature of socio-economic impacts associated with the proposed Plan 8 WEF.

This document is an updated version of the August 2013 SEIA that formed part of the EIA approved by the Department of Environmental Affairs (DEA) in 2015 for the Plan 8 WEF. This document forms the updated SEIA for the purposes of the amendment to be submitted by Plan 8. All figures, policy documents and research where possible, have been updated to the latest available as of November 2018. The grey text boxes throughout summarise the key changes that have occurred since 2013 and the significance these changes may have based on the proposed amendments to the development concept. The SEIA study goals and objectives, methodology and study area have otherwise not changed for this update.

1.1 STUDY GOALS AND OBJECTIVES

The national guidelines for conducting Socio-Economic Impact Assessments indicate that the overall aim of an SEIA is to understand the current social and economic environment and use it as a baseline for predictions and measurements (DEAT, 2006). More specifically, this study seeks to determine and assess all potential positive and negative socio-economic impacts of the proposed amended development and contrast it against the “do-nothing” alternative to identify whether the proposed amended development will have a net positive or a net negative effect on the society and economy.

Terms of Reference: The specific objectives of the study were:

- Generating a profile of the local and regional economy in order to understand the economic dynamics, potential and challenges of the area
- Developing a profile of the affected environment which would then represent the “do nothing” alternative
- Identifying all possible positive and negative socio-economic impacts that could be expected to arise from the project during both the construction and operational phases of the development
- Where possible, quantify socio-economic impacts using an economic model developed on the basis of a Social Accounting Matrix (SAM) or other techniques
- Determine the significance of potential impacts using criteria determined by the environmental practitioner
- Compare various alternatives and advise on the most advantageous option
- Provide, where possible and when necessary, practical mitigation measures to reduce or completely eliminate the potential negative impacts of the proposed development

1.2 PROJECT BACKGROUND AND LOCALITY

Plan 8 Infinite Energy, a renewable energy company, plans to submit an application to amend the Environmental Authorisation for a wind energy facility (WEF) approximately 30km outside of Makhanda (formerly known as Grahamstown) along the N2 in an easterly direction towards East London, in the Eastern Cape Province of South Africa. The Department of Environmental Affairs (DEA) approved the project and granted Environmental Authorisation on 22nd October 2015. Three appeals against the

granting of environmental authorisation were submitted to the minister, and were dismissed minister on 20th September 2016 and 16th March 2017.

The proposed site is on the farms Gilead, Tower Hill and Peynes Kraal, and the project area lies within the Makana Local and Sarah Baartman (formerly Cacadu) District Municipal jurisdictions. The location of the proposed WEF is presented in Map 1. Makhanda is the major urban settlement within the Makana municipality and is the centre of formal business, administrative capital and host to several civic, public and educational institutions. Other secondary urban settlements are found at Salem, Riebeck East and Alicedale.

Map 1: Location of proposed WEF



Source: Urban-Econ GIS Unit (2013)

(Circled numbers indicate Ward numbers in the Makhanda Local Municipality area of jurisdiction)

The site of the proposed wind energy project is located in Ward 13, MLM, approximately halfway between Makhanda and Peddie (a smaller town that services rural subsistence agrarian communities) in the Ngqushwa Local Municipality. The site is located on the N2 national road and is surrounded by a combination of game, livestock and crop farms. These are private ventures with limited resident populations on-site. As such, the immediate surrounds of the proposed wind energy site do not have significant built-up footprints (these land uses typically require low labour intensities to achieve sustainable yield returns). Higher concentrations of settlement are found at Collingham Towers, Trentham Towers, Pershoek, Fraser's Camp Coombs, Fort Brown and Committee's Drift.

Apart from the turbines to be constructed, the WEF will also have supporting infrastructure. Powerlines (overhead) to connect the WEF to the national grid will be constructed. This will be supported by a sub-station which will be built. Other infrastructure to be provided includes roads for internal access on the farms and small buildings for maintenance, storage and operation control.

1.3 STUDY METHODOLOGY

1.3.1 Economic Impact Assessment Method

Socio-Economic Impact Assessment studies are undertaken to determine, evaluate, and where possible, quantify the effects of an intervention. This intervention could be either an existing activity within the

economy or a new activity (i.e. the proposed Makhanda WEF).

Socio-economic impacts generated by an intervention can be disaggregated in terms of the initial or direct impacts that occur when the intervention begins. Such impacts in turn trigger secondary and further flow-on rounds of impacts, thereby creating a multiplier effect. This multiplier effect can be either positive or negative. In pure economic terms these impacts are expressed as indirect and induced effects, where:

- Indirect effects relate to the changes in economic indicators that are triggered along the upstream industries that supply goods and services to the intervention
- Induced effects refer to the changes in economic indicators that are stimulated by changes in consumption expenditure of households that were directly or indirectly affected by the intervention.

In addition, two additional types of socio-economic impacts can be distinguished. These include:

- Secondary impacts that are caused by the intervention, but that are further removed in distance or take a greater amount of time to materialise but are still reasonably foreseeable. Secondary impacts generally relate to changes in land use patterns, economic performance, changes to the character of a community and property values in the vicinity of the interventions location.
- Cumulative effects are the results of incremental consequences of the intervention when added with other past, present and anticipated future interventions. Cumulative effects consider the manner in which the impacts of a project may affect or be affected by other projects. Such effects are generally difficult to identify as they require a complete knowledge of local conditions and development plans, and accordingly are sometimes even more difficult to quantify.

Projection of the initial impacts and multiplier effects is usually done by employing an input-output model or a General Equilibrium Model. The use of these models in socio-economic impact assessments allows for the quantification of potential impacts in terms of a number of economic indicators such as production, Gross Value Added (GVA), employment, and income. The scale of these impacts is dependent on the size and diversification of the economy under analysis which in turn determines the leakage. Secondary and cumulative effects can be identified through an expert opinion technique, consultations, development matrices and interviews. Such impacts can be difficult to quantify. Overall, a socio-economic impact analysis that includes the assessment of primary impacts, multiplier effects, secondary impacts and cumulative effects provides a comprehensive assessment of potential impacts. It furthermore assists in ranking the intervention using a methodology prescribed by the Department of Environmental Affairs.

The socio-economic impact assessment made use of the economic models based on the Eastern Cape Social Accounting Matrix (SAM) developed in 2006 and adjusted to represent 2018 figures. The SAM is a comprehensive, economy-wide database that contains information about the flow of resources that takes place between the different economic agents in this case the Eastern Cape economy. The selection of this model in the assessment is attributed to the expected spatial distribution of procurement during both the construction and operational phases of the project.

1.3.2 Impact Evaluation Model

All impacts identified were evaluated in terms of the extent, duration, magnitude, probability and significance. The model also assesses whether impacts will be positive or negative, in line with DEDEAT guidelines. The following approach was used to assess each of these aspects of the impact:

Table 1: Impact evaluation model

Aspect	Ranges
Extent (E)	Affected site/s (1) Surrounding Area (2) Local economies (3) National (4) International (5)
Duration (D)	Very short term, 0-1 years (1) Short term, 2-5 years (2) Medium term, 5-15 years (3) Long term, 15+ years (4) Permanent (5)
Magnitude (M)	Small, no effect on environment (0) Minor, no impact on processes (2) Low, slight impact on processes (4) Moderate, process continue in modified way (6) High, processes temporarily ceases (8) Very high, complete destruction of patterns and permanent cessation of processes (10)
Probability (P)	Very improbable, probably will not happen (1) Improbable, some possibility, but low likelihood (2) Probable, distinct possibility (3) Highly probable, most likely (4) Definite, impact will occur regardless of any prevention measures (5)
Significance (S)	Calculated using the following formula $S = (E+D+M)P$ < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area) 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated) 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

In addition, each impact is evaluated in terms of the following:

- The degree to which the impact can be reversed (Reversible or Not)
- The degree to which the impact may cause irreplaceable loss of resources (Yes or No)
- The degree to which the impact can be mitigated (Yes or No)

It is important to state that the evaluation undertaken using this method will in many cases be based on subjective criteria that are difficult to quantify at a high percent confidence interval. This is a result of the nature of this project, whereby:

- Wind energy is now more developed than previously in South Africa in 2013 when the report was originally authored, but there is still a lack of information regarding impacts of the WEF on various socio-economic aspects.
- The results of the impact evaluation model are thus to a great degree based on a combination of reviewed literature and results of surveys administered (as discussed in the next section).
- Where results of the literature review diverge significantly from those of the surveys administered, a middle-ground approach is adopted in order to consider both extreme cases and arrive at a likely outcome.
- Emphasis is thus to be drawn away from the numerical value of the significance rating and more to the issues discussed (extent, duration, magnitude and probability). Although these are often subjective matters (given the absence of historical data on which to base econometric modelling

for extrapolation of trends). It is thus recognised that while no absolute value can be ascertained to the impacts identified in this report, it is still important to identify these potential impacts and highlight some of the critical issues that will apply in the specific case of the proposed Plan 8 Infinite Energy Grahamstown WEF.

1.3.3 Data Collection

As part of the data collection process for the socio-economic impact assessment of the Grahamstown WEF the following activities were undertaken:

- **Review of planning documents**

In order to document the socio-economic context of the study area within the Makana Local Municipality, important policy, planning and strategic documents were reviewed, referenced and used to inform this SEIA.

- **Literature Review**

In order to substantiate the findings of the socio-economic impact assessment a number of secondary research documents have been considered as they relate to the proposed WEF.

These documents include academic journals and studies available on the internet or in print media. It is intended that these documents substantiate the baseline profile while at the same time providing context to the project.

- **Interviews with stakeholders**

The interviews with stakeholders were originally conducted in 2013 and were repeated in 2018 for the purpose of the proposed amendments. Where possible the original stakeholders contacted in 2013 were contacted again in 2018 in order to determine if changes had occurred in land use in the area.

Interviews were originally undertaken in 2013 then again in 2018 as part of the SEIA to collect information from key parties that are likely to be interested in and affected by the proposed WEF. These interviews were primarily conducted telephonically. These interviews formed the basis of the primary data collection and assisted with the gathering of baseline information, as well as establishing the stakeholder's perceptions, interests and concerns. The survey template which was used is attached as an appendix to this report. Results of this survey are presented in an aggregate form throughout this report. This is done in order to preserve the confidentiality of the results. As such, responses are not presented per farm/property/land owner or respondent.

It is recognised that responses to the survey may be based on subjective opinions that are difficult to quantify. Despite this shortcoming, it was however, still important to gauge the perceptions of identified interested and affected parties as they represent local community, business and government interests.

- **Site visits**

Trips were made to the site in order to gain a contextual knowledge of its surrounding land uses.

1.4 STUDY AREA DELINEATION

Study area delineation depends on the type of economic activity that is analysed and the perceived spread of economic impacts that are expected to be generated from the project during both the construction and operational phases. The municipal area where the site is located is likely to experience some direct, indirect and induced impacts resulting from the activities on the site; however, it is unlikely that a local economy can be sufficiently diversified to supply all materials and services and support construction and operational activities from start to finish. Economic impacts therefore tend to extend beyond municipal boundaries and spread throughout the entire national economy.

For the purpose of this study both a primary and secondary study area were delineated. These are discussed in more detail in the subsequent section.

1.4.1 Primary study area

The primary study area (hereafter referred to the local area) refers to the locality where the direct economic impacts of the proposed development will be concentrated. The primary study area is defined based on the actual location of the proposed development, proximity to skilled and unskilled labour, position relative to suppliers of products and data availability.

Based on these criteria the Makana Local Municipality was selected as the smallest administrative units for which current economic and demographic data can be obtained.

1.4.2 Secondary and tertiary study areas

The secondary study area is where the majority of indirect and induced effects will be concentrated. Although the proposed WEF is located an estimated 30 kilometres from Makhanda it is anticipated that a portion of construction inputs will be sourced from the Nelson Mandela Bay Metro, situated an estimated 160 kilometres from the proposed development site on the N2 route.

This suggests that the Nelson Mandela Bay Metro will likely benefit more from the indirect and induced effects of the development than the Makana Local Municipalities. The procurement of construction inputs are, however, unlikely to be limited to the Nelson Mandela Bay Metro, and will likely be sourced from other parts of the Eastern Cape such as East London which is 150 kilometres from the WEF site on the N2. Accordingly, the Eastern Cape was selected as the secondary area.

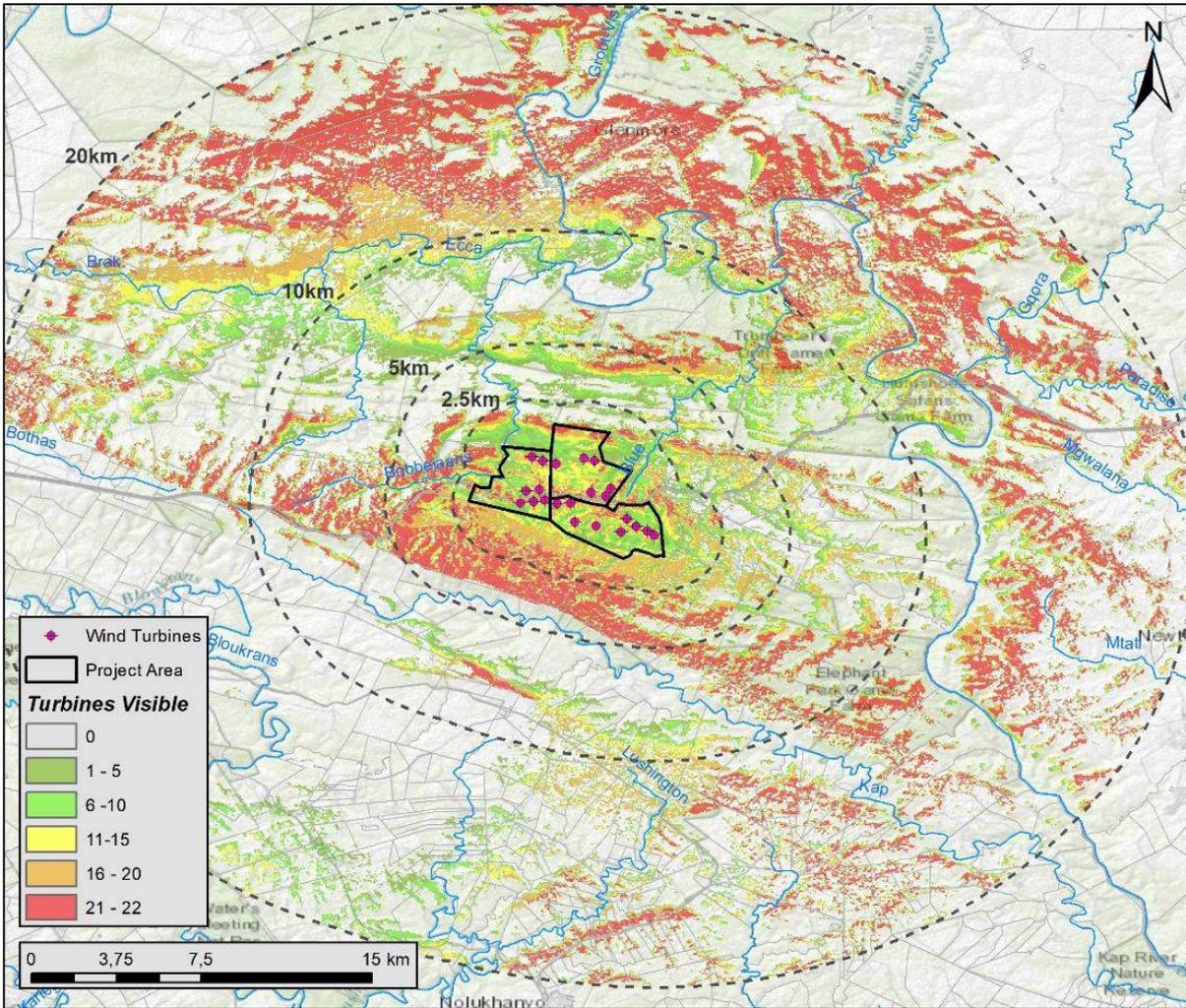
South Africa was chosen to be the tertiary study area as the proposed WEF is likely to benefit South Africa's overall domestic expenditure both directly and indirectly.

1.4.3 Visually affected study area

Through consultation with other specialists on the project team and the review of the minutes of various public participation meetings that have been held, it is evident that the most significant environmental impacts associated with the proposed development are to arise through the perceived resultant effects of the visual disturbance to the area's landscape. The public participation process also highlighted the fact that some of the current economic activities located in the vicinity of the development (including game farming/hunting) could potentially be adversely affected by the proposed project through visual disturbance.

In order to determine, and where possible quantify, the secondary economic impacts that can potentially be induced by the proposed Grahamstown WEF, a visually affected zone was delineated. This area was restricted to the potential visual exposure that was determined by the visual specialist on the project team. This area is illustrated in Map 2 below.

Map 2: Cumulative visual exposure from proposed turbine (hub height 125m; rotor diameter 149m) layout



Source: EOH CES Visual Impact Assessment Study (2018)

CHAPTER 2 POLICY AND PLANNING ENVIRONMENT

This chapter examines the key legislation and policies relevant to the proposed development and includes a review of pertinent national, provincial and local policies that have a direct bearing on the development.

The overall aim of this review process is to provide insight into the government’s priorities and plans in terms of renewable energies. This assists in determining the importance of the project with regard to the development objectives of the various spheres of government as well as in identifying potential developmental conflicts that the project might create. A brief review of the most relevant documents is provided in this section.

The policy and legislative landscape has changed since 2013. This is largely as a result of the acceptance of renewable energy by the country as well as a greater awareness of climate change and the dangers it poses. The new policies included in this 2018 updated SEIA and to be reviewed below are:

- Renewable Energy Vision 2030 South Africa (2014)
- Integrated Energy Plan (2016)

- Renewable Energy Independent Power Producer Procurement Programme (REI4P)
- The Eastern Cape Provincial Economic Development Strategy (PEDS) (2017)
- Sarah Baartman District IDP (2017)

2.1 NATIONAL INFORMANTS

2.1.1 National Energy Act (2008)

Seeks to, in its preamble; facilitate the increased generation and consumption of renewable resources while at the same time taking into account environmental management requirements and the interactions amongst economic sectors.

2.1.2 The White Paper on Renewable Energy (2003)

Sets a target of generating 10 000 GWh from renewable energy sources by 2013, which is equivalent to two units of a combined coal power plant with a capacity of 660 MW. The energy generated should come primarily from biomass, wind, solar and small-scale hydro. This renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating systems and bio-fuels.

2.1.3 National Climate Change Response Paper Green Paper (2010)

Focuses on making a fair contribution towards the stabilisation of greenhouse gas emissions and adapting and managing climate change impacts. The Paper proposes a number of approaches of dealing with climate change impacts with respect to selected sectors. Energy, in this context, is considered to be one of the key sectors that provides for possible mitigation to address climate change. Some of the responses proposed include:

- Diversifying the energy mix
- Using market-based measures such a carbon tax, to motivate and drive diversification of the energy mix
- Establish a business environment for the successful development of renewable energy manufacturing industry in the country
- Design and roll out ambitious Research and Development Projects aimed at diversifying the energy mix
- Review and scale up the 2013 targets of generating 10 000 GWh of renewable energy

2.1.4 The New Growth Path Framework (2010)

Is the government's programme of action that focuses firstly on the creation of decent employment opportunities through the support of labour-intensive sectors and secondly on ensuring long term growth through the support of advanced industries.

As a starting point, employment creation is planned to be stimulated in a few sectors including the green economy. Government plans to create 300 000 employment opportunities in the green economy alone by 2020, more than two thirds of which is intended to be created in construction, operation and maintenance of new environmentally friendly infrastructure.

2.1.5 The Integrated Resource Plan 2010 – 2030 (2011)

Projected that and additional capacity of 56 539 MW will be required to support the country's economic development and ensure adequate reserves over the next 20 years. The required expansion is more than twice the size of the existing capacity of the system.

A significant component of the above-mentioned plan is the expansion of the use of renewable energy sources to reduce carbon emissions involved in generating electricity. Overall, the proposed plan implies a total generating capacity of 9 200 MW from wind by 2030.

2.1.6 National Development Plan (NDP)

Vision 2030 was formulated by the National Planning Commission and released on 11 November 2011. The NDP proposes to create 11 million employment and grow the economy at an average rate of 5.4% per annum by 2030. The NDP also seeks to ensure that half of the new future generation capacity comes from renewable energy sources. It furthermore recognises the importance of the transition to a low carbon economy. As such the NDP suggests the following:

- Support carbon budgeting
- Establish an economy wide price for carbon by 2030 complemented by energy efficiency and demand management interventions
- Set a target of 5 million solar water heaters by 2030
- Implement zero emission building standards that promote energy efficacy
- Simplify regulatory regime to encourage renewable energy, regional hydroelectric initiative and independent power producers (IPPs)

2.1.7 Renewable Energy Vision 2030 South Africa (2014)

The renewable energy vision is a document developed by the World Wildlife Fund (WWF) and outlines South Africa's position, compared to other similarly developing countries, in terms of renewable energy development and energy generation. The document outlines goals and states that:

- Renewable energy as an exceptional source of flexible supply within the context of uncertain energy demand
- Comprehensive renewable energy base will support a resilient South African future
- A sustainable energy mix that excludes undue risks for the environment of society

2.1.8 Integrated Energy Plan (2016)

The integrated energy plan is developed by the Department of Energy and outlines the South African Energy Generation Strategy and plan for the future. The document states that South Africa should continue to track a diversified energy mix which lessens reliance on a few primary energy sources. In addition to solar energy facilities, wind energy should continue to contribute in the generation of electricity. Other aspects the document outlines include:

- Allocations to safeguard the development of wind energy projects aligned with the Integrated Resource Plan 2010 should continue to be pursued
- Ensure energy security and supply
- Reduce environmental impacts
- Endorse job creation and localisation
- Lessen cost of energy
- Reduce water consumption
- Diversify supply sources
- Promote energy efficiency
- Promote energy access

2.1.9 Renewable Energy Independent Power Producer Procurement Programme (REI4P)

The Department of Energy's (DoE) Independent Power Producers Procurement Programme was established at the end of 2010 as one of the South African government's urgent interventions to enhance South Africa's power generation capacity.

The DoE, national Treasury and the Development Bank of Southern Africa established the IPP Office for the specific purpose of delivering on the IPP procurement objectives. The primary mandate of this office is to secure electricity from renewable (REI4P) and non-renewable energy sources from the private sector. However, energy policy and supply is not only about technology, but also has a substantial influence on economic growth and socio-economic development. As such the IPPP has been designed to go beyond procurement of energy to also contribute to broader national development objectives such as job creation, social upliftment and the broadening of economic ownership.

At a national level the following commitments have been made for bid windows 1, 2, 3, 3.5 and 4 as of December 2017 (DoE, 2018):

- 6 422 MW of electricity had been procured from 112 RE Independent Power Producers (IPPs) in the seven bid rounds;
- 3 052 MW of electricity generation capacity from 56 IPP projects has been connected to the national grid;
- Investment (equity and debt) to the value of R 201.8 billion, of which R 48.8 billion (24%) is foreign investment, was attracted;
- Created 31 207 job years for South African citizens;
- Socio-economic development contributions of R 357.4 million to date;
- Enterprise development contributions of R 115.2 million to date;
- Carbon emission reductions of 15.4 MtonCO₂ has been realised by the programme from inception to date.

From an Eastern Cape perspective, the following commitments have been made across the aforementioned bid windows:

- Add 1 509 MW to the national grid from 17 REI4P projects;
- Incur R 33.8 billion in project costs increasing the gross domestic product (GDP) of the province;
- Incur R 4 489 million in social economic development expenditure;
- Contribute R 7 434 million to community trusts established as part of the programme;
- Create 18 137 job years.

2.2 KEY PROVINCIAL DOCUMENTS

2.2.1 The Eastern Cape Industrial Development Strategy (2011)

Sets out a number of strategic goals which include positive economic growth, ensuring that economic growth leads to labour absorption and ensuring that existing employment are retained. In pursuit of these goals the Industrial Development Strategy identifies the need for:

- R&D and innovation
- Skills development
- Improving infrastructure and logistics
- Providing developmental finance

- Promoting investment, trade and exports
- Developing institutional structures

The achievement of these strategic goals is planned through the development of several key sectors including:

- Tourism
- Chemicals and Petrochemicals
- Agriculture and agro-processing
- Capital goods
- Green industries
- Automotive

The Industrial Development Strategy also seeks to develop an industrial base for the manufacturing of components required for the production of solar cells, solar panels and certain components of wind turbines

2.2.2 The Eastern Cape Sustainable Energy Strategy (2012)

Seeks to lay out the provinces strategic direction in terms of the renewable energy industry. The focus of the strategy is to encourage sustainable, affordable and environmentally friendly energy production by creating an enabling environment for energy production and sustainable technology, skills and industry development. This is to be achieved through several initiative including:

- An intensive training programme among relevant decision makers with respect to renewable energy project approvals
- The establishment of an implementation task team to provide potential investors with a one-stop-shop for renewable energy information in the province
- Development of a provincial locational perspective of renewable energy
- Lobbying Eskom to expedite and strengthen the transmission capacity of the former Transkei area
- Lobbying the Department of Energy to set out long-terms programme for the procurement of renewable energy generation

Through the purist of these initiatives the Eastern Cape Province seeks to become a leading and preferred destination for renewable energy investment in South Africa.

2.2.3 The Eastern Cape Provincial Economic Development Strategy (PEDS) (2017)

The Eastern Cape PEDS seeks to create a clear, long-term vision and strategy for the growth and development of the Eastern Cape by building on the strength and opportunities of the province, while at the same time addressing its weaknesses and threats.

In pursuit of this goal, PEDS identifies six high potential economic sectors that can catalyse growth in the province. These sectors are:

- Agri-industry
- Sustainable energy
- Ocean economy
- Automotive
- Light manufacturing
- Tourism

With respect to sustainable energy, PEDS notes that it is imperative that the province aligns all its energy opportunities so as to:

- Create the optimal institutional environment for the location of sustainable energy projects in the Eastern Cape
- Harness the maximum possible value chain, localisation and industrialisation opportunities from sustainable energy projects
- Ensure adequate and aligned skills development
- Link innovation, entrepreneurial and small business opportunities to sustainable energy projects
- Link black industrialist opportunities to sustainable energy projects

2.3 LOCAL GUIDANCE

2.3.1 Sarah Baartman District SDF (2013)

The Sarah Baartman SDF observes that the district's economy is dependent on the natural resources of the area (tourism and production). As such, spatial planning initiatives need to support the implementation of the district's Socio-Economic and Enterprise Development Strategy (SEEDS) by:

- Implementing effective spatial planning land use management
- Ensuring that the SDP identifies areas for renewable energy production
- Recognizing that game reserves and farming are playing a greater role in the economy
- Undertaking urban regeneration projects
- Identifying where infrastructure upgrading is required.
- Providing the spatial framework for the district's Area Based Plan (ABP)

The Sarah Baartman SDF further notes that the introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district (in the form of potential changes to the visual and cultural landscapes). This is an important consideration as part of the proposed site falls in an area identified by the SDF as the N2 development corridor.

2.3.2 Sarah Baartman District IDP (2017)

The Sarah Baartman IDP identifies the green economy (including, but not limited to renewable energy and ecosystem services) as a focal point of economic development in the district, noting that such investments are likely to have significant economic spinoffs for the region. To achieve this, the IDP proposes investing in natural capital so as to create a new generation of green and blue economy jobs rooted in renewable energy.

2.3.3 Makana Local Municipality IDP (2017-2022)

The Makana IDP notes the growing importance of renewable energy and its associated infrastructure to the municipality's economy, particularly WEFs. There is already a WEF operational in the municipality which is expected to have R 400 million economic spinoffs over 20 years.

The municipality is looking at innovative alternative energy sourcing methods and there is a draft policy which sets out the criteria which will enable the evaluation of renewable energy generation infrastructure to be developed. The municipality also recognises that the southern portions of the municipality shows great potential for development of a WEF.

2.3.4 The Makana LED Strategy (2009)

As part of its strategic vision, identifies the need to move towards a green and environmentally sustainable economy. The LED Strategy further identifies the need for a reliable source of electricity as it promotes development and business confidence. The development of WEFs was associated as a positive step towards ensuring electricity generation.

2.4 SYNOPSIS

The review of the policy environment suggests that utilisation of renewable energy sources in South Africa is considered to be an integral means of reducing the carbon footprint of the country, diversifying the national economy and reducing poverty. Any project contributing to the above-mentioned objectives can therefore be considered strategically important to South Africa.

From a provincial and municipal policy perspective the facilitation of renewable energy projects and interventions that related to the broader green economy are seen as a priority. The Eastern Cape Provincial Industrial Development Strategy makes particular reference to the need to develop green industries which includes renewable energies. Likewise, the Makana municipality has noted the importance of wind energy in its IDP and is actively seeking to promote such developments.

CHAPTER 3 SOCIO-ECONOMIC PROFILE OF THE STUDY AREA

This chapter documents various aspects of the primary study area including, population and household numbers, income levels and employment. In addition, the chapter also reviews the economic structure and performance of the study area.

The intention of this review is to provide an overview of the socio-economic context of the area so as to better understand the dynamics of the area and to inform the SEIA process.

The socio-economic landscape of the study area has not changed significantly since 2013. Issues that were prevalent in 2013 such as poverty, lack of skills and education are still significant factors that define the socio-economic context of the study area. The following section contains updated socio-economic data for Makana Local and Sarah Baartman District municipalities and compares 2011 Census data figures to 2017 datasets where appropriate. Reference is made to the sources of data within the chapter below.

3.1 POPULATION, INCOME AND EMPLOYMENT PROFILE

Selected demographic information is presented in Table 2 for Makana Local Municipality and Sarah Baartman District Municipality. The Makana Local Municipality falls within the Sarah Baartman District Municipality and accounts for 19% of the district population, making it the second most populous locality after the Kouga Local Municipality. Population growth between 2011 and 2017 was 0.9%. This is similar to the Sarah Baartman District Municipality's population growth rate, which grew at 0.9% over the same period. These figures however, strongly suggest the possibility of out-migration due to the limited number of employment opportunities available in the area. These limited employment opportunities likely force people and households to move closer to urban centres that have greater potential for employment.

Table 2: Overview of the primary study areas population structure, 2017

Indicator	Sarah Baartman DM	Makana LM
Area (km ²)	58 243	4 376
Population	471 366	91 471
Number of Households	131 451	23 919
Population density (km ²)	8.1	20.90
Average household size	3.6	3.8
Population growth rate (2011-2017)	0.9%	0.9%
Average monthly household income	R 9 508	R 11 572

Source: Quantec Standardised Regional (2018)

The disposable average monthly income of households was R 9 508 in Sarah Baartman and R 11 572 for Makana. This is higher than that of the Eastern Cape (R 8 011) and the highest amongst other district municipalities. Makana has the highest average monthly household income largely as a result of the tertiary and secondary educational institutions located in Makhanda as well as business services and tourism located in the town.

The high earning households in the municipality skew the average monthly household income however, and the table below indicates that the employed rate is far lower than that of the District and the unemployment rate is far higher.

Table 3: Employment profile of the primary study

Indicator	Sarah Baartman DM	Makana LM
Employed	80%	68%
Unemployment Rate	20%	32%
Not Economically Active	37%	43%
Labour force participation rate	63%	57%

Source: Quantec Standardised Regional (2018)

As seen in Table 3, the review of the employment profile indicates that almost a third of the economic active population is unemployed. The unemployment rates and labour force participation rate was notably worse than that of the Sarah Baartman District Municipality (Unemployment rate: 32%; Labour force participation rate: 57%).

The implication of employment statistics presented in Table 3 are that

- There is likely to be a high rate of worker discouragement (people that have given up looking for work) in the area as a result of opportunities for employment being very limited
- The local labour force is likely to be under-skilled as a result of limited working opportunities
- The bulk of employment is likely to be in Makhanda, as farming operations in rural settings within Makana are typically not labour-intensive due to the nature of crops and livestock produced and the region's natural attributes.

3.2 ECONOMIC PROFILE

Table 5: GDP-R structure between 2011 and 2017 in Constant 2010 prices

Sector	2011	2017	CAGR 2011-2017
Primary Sectors	2.6%	2.3%	-0.3%
Agriculture and hunting	2.5%	2.3%	-0.3%
Mining and quarrying	0.1%	0.1%	1.5%
Secondary Sectors	16.2%	17.7%	2.4%
Manufacturing	10.8%	12.5%	3.1%
Electricity, gas and water	1.3%	1.0%	-2.7%
Construction	4.1%	4.3%	1.7%
Tertiary Sectors	81.2%	80.0%	0.8%
Trade	18.4%	18.9%	1.4%
Transport and communication	7.0%	8.0%	2.9%
Finance and business services	18.0%	19.4%	2.1%
Community services	9.5%	8.8%	0.0%
General government	28.3%	24.9%	-0.7%
TOTAL REAL GDP-R	R 3.422 bil	R 3.688 bil	1.1%

Source: Quantec (2018)

Over the last six years the Compounded Annual Growth Rate (CAGR) was 1.1%. The growth rate is lower than both the district (2.1%) and provincial (1.5%) economies (Quantec, 2018). This can be attributed to the size and diversity of these municipalities' economies relative to the Sarah Baartman District and the Eastern Cape.

As evident from Tables 5 and 6 the agricultural sector has experienced a decline in terms of its economic output but an increase in terms of employment. The economic decline could possibly be attributed to the longstanding drought that the area has recently experienced as well as economic uncertainty. The local area has also experienced a gradual movement away from traditional livestock farming towards game farming/hunting and eco-tourism.

The local agricultural sector includes limited subsistence farming, unlike other areas in the Eastern Cape where this practice is more dominant. The presence of this subsistence agricultural means that the number of households that are dependent on agricultural activities for income could be slightly greater than the figures presented in Table 6. This is due to the fact that the table only indicates those individuals that are formally employed in the agricultural sector.

Agricultural activities are labour intensive, thus a small decline in the size of the sector would generally lead to greater employment losses than for example in utilities, which tend to be more capital intensive. The agricultural sector is also frequently one of the largest employers in rural areas and it is for these two reasons that the sector is generally prioritised in development strategies.

Table 6: Employment structure

Sector	2011	2017	Change 2011-2017
Primary Sectors	9.9%	11.1%	3.2%
Agriculture and hunting	9.9%	11.0%	3.2%
Mining and quarrying	0.0%	0.0%	2.6%
Secondary Sectors	12.2%	13.1%	2.6%
Manufacturing	7.0%	7.4%	2.4%
Electricity, gas and water	0.3%	0.3%	0.2%
Construction	4.9%	5.5%	3.1%
Tertiary Sectors	77.9%	75.9%	1.2%
Trade	22.1%	23.2%	2.3%
Transport and communication	3.2%	3.6%	3.2%
Finance and business services	11.7%	11.6%	1.5%
Community services	20.4%	20.9%	1.9%
General government	20.5%	16.5%	-1.5%
TOTAL EMPLOYMENT	21 607	24 090	1.6%

Source: Quantec (2018)

3.3 PROFILE OF THE IMMEDIATELY AFFECTED ENVIRONMENT

3.3.1 Land use profile

The map below shows farm numbers of properties within a 20-kilometre radius of the site of the proposed Grahamstown WEF. The purpose of the map is to provide a spatial perspective to the locality of the site in relation to properties in the immediately affected environment. The map contains properties with different levels of visual exposure to the WEF (ranging from no impact to high impact) and is meant to provide a reference point to Map 1 and Map 2 from earlier on in this document. The distance of 20km is used in order to provide congruence with Map 2 from this document, whilst providing additional detail in comparison to Map 1 from this document. The distances provided (20km, 10km and 5km) are thus not representative of deemed visual impacts, but merely to provide spatial reference points. Farm numbers were used rather than farm names as it is recognised that colloquial names are often used as reference points for farms, and these may not always match with farm names registered at the Surveyor General's offices. The map informs the profiling undertaken in this section.

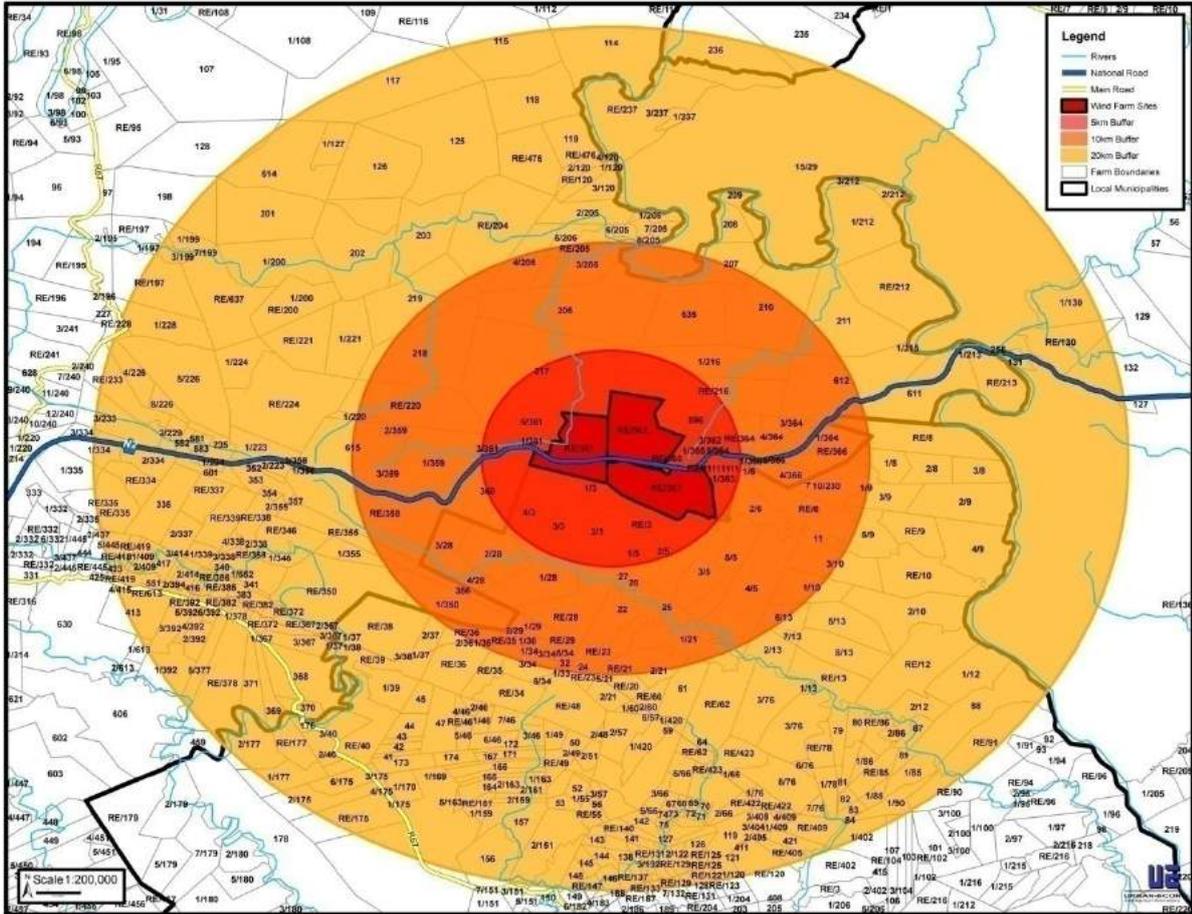
The farm portions on which the WEF is located is currently used for livestock and crop farming.

The area surrounding the proposed Plan 8 WEF is to a large extent put to the use of game farming/hunting and eco-tourism purposes. Livestock farming (sheep, goats and cattle), and to a lesser extent crop farming (Lucerne, horticulture and maize) is also undertaken on some properties. Some of the land is used solely for the purposes of rearing animals for resale to the hunting industry. Other properties are dedicated to hunting activities while others are dedicated to accommodation of tourists that do not hunt on the properties. Such accommodation facilities host people that visit the area for hunting, as well as other activities. accommodation facilities range from low-end chalets to luxury units.

It must be noted that a number of properties have mixed-uses. As such, some properties are used for both conventional farming (livestock rearing or crop) and game farming and hunting. Properties with mixed land uses typically cater to the local tourism market and rear animals for this market.

It is important to point out that some farm owners declined to respond to the questionnaire used to gather information for this report.

Map 3: Farm numbers of the immediately affected environment



Source: Adapted by Urban-Econ GIS (2013).

3.3.2 Socio-economic profile of the affected area

From the data obtained from surveyed land owners, it is estimated that agricultural operations (including hunting and tourism) in the directly affected area employ approximately 168 people, the majority of whom are permanent employees. The majority of the employees live on the farm and are those who do not, live in Makhanda. An additional 40 people live on the farms who are not labourers.

In comparison to the 2013 survey results, despite the slight decrease in the number of surveyed farm owners, there has been a general reduction in the number of temporary farm workers especially in the hunting/tourism industry and crop farming industry. There has however, been a drastic increase in the number of permanent staff employed by these operations. Overall there was a ratio of 10,4 staff per farm owner in 2013, whilst in 2018 there has been found to be a ratio of 10,5, indicating that while the permanent/temporary dynamic has changed dramatically, the overall number of staff per farmer has remained the same over this period.

Table 7: Selected socio-economic description of properties by land use in 2018. (2013 figures are in parentheses)

Land use	No. of farm Owners	No of labourers employed		
		Permanent	Temporary	Total
Hunting/tourism	7 (13)	96 (65)	15 (71)	118 (136)
Crop farming	1 (3)	1 (13)	0 (37)	1 (50)
Livestock farming	8 (7)	51 (20)	5 (34)	56 (54)
TOTAL	16 (23)	148 (98)	20 (142)	168 (240)

It is important to distinguish between farm portions and farm owners. One farm owner may own several farm portions of one or multiple farms. As such, the number of farm owners listed in the table above is not a direct indication of collective or total ownership of farms in the region. It was found that some farms were owned by more than one owner, and similarly some farm owners owned multiple farms or farm portions.

It is recognised that many farms in the area practice a combination of crop, livestock and hunting activity. As such, most farms are involved in all three land uses as shown in Table 7 to varying extents. Table 7 shows the dominant activity currently undertaken on farms that were surveyed. In addition to the information presented in Table 7, the following observations were made regarding land use and the area's socio-economic profile:

- The majority of the livestock farmers are commercial and only two of the respondents indicated that they kept livestock or crops for subsistence use
- The dominant area utilised by the farmers was for game breeding (13 000ha) and hunting (11 000ha) followed by livestock (5 700ha)
- The majority of labourers live on the farms they work on with their family members
- Employees on hunting farms tend to have higher skill levels than those who farm on crop or livestock farms
- Livestock animals reared for sale and kept for production of food products include goats, sheep and cattle
- Approximately 88% of the farms were the primary residence of the farm owner
- Approximately 190 international tourists visited the area for hunting purposes in a year
- 153 domestic tourists visited the area for hunting purposes in a year
- Over 400 international tourists have been found to visit the area for leisure purposes while over 500 domestic tourists have visited the area for the same purpose in the past year
- Some of the farms have accommodation facilities for visitors
- Game farms receive visitors mostly between April and December (predominantly for the purpose of hunting)
- Some of the game farms earn income through the trading of live game (predominantly for the purposes of hunting)
- Eco-based tourism in forms such as photography, trails is also undertaken in the area but to a lesser extent than hunting.

CHAPTER 4 IMPACT ASSESSMENT ASSUMPTIONS

This chapter of the report describes the assumptions used in the socio-economic impact assessment study and specifically in the economic modelling exercise which aims to quantify the economic impact of the project.

A limited number of the assumptions have changed between 2013 and 2018 versions of this report. The changes that have occurred are the total MW produced at the facility which has increased from 66MW to 99MW largely as a result of the larger rotor technology to be employed.

Other changes include:

- The date of the commencement of construction from 2015 to 2019,
- Increase in local spend during construction from R715 million (inflation adjusted to 2018 values) in 2013 to R952 million in 2018.
- Increase in labour required during construction from 142 to 307 Full Time Equivalent (FTE) positions
- The date of the commencement of operation from 2015 to 2022,
- Increase in local spend during operation from R7,6 million (inflation adjusted to 2018 values) in 2013 to R9,4 million in 2018.

The remaining assumptions such as number of persons to be employed during operations will remain as per the previous stated assumptions.

The assumptions presented in this chapter refer to:

- Construction, operation and decommissioning assumptions applicable to the project as provided by Plan 8 Infinite Energy.
- Assumptions associated with the visual impacts resulting from the project and the related potential losses of affected businesses

4.1 GRAHAMSTOWN WEF ASSUMPTIONS

The proposed facility is to have a maximum installed capacity of approximately 100 MW. The assumptions specific to the phases of the project's lifespan are provided in the following paragraphs.

4.1.1 Construction phase assumptions

The following assumptions regarding the construction phase of the proposed WEF are made:

- The construction of the facility is planned to commence in 2019 contingent on the project being selected under the Renewable Energy Independent Power Producer Procurement (RE IPPP) Programme.
- The total investment into the establishment of the facility is valued at R 1 320 832 500 in 2018 prices, of which R 952 036 001 will be spent within the South African economy and the rest on imported goods and services.
- Only local expenditure is considered in this analysis.
- Of the South Africa spend across all phases, 49.59% will be incurred on the procurement of goods and services and the rest will be spent on labour costs.
- About 13% of the localised spending for all phases will be incurred in the local area, of which R 82.1 million will be spent on supply chain and R 42.5 million will be spent on labour.
- The construction of the facility will create an estimated 307 project specific personnel of which 146 employment positions will be created for local labour. These employment positions will comprise of

the following occupations:

- * 2 managers and highly skilled professionals
- * 16 skilled artisans and supervisors
- * 128 low skilled individuals (security and general labourers)

4.1.2 Operational phase assumptions

The assumptions regarding the operational phase of the project used in the modelling exercise are as follows:

- Operations are expected to reach full capacity in 2022 after construction commences in 2019
- The facility will operate for 20 years
- The operations and maintenance cost of the facility will be valued at R 16 148 300 in 2018 prices per annum, of which R 9 492 562 will to be spent within the local South African economy (under Operations and Maintenance Contract).
- The greatest share of local spending will be directed at covering labour costs associated with the employment of 10 permanent workers.
- The required workforce of the entire facility includes 4 highly skilled positions (i.e. engineers, programmers), 4 skilled positions and 4 positions for security personnel, welfare officers and other general personnel. South African residents will fill all of these positions and most will come from the local area.
- Up to 5% of turnover generated by the WEF will be invested in social development and economic development projects in and around surrounding communities. Details of these projects are contained in the community needs analysis and assessment document which is available from Plan 8 infinite energy. Social and economic development projects will be undertaken at the site of the WEF as well as in Collingham towers, Eluxolweni, Pershoek, Fingo village and Trentham Park. This amounts to an average potential total spend of R 11 514 820 per year for 20 years.

4.1.3 Decommissioning phase assumptions

The costs of decommissioning the plant are not yet known. Given the nature of wind technology and the unlimited wind resource, it is highly likely that instead of decommissioning the plant, it will be refurbished in order to extend its lifespan beyond the 20-year period.

4.2 ASSUMPTIONS REGARDING POTENTIAL LOSSES IN THE AREA AFFECTED BY VISUAL IMPACTS

During the operation of the WEF, farming operations will be able to continue as is currently undertaken on part of the land not taken up by permanent WEF infrastructure (turbines, substation, control building etc.). It is not envisaged that significant changes will occur to land use once the WEF has been built, and animals will be free to graze across the site with landowners being able to continue to use the land in the same manner as they did prior to the establishment of the WEF. Similarly, cultivation of crops will still be possible on the remaining extent of the farm on which the turbines will be installed.

Accordingly, the revenue generated through livestock and crop farming is not anticipated to be affected by the visual disturbances in the area. The opposite however, applies to the tourism and game farming/hunting industries. The following paragraphs describe the sensitivity of the tourism and the game farm/hunting industries towards potential visual disturbances and provide an estimation of the potential loss in revenue that could result from the establishment of the WEF.

A number of changes occurred between 2013 and 2018 versions of this report. The 2018 version of this report now recognises that the renewable energy landscape has changed significantly from 2013 when WEFs were uncommon in the Eastern Cape compared to 2018 where a large number of WEFs have subsequently been developed and are now fully operational. The report also acknowledges that the Waainek WEF is also operating in the area. The presence of such a development would have likely changed perceptions towards WEFs and the renewable energy sector in the area. It is likely that fears over the presence of WEFs have been reduced as residents become more familiar with the changes in their surroundings. This is in keeping with academic literature which indicates that opposition to WEFs generally decreases after construction is completed largely as a result of a greater understanding of the nature of the WEFs. This has led to an adjustment in the sensitivity values (percentage points) that the tourists and locals would experience. This is discussed in the following section.

4.2.1 Assumptions regarding sensitivity of tourists to visual disturbances

Based on the outcomes of the surveys conducted with local land owners, the majority of the revenue generated by game farms and hunting activities in the immediately affected environment is generated through international tourist visitors, with the rest being derived from domestic visitors. International tourists visiting farms in the area are almost exclusively trophy hunters. Some of these international tourists however, do engage in other activities such as bow hunting, photography, painting etc. Domestic tourists are mainly described as 'biltong hunters.' A small number of domestic tourists also visit the area for general recreation purposes i.e. bird watching and game viewing.

International tourists are expected to be fairly sensitive to a visual disturbance in the area. One of the reasons international tourists visit the area is to experience a "Wild Africa" and to hunt/view game. Any outside disturbance that would affect this "Wild Africa" experience is therefore likely to negatively impact the level of satisfaction that these tourists experience. It was however, indicated that one of the critical factors that international hunters consider when visiting local game farms is the quality of the trophy. In many cases this is the chief concern of international hunters.

It was also noted that many of the international tourists visiting local game farm/hunting establishments are repeat visitors and have been referred to the farms by friends and family. This means that any visual disturbance that would affect the experience of international visitors would impact on their decision to return to the respective game farm/hunting establishment. It is also probable that these international visitors would likely spread the word about their experience to other potential tourists meaning that, in a case where the experience is unsatisfactory, international tourists may not make referrals to the game farms for their activities such as hunting.

Domestic tourists are also expected to be sensitive to visual disturbance that affect their sense of places, as well as their experience of the game farms. Biltong hunters are, however, expected to be less sensitive than trophy hunters or even domestic visitors interested in eco-tourism. This is largely due to the fact that small groups of biltong hunters primarily hunt for meat and biltong and are generally not very demanding as far as their facilities and environment are concerned. The situation might differ if corporate groups are examined. Corporate tourists are likely to be more demanding with regard to facilities and thus more sensitive to the ambience created by the surrounding environment.

It should also be noted that the Makana Municipality already has a functional WEF while many more exist in the Eastern Cape. This may have changed some of the perceptions of wind energy and its associated

infrastructure among locals and international tourists traveling through the area.

It is also important to note that for both international and domestic tourists the visual experience of the area is but one factor that is considered when visiting a game farm/hunting establishment. Other factors include, inter alia:

- Location and quality of the facilities
- Variety and abundance of wildlife
- Quality of the trophy (for hunting tourists)
- Relationship with the farm owner

In order to determine the sensitivity of various groups towards the visual disturbances created by the proposed development, a telephonic perception survey was conducted with professional hunters operating in the area, as well as local game farm/hunting establishments situated in the area. Based on the outcomes of this survey in 2013, as well as other qualitative and quantitative assessments (as discussed and referenced throughout chapter 5 of this document) the following assumptions were made:

- **International tourists**

A maximum of 50% of international tourists would definitely change their decision to visit the area if there was a high visual disturbance associated with the WEF. A small visual impact (large distance from the WEF) created by the WEF though was of a lesser concern. Nevertheless, it still might result in an estimated 15% of tourists choosing not to visit the respective farms. This means that as word spreads and usual repeat tourists visit the game farm/hunting establishment that is within visual impact of the WEF, the potential decline in the number of international tourists could range between 15% and 50% depending on the distance from the facility.

- **Domestic tourists**

Domestic tourists are also assumed to be sensitive towards the visual impact but to a slightly lesser degree than international tourists. Based on the qualitative and quantitative assessments, between 10% and 40% of domestic visitors to game farm/hunting establishments would change their decision to visit the farm depending on the extent of the visual impact.

4.2.2 Assumptions regarding the extent of visual effects on properties and revenues

Using the visual impact index map as seen in Map 2 with respect of the proposed WEF, assumptions with regard to the sensitivity of the specific game farm/hunting establishments towards the visual impact were made.

The first step was determining the degree to which a specific farm would be visually affected by the WEF. Thereafter, the following was taken into account to determine the rating of that impact from a socio-economic perspective:

- The visual impact maps
- The location of accommodation facilities
- The extent to which the visual impact would spread over the entire property
- The existing visual disturbances (i.e. existing power lines) on the properties

The range used to rate the sensitivity of the farm towards visual impacts was as follows:

- **Low visual exposure:** Turbines not particularly noticeable to the viewer. Minimal change in the surroundings

- **High & moderate visual exposure:** Turbines dominate, clearly noticeable or recognisable to the viewer. Exceptional viewer sensitivity and viewpoints associated with tourism or recreational attractions. Noticeable change in surroundings
- This is based entirely on the visual exposure as shown in Map 2 and discussed in the revised Visual Impact study submitted as part of the EIR. Ranges of distance were not used in the assessment of visual exposure as the nature of the region’s relief would result in under- or over- representation of properties.
- Consideration was made of the percentage of land within the farm cadastral that was classified as high, moderate or low visual exposure. As such, if only low percentages of the land division’s extents were classified as high/ medium/ low visual exposure, this would be reflected in the tables below.
- The nature of activity on each property was also factored in this assessment. As such, it was assumed that properties that are engaged in tourism-related activities such as hunting and accommodation solely would be more sensitive to the degree of visual exposure than those involved in mixed activity (with hunting that typically caters to biltong hunters and other domestic tourists).

For the purpose of considering potential losses to farm revenue, the following scenarios are presented, incorporating the possibilities of extreme outcomes as well as a moderate outcome. The scenarios assume different degree of change in tourist behaviour as a result of the establishment of the WEF.

Monetary values are assigned to these scenarios showing results of the estimated potential losses for tourism and game farm/hunting establishments that could occur in Table 8. It must be noted that these are based on scenario testing. Distinction is also made between farms with low visual exposure (turbines not particularly noticeable to viewers) and those with moderate (recognisable to the viewer) and high visual exposure (dominant or clearly noticeable).

Sensitivity values have been adjusted across the board by between 2% and 10% depending on the scenario and the visitor type largely as a result of the reduction in sensitivity to WEFs as a result of the presence of new WEFs in the region between 2013 and 2018.

Description	Scenario 1		Scenario 2		Scenario 3	
	Low degree of visitor sensitivity		Moderate degree of visitor sensitivity		High degree of visitor sensitivity	
Change in international tourist visitors	High & moderate visual exposure property	Low visual exposure property	High & moderate visual exposure property	Low visual exposure property	High & moderate visual exposure property	Low visual exposure property
	-8%	-4%	-30%	-15%	-50%	-25%
Change in domestic tourist visitors	High & moderate visual exposure property	Low visual exposure property	High & moderate visual exposure property	Low visual exposure property	High & moderate visual exposure property	Low visual exposure property
	-5%	-2%	-25%	-10%	-40%	-20%

Table 8: Potential estimated production losses associated with visual impacts (R' millions; 2018 prices)

Description	Scenario 1		Scenario 2		Scenario 3	
	Low degree of visitor sensitivity		Moderate degree of visitor sensitivity		High degree of visitor sensitivity	
Change in international tourist visitors	High & moderate visual exposure	Low visual exposure	High & moderate visual exposure	Low visual exposure	High & moderate visual exposure	Low visual exposure
	R1.1m	R0.5m	R4.1m	R2m	R6.8m	R3.4m
Change in domestic tourist visitors	High & moderate visual exposure	Low visual exposure	High & moderate visual exposure	Low visual exposure	High & moderate visual exposure	Low visual exposure
	R0.4m	R0.1m	R2.4m	R0.9m	R3.9m	R1.9m

As indicated in Table 8, the potential losses to the local game farm/hunting, tourism and associated industries due to the construction of the WEF could range between R 0.1 million and R 3.9 million per annum for domestic tourists and R 0.5 million and R 6.8 million for international tourists in 2018 prices. Comparatively the values from 2013 indicate that the potential losses due to the construction of the WEF are between R1,3 million and R 8,3 million (inflation adjusted to 2018) for domestic and international tourists.

Note section 5.2 and 5.3 for a comparison of these potential losses against and the anticipated economic gains of the project.

CHAPTER 5 EVALUATION OF IMPACTS AS A RESULT OF THE WEF

This chapter of the report seeks to describe and evaluate the economic and social impacts that are expected to occur as a result of the development of the Grahamstown WEF. This chapter also provides a net effect and trade off analysis of the development of the WEF in order to determine the preference of one option over another. This chapter has separated the assessment of the Grahamstown WEF into the projects three lifecycle phases namely construction, operation, decommissioning.

Due to the nature of the proposed amendments, no changes to the impact tables are expected between 2013 and 2018. The increase in value of the local spend for construction and operation as well as the new technology will not fundamentally change the impacts presented below especially with regards to magnitude, extent, duration or probability. The major changes are however, those of an economic nature and are discussed in the relevant sub-section.

5.1 DEFINING ECONOMIC IMPACTS

Economic impacts can be defined as the effects (positive or negative) on the level of economic activity in a given area(s). The net economic impact is usually measured as the expansion or contraction of an area's economy, resulting from the changes in (i.e. opening, closing, expansion or contraction of) a facility, project or programme.

5.1.1 Types of economic impacts

The net economic impact of an exogenous change in the economy will be translated according to various direct and indirect economic effects, as are defined below:

- **Direct economic impacts:** are the changes in local business activity occurring as a direct consequence of public or private activities in the economy, or public programmes and policies. Furthermore, increased user benefits lead to monetary benefits for some users and non-users (individuals and businesses) within the geographical area:
 - * For affected businesses, there may be economic efficiency benefits in terms of product cost, product quality or product availability, stemming from changes in labour market access, cost of obtaining production inputs and/or cost of supplying finished products to customers. For affected residents, benefits may include reduced costs for obtaining goods and services, increased income from selling goods and services to outsiders, and/or increased variety of work and recreational opportunities associated with greater location accessibility.
- **Indirect and induced impacts:** The direct benefits to business and the residents of communities and regions may also have broader impacts, including:
 - * Indirect business impacts – business growth for suppliers to the directly affected businesses and potential growth of municipal revenue due to raised taxes and service levies.
 - * Induced business impacts – business growth as the additional workers (created by direct and indirect economic impacts/effects) spend their income on food, clothing, shelter and other local goods and services.

5.1.2 Economic impacts considered

The direct and indirect economic impacts listed are measured according to the following broad economic variable categories:

- **Production/Business Sales:** refers to the value of all inter- and intra-sectoral business sales generated in the economy as a consequence of the introduction of an exogenous change in the economy. Explained more simply, new business sales equates to additional business turnover as a result of the introduction of an exogenous change in the economy.
- **Contribution to GDP-R:** 'Gross Domestic Product' (GDP-R) is a broader measure of the full income effect. This measure essentially reflects the sum of wage income and corporate profit generated in the study area as a result of an exogenous change in the economy.
- **Employment:** Refers to the employment resulting from the construction or operation of the project under investigation.

Using the Input/Output model methodology, various anticipated direct and indirect economic impacts of construction and operational phases of the proposed WEF have been quantified. These economic impacts have been derived using an understanding of economic cause-effect relationships. The principle of cause-effect is that for any economic action, there can be a multitude of different economic reactions (effects).

5.2 CONSTRUCTION PHASE IMPACTS

The following sections indicate the impacts that are likely to occur during the construction phase of the proposed WEF. Since the facility is expected to have both positive and negative effects in terms of the same indicator, the evaluation of impacts are grouped accordingly.

5.2.1 Positive impacts during construction

a) Temporary stimulation of the national and local economy

The most significant change to the development has been that of increased spend on the development. This is especially relevant for the local content aspect. It is likely that the project will inject a larger investment into the local economy than originally anticipated due to the amended development concept. It is also likely that the induced and indirect economic benefits will increase accordingly. This increase however, will not change the overall extent, duration, type or probability of the impact. These remain unchanged when compared to the 2013 SEIA.

The proposed Grahamstown WEF is expected to require R 1.320 billion (2018 prices) to establish during construction. Of the above-mentioned expenditure, R 952 million will be spent in the country. R125 million will be spent within the Makana Local economy, R43 million of which being allocated to local labour costs. This equates to approximately 13% of all national expenditure by the developers. An additional R177 million will be spent within the Eastern Cape Province. Aspects such as aggregate civil works for the substation and electrical infrastructure and fuel will be procured predominantly from Makana suppliers. Equipment and plant which is not available in Makhanda and other towns within the Makana region will be procured from suppliers within the province. The localised expenditure on the project will stimulate the local and national economies. The availability of materials within South Africa will dictate where inputs are sourced from and which company will be awarded the tender, with closely proximity to site and BBEE status given as preference.

As indicated in Table 9 it is estimated that the construction of the project will increase the production in the country (i.e. new business sales) by R 2.4 billion, which will translate into an additional R 838 million of Gross Domestic Product per Region (GDP-R). Besides the value added that could be generated by local construction businesses through sub-contracting agreements and employment of freelancers, the sectors that are expected to benefit the most from the production and consumption induced effects are tertiary services such as trade, accommodation, transport services, personal services, real estate, and insurance.

The values presented in Table 9 also indicate that the new 2018 figures are significantly higher than those of the 2013 (inflation adjusted) values from the original application. This indicates that the development will inject more investment into the South African economy than originally planned.

Table 9: Estimated impact on the national and local economies compared between 2013 report and 2018 proposed amendments (R' million, 2018 prices)

2018 Values			
Direct	Indirect	Induced	TOTAL
Impact on Production			
R 952,03	R 1 030,99	R 401,76	R 2 384,51
Impact on Gross Domestic Product per Region			
R 284,02	R 401,83	R 151,78	R 837,64
2013 Values (Inflation Adjusted)			
Direct	Indirect	Induced	TOTAL
Impact on Production			
R 536,30	R 599,19	R 216,58	R 1 352,08
Impact on Gross Domestic Product per Region			

R 124,44	R 209,60	R 81,86	R 415,91
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The greatest effects on production and GDP-R stimulated during construction activities will be created through the multiplier effects, specifically through a combination of production and consumption induced effects. The former refers to the impact generated along backwards linkages when the project creates demand for goods and services required for construction and subsequently stimulates the business sales of the suppliers of inputs that are required to produce these goods and services. The latter refers to the effects of household spending which is derived from an increase in salaries and wages directly and indirectly stimulated by the project’s expenditure.

Sectors and industries that will experience the greatest stimulus from these indirect and induced impacts include:

- Basic metals, structural metal products and other fabricated metal products industries
- Trade
- Insurance
- Transport services
- Electrical machinery and apparatus

<i>Nature: Temporary increase in the GDP-R and production of the national and local economies during construction</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Medium term (3)	Medium term (3)
<i>Magnitude</i>	High (8)	High (8)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	60 (High)	60 (High)
<i>Reversibility</i>	Benefit is terminated with the end of construction	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • The developer should be encouraged by the EPC contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies. • The developer should engage with local authorities and business organisations to investigate the possibility of procuring construction materials, goods and products from local suppliers were feasible. 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • A number of WEFs are proposed to be built in the municipality (Albany WEF) and province with some already constructed (Waainek WEF). This could provide sufficient economies of scale and thus open up opportunities for the establishment of new industries in the country and new businesses in the local area, specifically in the sectors that are not well represented in the economy. This has already occurred to a certain extent with the manufacturing of WEF components in the country. 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • None foreseen at this stage 		

b) Temporary increase employment in the national and local economies

The proposed amendments to the facility will likely created more Full Time Equivalent (FTE) positions during construction for the local population indicating a larger positive impact on the employment levels in the area. This increase however, will not change the overall extent, duration, type or probability of the impact. These remain unchanged when compared to the 2013

The proposed facility will create 307 Full Time Equivalent (FTE) employment positions during construction. About 87% of the employment positions involve skilled and semi-skilled construction workers, with the remaining being managers, professional engineers and supervisors. It is anticipated that 48% of the employment will be filled by people from local communities. The table below also indicates the 2013 compared to the 2018 values. The project will create more FTE positions in 2018 based on the proposed amendments compared to 2013.

Given the size of the local construction sector it is anticipated that there will be sufficient local labour to satisfy the demand for unskilled workers.

Table 10: Estimated Full Time Equivalent positions to be created during construction (2013 and 2018 values)

2018 Values			
Direct	Indirect	Induced	TOTAL
307	1 940	802	3 049
2013 Values			
Direct	Indirect	Induced	TOTAL
142	897	370	1 410

Beyond the direct employment opportunities that will be created by the project during the construction phase the development will also have a positive spin-off effect on the employment situation in other sectors of the national and local economies as shown in Table 10. Most of these positions will be in sectors such as construction, business services and trade. Given that a significant portion of the multiplier effects will be generated through backward linkages, more than half of these FTE employment positions will be created along the supply chain and amongst industries providing inputs to the businesses in the supply chain.

Based on these figures the total contribution of the project towards employment creation in South Africa is estimated at 3 049 FTE employment positions. Throughout the construction phase it is recommended that the developer encourage the EPC contractor to fill as many local positions as possible.

<i>Nature: Temporary increase in employment in local and national economies</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Magnitude</i>	High (8)	High (8)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	56 (Medium)	56 (Medium)
<i>Reversibility</i>	Benefit is terminated with the end of construction	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> Organise local community meetings to advise the local labour force about the project that is planned to be established and the employment that can potentially be applied for Establish a local skills desk (in Makhanda) to determine the potential skills that could be sourced in the area Recruit local labour as far as feasible Employ labour-intensive methods in construction where feasible 		

<ul style="list-style-type: none"> • Sub-contract to local construction companies particularly SMMEs and BBBEE compliant enterprises where possible • Use local suppliers where feasible and arrange with the local SMMEs to provide transport, catering and other services to the construction crews.
<p><i>Cumulative impacts:</i></p> <ul style="list-style-type: none"> • None foreseen given the nature of employment
<p><i>Residual Impacts:</i></p> <ul style="list-style-type: none"> • Experience in building Wind Energy facilities

c) Contribution to skills development in the country and local economy

The construction of the proposed Grahamstown WEF is likely to have a positive impact on skills development in South Africa, particularly given the limited number of such facilities currently operating in the country. Since there are a limited number of operational wind energy facilities in South Africa, the local expertise in the construction of such facilities is very limited. During the turbine component assembly and tower manufacturing period which is included as part of the construction phase and is planned to be conducted in the Eastern Cape, it is likely that foreign technical experts will be involved. This will present an opportunity for skills and knowledge transfer between these technical experts and local manufactures.

It is also expected that the construction crew involved in the project will gain knowledge and experience in respect of the development of wind energy facilities. This will be highly beneficial, given South Africa’s target of generating 9 200 MW from wind energy by 2030 (Department Energy, 2011).

In addition to the direct effects of the project on skills development in the country and the local economy, the project could contribute to the development of the local R&D and manufacturing industries associated with wind technology. This could be achieved through partnerships with Rhodes University (situated in the Makana Local Municipality) or the Nelson Mandela University (NMU) in Port Elizabeth. Partnerships of this nature could further enhance the development of new skills and expertise.

<i>Nature: Contribution to skills development in the country and in the local economy</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Medium term (3)	Medium term (3)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Probable (3)	Highly Probable (4)
<i>Significance</i>	39 (Medium)	52 (Medium)
<i>Reversibility</i>	Yes, skills can be lost if not practiced	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases • Set up apprenticeship programmes to build onto existing skill levels or develop new skills amongst construction workers especially those from local communities 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • Improved labour productivity and employability of construction workers for similar projects • Possible development of local skills and expertise in R&D and manufacturing industries related to wind technology through partnerships with Rhodes University and NMU 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • South Africa’s human capital development 		

d) Temporary increase in household earnings

The proposed amendments to the facility will likely increase the earnings during construction for those directly employed to construct the facility, as compared to the 2013 SEIA forecasts. This increase, however, will not change the overall extent, duration, type or probability of the impact. These remain unchanged when compared to the 2013 report.

The proposed WEF will create a total of 3 049 FTE employment positions during construction generating R 1.9 billion of revenue for the affected households in the country through direct, indirect and induced effects. Of this figure R 480 million will be paid out in the form of salaries and wages to those individuals directly employed during the construction phase. The remaining R 1.4 billion million in households' earnings will be generated through indirect and induced effects resulting from project expenditure.

Although temporary, this increase in household earnings will have a positive effect on the standard of living these households. This is especially applicable to the households benefiting from the project that reside in the Makana Local Municipality. The proposed amendments to the project will increase the overall earnings per household for those employed by the facility for the duration of the construction. This is largely as a result of the increased number of FTE positions that have been added by the proposed amendments between 2013 and 2018.

<i>Nature: Temporary improvement of the standard of living of the positively affected households</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	36 (Medium)	36 (Medium)
<i>Reversibility</i>	Benefit is terminated with the end of construction	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Recruit local labour as far as feasible to increase the benefits to the local households • Employ labour intensive methods in construction where feasible • Sub-contract to local construction companies where possible • Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • Improved standard of living of the affected households 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • Possible increase of households' saving accounts 		

e) Temporary increase in government revenue

The investment in the Grahamstown WEF will generate revenue for the government during the construction period through a combination of personal income tax, VAT, companies' tax etc. Government earnings will be distributed by national government to cover public spending which includes amongst others the provision and maintenance of transport infrastructure, health and education services as well as other public goods.

<i>Nature: Temporary increase in government revenue</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Short-term (2)	Short-term (2)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	40 (Medium)	40 (Medium)
<i>Reversibility</i>	Benefit is terminated with the end of construction	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • None suggested 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • Lower government debt and servicing costs 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • None envisioned 		

5.2.2 Negative impacts during construction

a) Negative changes to the sense of place

A community's sense of place is developed over time as it embraces the surrounding environment, becomes familiar with its physical properties and creates its own history. The sense of place is created through the interaction of a number of different factors such as the area's visual resources, its aesthetics, climate, culture and heritage as well as the lifestyle of individuals that live in and visit the area. Most importantly, it is a highly subjective matter and dependent on the demographics of the population that resides in the area and their perceptions regarding trade-offs.

For example, a community living in poverty is generally more likely to be accepting of industrial development that promises employment opportunities, while a more affluent residential area is more likely to oppose such a development on the grounds that the development is not likely to generate gains for the community.

The area proposed for the development as well as its surrounds does not currently have any large-scale industries or high-rise buildings. Noise and light intrusion during the night in the area is also very low. Given the above characteristics the area can be defined as being largely rural. Any rapid changes that alter the characteristics that define the areas sense of place could potentially have a negative impact.

It is important to note that noise in this discussion refers to the construction period of the project and does not refer to the operation phase of the WEF. During the construction of the proposed WEF there are likely to be noise impacts caused by the movement of vehicles, as well as construction activities on site. These impacts are anticipated to occur primarily during the day with illumination from the site being experienced during the night. The presence of this noise is likely to alter the way the surrounding environment is experienced by households in the area.

It is worth noting' however, that as the site is located adjacent to the N2 road, which is characterised by relatively high levels of traffic compared to other national roads, and which therefore in itself generates notable levels of noise pollution as it stands. This road has also recently experienced redevelopment, and increased construction traffic has been experienced on the road. This could mean that the noise generated by construction activities may possibly exacerbate the current situation, or not be noticed at all as a result

of high levels of ambient noise. Such issues are discussed in the Environmental Impact Report prepared by EOH CES for Plan 8 infinite energy and fall outside the scope of this assessment.

Visual impacts associated with the sense of place will initially be very limited, as the site will only be visible to a few individuals in the early stages of construction. In the early stages of construction, the equipment, machinery and changes to the site will not be visible from a distance as road building and digging of foundations will take place at this stage. As construction activities progress and the footprint of the facility grows, the visual impact will also become more apparent and the sense of place experienced by households residing within the visually affected area will altered further. This will happen when the towers, nacelles and blades are being erected. While it is recognised that much of the local natural environment has been transformed by agricultural activities in the past, some farms that are involved in tourism-related activities have undertaken activities to rehabilitate the land. As such, the sense of place in some properties will be a notable factor while this will be less of a concern on other properties.

It is anticipated that households residing on the farms on which wind turbines are proposed to be established will experience the greatest disruption in their sense of place during the construction period. Individuals living on the properties, as well as tourists to the area staying in hospitality facilities, will over the course of the construction phase of the project be subjected to either visual or noise disruptions that are currently not present in the area.

The sense of place at the farms located adjacent to or beyond the site of the proposed WEF will also be affected to some extent. The visual exposure on all these farms during the construction phase will not be continuous, given the proximity of some of the farms to the proposed WEF. Nevertheless, the knowledge of the facility near the farm and the fact that it could be seen from some parts will still have a negative connotation and will alter the sense of place experienced by the households residing on these farms. This, however, may be limited as a result of the presence of other WEFs in the Eastern Cape as well as WEFs located within Makana Municipality itself (Waainek WEF near Makhanda).

It is important to provide a caveat that some households in the affected area may consider the changes to the area’s sense of place during construction as positive. Such sentiments may emanate from perceptions about the construction project facilitating a shift towards a greener or more sustainable future (through increased use of renewable energy production).

It is also important to note that only construction aspects of the sense of place will cease once construction is over at the site. It is likely that the sense of place change as a result of the construction will continue into the operation of the facility (these impacts discussed in the sub-section below).

<i>Nature: Impact on the sense of place experienced by the local community as a result of visual and noise effects that appear during the construction phase</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Site surrounding area (2)	Affected site (1)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Magnitude</i>	High (8)	High (8)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	48 (Medium)	44 (Medium)
<i>Reversibility</i>	Possible to reverse but only with decommissioning	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No

Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> The mitigation measures proposed by the visual and noise specialists should be adhered to Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during construction 		
Cumulative impacts:		
<ul style="list-style-type: none"> Change in perception of the area due to the construction of other wind turbine developments in the surrounding area albeit temporarily 		
Residual Impacts:		
<ul style="list-style-type: none"> Altered characteristics of the environment Change in the perception of tourists of the local environment 		

b) Negative impact on the local tourism, game industry and associated industries

As indicated earlier the increased noise as well as the visual disturbance generated by the construction phase of the development will affect residents’ sense of place. This, however, will not only affect the people that live in the area but also alter the experience of any international and domestic tourists that visit the area.

Changes in the perceptions of the aesthetics of the surrounding environment by tourists visiting the potentially affected game farm/hunting establishments are likely to increase as construction progresses. The construction activity is, however, likely to impact their experience and perceptions of the destination, which could have an impact on both their decision to revisit the area in future as well as their recommendations that they provide to other potential tourists. Thus, the majority of the negative effect of the facility on the tourism industry is likely to be captured during the operation phase of the project.

<i>Nature: Impact on the local tourism and game farm/hunting industry that ensue during the construction phase as a result of noise and visual effects</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economies (3)	Site surrounding area (2)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	52 (Medium)	30 (Low)
<i>Reversibility</i>	Possible to reverse with decommissioning	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> Mitigation proposed by the visual specialists should be implemented during the beginning of the construction period to screen off visual disturbances as soon into the development phase as feasible Heavy vehicles travelling on secondary roads should adhere to low speed limits to minimise noise and dust pollution If feasible, no construction activities should be carried out during weekends and outside daytime working hours 		
Cumulative impacts:		
<ul style="list-style-type: none"> Reduction in the number of tourists visiting the area due to the construction of other wind turbine developments in the surrounding area albeit temporarily 		
Residual Impacts:		
<ul style="list-style-type: none"> Visual impacts cannot be eliminated due to the height of the turbines thus the local industry could still experience some losses Perceptions of international tourists regarding the area’s representation as “Wild Africa” would change due to the development as well as similar developments proposed for other parts of the Makana Local Municipality 		

c) Temporary increase in social conflicts associated with the influx of people

The Makana economy is not sufficiently diversified to supply the entire workforce for the construction of the proposed WEF, particularly in terms of skilled positions. A significant number of the unskilled and semi-skilled workers required during the construction phase will however, be sourced locally. It is estimated that up to 48% of employment that will be created during the construction phase could be filled by labour coming from the local municipality. Migrant workers will therefore comprise just over half of the total work force, equating to approximately 161 highly-skilled, skilled and semi-skilled workers.

The migration of people to the area is not likely to result in social conflicts between the local population, and the migrant work force from the local population perceiving the migrant workers as “stealing” their employment opportunities. Given the low reliance on labour sourced externally, the potential of the influx of people into the area leading to a temporary increase in level of crime, illicit activity and possibly a deterioration of the health of the local community through the spread of infectious diseases is low. Semi-skilled and unskilled construction workers are unlikely to choose to remain in the area following the completion of the construction phase given the rural nature of the project site (with limited human settlements in the surrounding area). The risk of such individuals exacerbating the level of poverty within the Makana Local Municipality from living in the area without a source of income is thus low.

The influx of employment seekers and the potential social conflicts that can arise with in-migration of temporary workers to an area is difficult to mitigate. Plan 8 Infinite Energy has indicated that appropriate awareness campaigns and strict adherence to recruiting practices will be employed to reduce the possibility of adverse effects such as stock theft, incidents of trespassing and littering.

During the construction phase none of the workforce (excluding security personnel) will live on site as they will be transported on a daily basis from Makhanda. Access control will restrict access to the construction site. Furthermore, a community liaison officer (approved by the Makana Local Municipality) will be appointed prior to the commencement of the construction.

Addressing the challenges related to potential social impacts is best done in partnership with all stakeholders in the area, specifically the affected and adjacent property owners, local communities, ward communities and municipalities. This would promote transparency, information sharing and help build good relationships between all affected parties. In addition, all opportunities that would could include the community in the project should be explored and where possible implemented. Employment opportunities, including the provision of ancillary services, are particularly relevant in this incidence as the creation of employment opportunities for locals could eliminate the potential alienation between the community and the project as well as migrant workers.

While the updated development concept will increase the number of employees on the site as compared to the 2013 forecasts, it is unlikely that the increase will be significant enough to change the overall extent, magnitude and probability of this impact.

<i>Nature: Temporary increase in social conflicts associated with the influx of construction workers and employment seekers to the area</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Surrounding areas (2)	Affected site (1)
<i>Duration</i>	Short term (2)	Very short term (1)

<i>Magnitude</i>	Low (6)	Small (4)
<i>Probability</i>	Probable (3)	Very improbable (1)
<i>Significance</i>	30 (Medium)	6 (Low)
<i>Reversibility</i>	Reversibility within a short period	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	Yes	Yes
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Adhere to strict labour recruitment practices that would reduce the desire of potential employment seekers to loiter around the properties in the hope of finding temporary employment • Control the movement of workers between the site and areas of residence to minimise loitering around the facility. This should be achieved through the provision of scheduled transportation services between the construction site and area of residence • Employ locals as far as feasible through the creation of a local skills database • Establish a management forum comprising key stakeholders to monitor and identify potential problems that may arise due to the influx of employment seekers to the area • Ensure that any damages or losses to nearby affected farms that can be linked to the conduct of construction workers are adequately reimbursed • Assign a dedicated person to deal with complaints and concerns of affected parties 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • None foreseen 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • Contribution towards social conflicts in the area by construction workers and employment seekers who decide to stay in the area after construction is complete and who are unable to find a sustainable income 		

d) Impact on economic and social infrastructure

Given that migrant workers will require accommodation and other services there is likely to be an increase in the demand for rental accommodation, social services and access to water and electricity. Local workers may also be required to be accommodated overnight on the site in temporary accommodation during the construction phase of the project

According to the Makana Local Municipality’s IDP (2017) the municipality has a number of clinics and hospitals situated throughout its municipal area.

The effects of the project on road infrastructure should also be considered, as it is highly likely that the development will lead to an increase in traffic volumes in surrounding areas. This could lead to a deterioration of local road conditions which could place additional financial burden on the Makana Local municipality through additional maintenance costs. This may add additional operating costs to farmers in the area due to delays in deliveries and damage to vehicles.

Potential damage to roads will be reduced as a result of

- The site being adjacent to the N2 national road. This reduces the need to travel on by-, farm-, arterial- or secondary-roads that are typically constructed to inferior design specification to those of the N2 road
- The EPC contractor will construct additional roads within the site for access within the site

Based on the above discussion it is expected that the housing and accommodation situation, basic service provision, health facilities and road infrastructure will be under additional strain during the construction period. Given that the project is anticipated to attract additional people to the area the significance of the

impact is considered to be medium. These impacts can however, be mitigated if the developer engages with the local municipalities and plans accordingly.

<i>Nature: Added pressure on economic and social infrastructure during construction as a result of increase in local traffic and in migration of construction workers</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Surrounding areas (2)	Surrounding areas (2)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Magnitude</i>	Moderate (4)	Minor (2)
<i>Probability</i>	Probable (4)	Probable (3)
<i>Significance</i>	32 (Medium)	18 (Low)
<i>Reversibility</i>	Reversible within a short period	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> None foreseen due to the temporal nature of the construction phase 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> None foreseen at this stage 		

e) Impact on real estate dynamics and business activity in the immediately affected area

During the scoping phase of the project the local community expressed concern that the visual impact and the proximity of the farms to the proposed sites could negatively impact land values in the area. This report does not attempt to quantify potential positive and negative impacts on property values resulting from the proposed investment. This report rather makes reference to previous studies of a similar nature in order to provide perspective on factors to consider.

In general, any development associated with some negative environmental effects can influence property values in two primary ways:

- Firstly, it can reduce the value of the land if the proposed development has a negative image associated with it. This could be related to the real or perceived adverse effects that the proposed development could have on ability to conduct business, air quality, noise levels, aesthetics, traffic congestion, health, and crime levels in the area.
- Secondly, the development could increase the demand for surrounding properties and lead to a rise in the area’s property values. This could occur in situations where nearby properties are found to carry valuable marketable natural resources.

Impact on real estate dynamics

The value of a commercial agricultural property can be determined using a “going concern value” method which refers to a real estate value, personal property value and a business enterprise value. The former two refer to physical assets or property values, whilst the latter refers to the value of the income derived from a business and its goodwill or other intangible assets. An investigation into the potential effects of these parameters could shed some light onto the potential effects of the proposed project on the property value

of the land in the area.

Given the recency of the development of WEFs in South Africa and the lack of suitable time to assess the impact of these facilities on property values there are very little data available. There are also no known domestic studies that investigate the impact of WEFs on property prices. Several international studies however, have been conducted but many of these studies reveal conflicting results.

For example, a study undertaken by British Wind Energy Association (BEWA) (now known as RenewableUK) in Cornwall in the United Kingdom, indicates that most estate agents (60% of 405 respondents) agreed that there was a detrimental effect on property value in close proximity to or within visibility of a WEF (Dent and Sims, 2007). This study, however, also suggested that since most negative responses were acquired during the planning stages, these concerns are most likely the result of uncertainty or fear of a wind farm being constructed nearby and that concerns would lessen with time (Dent and Sims, 2007).

On the contrary, other studies have demonstrated that the establishment of WEFs have no impacts on property and house values. This was evident in an American study, which examined 24 300 property transactions at ten locations over a six-year period, and which found no evidence that wind turbines within an eight-kilometre radius had a negative impact on property values (Sterzinger, Beck & Kostiuk, 2003). Alternatively, some of the property values rose above the regional average, suggesting that perhaps close proximity to wind turbines (within 10 miles or 16 kilometres) can actually increase residential property values.

Another study conducted by the New South Wales Valuer General (Duponts, 2009) also sought to determine the impact that WEFs have on the surrounding land value in Australia. The main finding of the study was that WEFs, in most cases, did not appear to have negatively affected property values in the analysed areas. Of the 45 sales investigated, 40 did not show any reduction in value, while only five properties were found to have lower than expected sale prices (Duponts, 2009).

The results from rural residential properties (known as 'lifestyle properties') were more mixed. A relatively small number of these properties located very close (less than 500 metres) to WEFs were found to have lower than expected sales prices (based on statistical analysis), and it is possible that audio and visual aspects of WEFs contributed to this phenomenon (Duponts, 2009). Property values alongside these locations however, also appeared not to have been affected.

Furthermore, landowners can also potentially benefit from the presence of WEFs on their land. Wind energy companies provide an annual fee for the use of the land (CanWEA, 2006; Wasatch Wind, 2011) and, since only a small percentage of the land is used for wind turbines, existing land use (such as farming, recreation, ranching) can continue. This thereby increases the landowners' revenue without materially impacting the existing land use. This, however, only applies for the owners of the land on which the turbines will be located, and owners of land adjacent to the turbines may experience disbenefits.

Impact on business enterprise activity

Business enterprise value is determined by goodwill and income derived by the business at the time of the transaction. Goodwill, as an intangible asset, is extremely difficult to quantify as it refers to factors such as management style, customer loyalty, brand recognition, etc. Income on the other hand is easier to assess as it includes all revenue derived by the activity using the combination of the capital and labour resources.

Among the major types of businesses that exist within the visually affected environment of the proposed Plan 8 Infinite Energy Grahamstown WEF are conventional farming (crops and livestock), game farm/hunting and eco-tourism.

It is anticipated that, in respect of existing conventional farming operations, the proposed project will not affect the goodwill or the productivity of the land and thus the revenue derived from farming. The effects of the proposed project on the business value of conventional farming are therefore expected to be marginal if not non-existent. The situation with game farm/hunting and eco-tourism though is expected to be different.

As mentioned earlier in this report the changes in the aesthetics and visual resource of the environment as a result of the WEF development are expected to have a negative impact on the number of international and domestic tourists of the nearby game farm/hunting and eco-tourism establishments, albeit to a different extent. Many of these tourists are repeat visitors, meaning that the proposed activity could potentially diminish the client lists of both the game farm/hunting and eco-tourism establishments, thereby diminishing their goodwill component. Furthermore, it will have an impact on the revenue derived by game farm/hunting and eco-tourism businesses. A key determinant of business value is the ability of its assets (both fixed and current) to generate revenue in the future. As such, any factors that impair this ability may negatively affect business valuation. In this case, the possibility of a reduced capability to generate revenue from hunting and related activities exists. The business enterprise values of nearby game farm/hunting and eco-tourism establishments could thus be reduced because of the proposed project.

It is also worth noting that the extent of such a reduction in business values would be for the entire local municipality rather than just for the site around the affected area. This is because of the value chains which exist in the local hunting-based tourism sector in the Makana region. As such, hunting activities are thus interrelated with business values of taxidermists, freight forwarders, transporters, and booking agencies. These mean that small changes in tourist visitor numbers to the region would have far-reaching effects on the local economy of Makhanda.

Given the visual exposure of the proposed WEF from different game farm/hunting and eco-tourism establishments in the area, and estimated losses in revenue derived from international and domestic tourist by these facilities, the following can be suggested:

- Game farm/hunting establishments that cater to mostly international tourists and are in the immediate vicinity of the development could potentially experience the largest decrease in existing business enterprise value relative to their current values. These farms could potentially lose up to 50% of their revenue.
- Game farm/hunting establishments that cater to mostly domestic tourist could potentially lose up to 40% of their revenue.

It is critical to note, as indicated earlier, that revenue from game farming/hunting and eco-tourism establishments has been estimated based on total tourist numbers visiting the respective farms as well as the reported average spend by tourists as quoted by survey respondents. Total revenue, as utilised in this calculation, is therefore a function of tourist numbers and does not fully incorporate other sources of income. The decline in tourism numbers therefore has a disproportionately high impact on the revenue changes indicated above than would be the case if other sources of income were considered.

Given the combination of the possible effects of the proposed project on property prices and the income of businesses the following can be envisaged:

- The value of crop and stock farms located in the area could be negatively affected by the proposed activity. In the likelihood of this happening the impact would most likely be small and short-lived.

It is important to note that this assessment is based on a combination of two factors: real estate value and business enterprise value. The literature discussed in this section refers more to real estate values than business enterprise values (which are based on survey feedback and engagements with various stakeholders. This is thus reflected in the assessment presented in this section.

<i>Nature: Impact on real estate dynamics and business activity in the immediately affected area</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local Economies (3)	Local Economies (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Highly Probable (4)	Probable (3)
<i>Significance</i>	60 (High)	39 (Medium)
<i>Reversibility</i>	Reversible with decommissioning of the facility	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	Yes	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • The developer should offer some form of an agreement, incentive, or property value guarantee to the nearby farms to offset potential losses in property values provided they are proven to result from the establishment of the facility in the area. The nature and conditions of such agreements should be negotiated with the affected landowners and should be acceptable by both parties • Mitigation measures to reduce the impact on the sense of place should also be implemented 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • May be present as other similar projects are proposed within the region 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • Perceptions associated with the effect of industrial type developments on aesthetics and landscape of the natural environment cannot be entirely eliminated, thus some potential buyers might still reserve themselves from buying a property in the area 		

5.3 OPERATIONAL PHASE IMPACTS

The following section describes the impact that the proposed wind energy facility will have once it is operational. According to the project plan, the facility is expected to be fully operational by 2022. The facility is envisaged to have a lifespan of approximately 20 years, which means that the impacts observed during this phase, regardless of whether the impacts are positive or negative, will be long-lasting. All data presented in this section should be interpreted as annual figures at 2018 prices.

5.3.1 Positive impacts during operations

a) Sustainable increase in production and GDP-R nationally and locally

The most notable updates compared between 2013 and 2018 were largely in the construction phase of the development. There is a smaller but significant change between the operational costs between the two periods. This increase, however, will not change the overall extent, duration, type or probability of the impact. These remain unchanged when compared to the 2013 report.

The proposed facility will generate approximately R230.29 million in revenue annually and will require annual operational expenditure of R 16.14 million, of which approximately R 9.4 million (R 7.6 million 2013 inflation adjusted) will be spent locally in the country on an annual basis. The total impact on production in the country as a result of the project's operations will equate to R 20.65 million (R 17.4 million 2013 inflation adjusted) per annum in 2018 prices. Of the R20.65 million in production generated it is anticipated that with local expenditure related to the annual spending on labour and procurement of local goods and services, new business sales within Makana Local Municipality will increase by R10 million (R 8.9 million 2013 inflation adjusted) on an annual basis, over and above current business sales. Aside from the utilities sector, industries that will experience the greatest stimulus from the project on a national scale will include the transport and transport equipment industries, chemical and chemical product industries as well as the trade and business services industries.

Through indirect and induced effects brought on by this injection to the local and national economy, a total of R 9.1 million (R 7.6 million 2013 inflation adjusted) of GDP-R will be generated per annum from the project within the whole of South Africa. A total of R 4.3 million (R 4 million 2013 inflation adjusted) in value add will be generated in the Makana Local Municipality alone. The production- and consumption-induced multiplier effects of the project are considered to be relatively small compared to conventional electricity generating industries. This is due to the energy source used to produce electricity by the proposed wind energy facility is free, unlike conventional power stations where raw inputs (i.e. coal) and the transport thereof comprise a significant portion of operating expenditure. It is for this reason that such a facility is a highly attractive business venture.

The proposed amendments to the original application will have a small but significant increase in the values presented in 2013. This indicates that the change in technology is likely to increase the economy even more than was originally anticipated in 2013.

<i>Nature: Sustainable increase in production and GDP-R nationally and locally</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	52 (Medium)	52 (Medium)
<i>Reversibility</i>	Benefits are sustained only over project's lifespan	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> The operator of the wind energy facility should be encouraged to, as far as possible, procure materials, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Improved energy supply in the country Reduced carbon emissions in generation of electricity If other wind energy facilities proposed to be established in the Eastern Cape are approved, together with the Plan 8 project, sufficient economies of scale could be created to establish new businesses in the local economies. These businesses could then supply the goods and services required for the operation and maintenance of the facility than cannot currently be procured in the area. This would contribute to the local economies' growth and development 		
<i>Residual Impacts:</i>		

- None foreseen at this stage

b) Creation of sustainable employment positions nationally and locally

The proposed facility is anticipated to create new 36 permanent employment positions once fully operational throughout the country. This figure includes approximately 8-10 direct employment opportunities on site, translating into the creation of a total of 26 new employment positions within Makana Local Municipality. Of the direct employment positions created, 20% to 40% will be semi-skilled and unskilled labourers, the remainder being skilled and highly skilled. The skilled positions will comprise facilities managers, technicians and environmental engineers. Unskilled and low skilled staff will include positions such as security personnel.

Due to the spatial allocation of procurement spending and direct employment created, most of the indirect and induced positions will also be created within the local Makana area. The trade, agriculture and community and personal services sectors will benefit the most from these new employment opportunities.

Unlike the construction phase impacts, this is unlikely to change with the proposed amendments when compared with the original report in 2013.

<i>Nature: Creation of sustainable employment positions nationally and locally</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	52 (Medium)	52 (Medium)
<i>Reversibility</i>	Benefits are sustained only over project's lifespan	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> • Where possible, local labour should be considered for employment so as to increase the positive impact on the local economy • As far as possible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> • Improved living standards of the directly and indirectly affected households 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> • Experience in operating and maintaining a wind energy facility 		

c) Skills development of permanently employed workers

It is likely that the majority of the highly and semi-skilled employees required for the operation of the facility will likely to be recruited from larger Metropolitan areas and trained by the manufacturer. These employees will undertake a variety of maintenance activities throughout the lifetime of the turbines. A maintenance schedule usually involves an initial inspection after commissioning, semi-annual inspection, an annual inspection and two- and five-year inspections but this varies according to the turbine. Typical activities during maintenance include changing of oil, replacement of brake lining and cleaning of components. The continual development of these employees will add valuable skills to the municipality which is in desperate need throughout the country.

<i>Nature: Skills development of permanently employed workers</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economy (3)	Local economy (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Highly probable (4)	Definite (5)
<i>Significance</i>	44 (Medium)	55 (Medium)
<i>Reversibility</i>	Yes, skills can be lost in not practiced	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> The developer should consider establishing vocational training programmes for the local labour force to promote the development of skills required by the wind energy facility and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Development of new skills and expertise in the country to support the development of the wind energy industry 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> Human capital development of the affected workers 		

d) Improved standards of living for benefiting household

The creation of approximately 36 FTE positions throughout the country will generate about R 7.1 million of personal income (2018 prices), which will be sustained for the entire duration of the project's lifespan. The sustainable income generated as a result of the project's operation will positively affect the standard of living of all benefitting households. This is specifically applicable to the Makana Municipality, as the average income per employee at the facility would far exceed the average household income within the region currently. In Makana Local Municipality alone it is anticipated that total worker income to the region will increase by R 4.4 million on an annual basis.

<i>Nature: Improved standard of living for benefiting households</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economy (3)	Local economy (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Moderate (6)	Moderate (6)
<i>Probability</i>	Probable (4)	Probable
<i>Significance</i>	52 (Medium)	52 (Medium)
<i>Reversibility</i>	Benefits are sustainable only over project's lifespan	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy As far as feasible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Improved productivity of workers Improved health and living conditions of the affected households 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> None foreseen at this stage 		

e) Sustainable increase in national and local government revenue

The annual operation and related expenditure of the proposed facility will, through property taxes, salaries and wage payments (PAYE), contribute towards both local and national government revenue in the form of a variety of tax payments i.e. to SARS and to the Local Municipality.

At a local level the project will contribute to local government through payments for utilities used in the operation of the facility. It will also increase its revenue through an increase in property taxes compared to the current levels. The land where the proposed facility is to be established is currently zoned for agricultural purposes and is used for low intensive agricultural activities. In order for the facility to proceed it is likely that the affected properties will have to be rezoned from agriculture to special purpose. This change in zoning is also likely to lead to an increase in the existing property tariff given that under the current tariff regime properties zoned for farming pay the lowest tariff rate. The increased tariff will, however, not adversely affect existing landowners, as any additional tariff brought about by the development will be borne by the developer.

Given that the Makana Local Municipality has a relatively small economy, and judging by the rates income derived by the municipalities (Makana IDP, 2018), the municipality would benefit significantly from any increase in rates revenue derived from zoning changes. This money generated can in turn be used by Makana to fund poverty alleviation and other social upliftment projects at their discretion.

On a national level, the revenue derived by the project during its operations, as well as the payment of salaries and wages to permanent employees, will contribute to the national fiscus. Although it is impossible to trace exactly how such revenue is allocated, any additional revenue generated means that national governments can increase its spending on public goods and services.

<i>Nature: Sustainable increase in national and local government revenue</i>		
	Without mitigation	With mitigation
<i>Extent</i>	National (4)	National (4)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Low (4)	Low (4)
<i>Probability</i>	Highly probable (4)	Highly probable (4)
<i>Significance</i>	48 (Medium)	48 (Medium)
<i>Reversibility</i>	Benefits are sustained only over project's lifespan	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	No	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> None suggested 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Possible improvement in local service delivery 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> None foreseen at this stage 		

f) Local economic and social development benefits derived from the project's operations

The proposed Plan 8 Wind Energy Facility will make a notable contribution to poverty and social and community development in the area. It is anticipated that a Community Trust will be established and funded through income generated by the development. Members of this trust will be both previously disadvantaged individuals and those living close to the proposed facility. This entity will share in profits derived by the proposed project and will thus benefit financially from its activities. Government prescribes

that between 1% and 1.5% of the revenue derived by a project should be allocated towards the needs of the community (Tait, 2012). However, the intention of the developers is to contribute between 2% and 5% to such initiatives. Thus, the Community Trust’s share of the project revenue can subsequently be utilised for local social development projects. This represents extensive funding to uplift rural communities and is to be coupled with a high degree of accountability from the Department of Energy.

Furthermore, the Community Trust will be engaged in numerous local welfare projects and community development initiatives that will be directed at uplifting local people and improving their standards of living.

<i>Nature: Local community and social development benefits derived from the project’s operations</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economies (3)	Local economies (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	Moderate (6)	High (8)
<i>Probability</i>	Definite (5)	Definite (5)
<i>Significance</i>	65 (High)	75 (High)
<i>Reversibility</i>	Benefits could stretch beyond project’s lifespan	
<i>Status (positive or negative)</i>	Positive	Positive
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes (enhanced)	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> The Community Needs analysis and Assessment Report programmes and projects should be supported throughout the project’s lifespan This plan should constantly be refined in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits. These plans should be reviewed on an annual basis and, where necessary, updated When identifying enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises In devising the programmes to be implemented through the Community Trust allocations, the developer should take into account all updates to the Makana’s Integrated Development Plans and Local Economic Development Strategies. 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Declining levels of poverty in Makana Local Municipality. Improved standards of living of the members of the Community Trust and households that benefit from the trusts programmes Possible improvements in access to services and status of local infrastructure 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> None foreseen at this stage 		

5.3.2 Negative impacts during operations

a) Negative changes to the sense of place

The effects on the community’s sense of place will initially be felt during the construction period and will continue into the operational phase. 68% of respondents to the survey indicated that they had concerns about negative changes to the area’s sense of place (in relation to its function as a tourism destination).

This must however, be counterbalanced by the fact that the operation of the facility may be seen by other members of the wider community as contributing positively towards a more sustainable or ‘green’ future through an increase in the use of renewable energy sources. Such positive sentiment may in itself create opportunities for tourism (e.g. educational tours by schools from the area).

It is important to note that the surveys conducted in 2018 indicated that 38% of the respondents were not in favour of the WEF because of the change in sense of place. This is notably lower than the previous survey conducted in 2013 which had 50% of the respondents with negative feedback. This indicates a generally more favourable view towards the development by respondents.

<i>Nature: Impact on the sense of place experienced by the local community as a result of visual and noise effects that appear during the operation phase</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Site surrounding area (2)	Site surrounding area (2)
<i>Duration</i>	Long Term (4)	Long Term (4)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Definite (5)	Highly probable (4)
<i>Significance</i>	70 (Medium)	48 (Medium)
<i>Reversibility</i>	Possible to reverse but only with decommissioning	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> The mitigation measures proposed by the visual and noise specialists should be adhered to Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during construction 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Change in perception of the area due to the operation of other wind turbine developments in the surrounding area 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> Altered characteristics of the environment Change in the perception of tourists of the local environment 		

b) Negative impact on local tourism, game farm/hunting and associated industries

The negative effects on the local tourism and game farming industry are expected to be created during the construction phase of the development. Such negative impacts are expected to ensue as a result of noise and most importantly visual disturbance, which will alter the natural and cultural landscape features of the environment and subsequently the experience of visitors to local tourism destinations and game farms. The full extent of the negative impact will, however, most probably be achieved during the operational phase of the project when the word about the proximity of the project to local game farms spread amongst potential tourists and repeat visitors.

Proposals for WEF developments commonly receive resistance from the tourism and game farming/hunting industry, who believe such developments are likely to adversely affect the tourism potential of an area. Several issues are raised by these stakeholders including the visual impact of the wind turbines on the scenery; the cumulative effect of providing bad publicity to an area; and the detrimental effects on birds and other wildlife (especially for companies offering outdoor activities) (NFO WorldGroup, 2003). The visual impact of WEFs causes the greatest concern for local tourist companies – especially in countries known for their natural environment (NFO System Three, 2002). Tourism companies, who in addition to being concerned about the actual turbines, also express concern about additional infrastructure linked to the proposed WEF i.e. roads and cabling (NFO System Three, 2002). This supporting infrastructure is also seen as having a negative visual affect. A number of these concerned tourism stakeholders however, believe that these adverse visual impacts can be mitigated through having WEFs “sensitively sited” so as to avoid important tourism sites (NFO System Three, 2002).

People have also expressed positive perceptions about WEF development within their area. Some studies have suggested that WEFs themselves can actually act as tourism attractions in themselves and can increase “green tourism” in the area (AusWEA, 2003; NFO WorldGroup, 2003; BWEA, 2006; CanWEA, 2008). Another survey found that WEFs can have a positive effect on tourism by enhancing the reputation of a region or country as an environmentally friendly destination (NFO System Three, 2002). In addition, WEFs can also bring temporary visitors and possibly create access to more remote areas thereby providing some revenue to these areas (NFO System Three, 2002; NFO WorldGroup, 2003).

Determining how WEFs directly affect the tourism industry is therefore very difficult, and thus many authors and organisations are of the opinion that it is not possible to draw conclusions. As a result, many surveys have been conducted with tourists to determine how the sight of WEFs affected their visit to the area. It should be noted that most of these surveys bear out the finding that a significant number of tourists (between 70% and 91%) are not overly concerned by the presence of WEFs (NFO System Three, 2002; NFO WorldGroup, 2003; BWEA, 2006). No studies that look specifically at the impact of WEFs on hunting-based tourism (as found in the Makana area) in a South African context have been undertaken, however.

Besides direct effects, business activities generate production- and consumption-induced effects. Any decline in business sales would, then, lead to a decrease in demand through backward linkages that stimulate production-induced impacts. This could potentially stimulate a decline in the consumption effect through salaries and wages earned by employees. It is estimated that every R 1 spent in the game farming industry R 1.02 of new business sales are created elsewhere in the economy through both indirect and induced impacts. The production multiplier for the tourism industry is estimated at R 1.96 for every R 1.00 spent by domestic tourists, and R 1.90 for every R 1.00 spent by international tourists (Saayman, Saayaman & Naude, 2000).

The potential losses to the local tourism and taxidermy industry need to be considered as part of the proposed WEF development. Since one of the drivers of these losses could be the altered aesthetics and visual resources of the area, mitigation of this impact should be focused on addressing these aspects (i.e. the focus should be on the cause rather than the effect). This means that mitigation measures to reduce the potential impact on the local tourism and associated industries would need to comprise the measures suggested by the visual specialists.

It should be acknowledged that it will not be possible to mitigate all visual impacts, given the size and extent of the development. In certain cases, the developer should engage with the owner of the affected farm to find a solution that is acceptable to both parties.

<i>Nature: Impact on the local tourism, game farm/hunting industry and associated activities due to the altered visual and aesthetic environment experienced during the operational phase</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economies (3)	Local economies (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	High (8)	Moderate (6)
<i>Probability</i>	Probable (3)	Probable (3)
<i>Significance</i>	45 (Medium)	39 (Medium)
<i>Reversibility</i>	Possible to reverse with decommissioning	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		

<ul style="list-style-type: none"> • It is advisable to consult owners of the game farm/hunting establishments during the design and construction process to take into account their requests with respect to mitigation of long-term visual disturbances and come up with practical solutions that would be acceptable to both parties • The mitigation measures proposed by the visual specialists should be adhered to • The mitigation measures proposed by the noise specialists should be adhered to
<p><i>Cumulative impacts:</i></p> <ul style="list-style-type: none"> • Change in the perception of international tourists regarding the local area's representation as a "Wild Africa" environment and possibly the entire South Africa when compared to other destinations in Africa
<p><i>Residual Impacts:</i></p> <ul style="list-style-type: none"> • Visual impacts cannot be entirely eliminated; thus, the local industry could still experience some losses

c) **Negative impact on the livelihoods of the households dependent on the local tourism, game farming/hunting and association industries**

The potential decline in the number of tourists visiting local game farms is likely to reduce the revenue of these businesses. This in turn could have a negative impact on the livelihoods of the households that are directly or indirectly dependent on the tourism and game farm/hunting industry in the visually affected area. The households that could be affected include:

- *Owners of the businesses and their households:* The decrease in the number of tourists and subsequent decline in the revenue of local game farms would most likely reduce the personal income of the owners of these farms and subsequently their households. Reduced income levels would result in lower household consumption expenditure, savings or investment levels. This lower personal income translates into less business sales and business development activity elsewhere in the local economy.
- *Employees in the local game farm/hunting industry and their households, as well as households indirectly dependent on the activities on these farms:* The decline in the revenue of local game farms could have a negative impact on the number of employment positions that are created and sustained on an annual basis by these businesses. Based on a 2011 report on eco-tourism-based private game reserves in the Eastern Cape commissioned by Indalo the average employment multiplier amongst local game farms is five employment positions per R 1 million in business revenue/sales (Muir, Skowno and Kerley, 2011). If the proposed facility were to result in the loss of revenue, it could potentially be associated with the loss of employment. Alternatively, it could lead to a reduction in the salaries and wages paid to employees. Due to the multiplier effect, the decline in game farm/hunting revenue could lead to further employment losses locally and elsewhere in the country. Since these FTE positions however, represent a combination of employment person years to be lost in different sectors, it would mostly likely be translated into a decline in revenue rather than actual employment losses. Regardless of the outcome annual household earnings could decline, which will negatively affect livelihoods and worsen the standard of living of the affected households.

It is important to note that the hunting related-economy is interlinked across vertical and horizontal value chains. An example is thus given as follows:

- Properties that rear hunting animals as a sole source of income would not be negatively affected by a change in the sense of place of the area, as the activity of animal rearing itself would not be negatively affected by the construction or operation of the Grahamstown WEF.
- It may be posited that a significant percentage of properties in the area that operate solely as rearing operations for hunting purposes (without any hunting take place on the said property) do so on the basis of the growth and location of hunting activity in other farms in nearby areas.
- If such properties sell the majority of their animals to hunting operations within the affected vicinity, then a possible reduction in tourist numbers would affect the revenue of these properties

Depending on the actual effect of the facility on tourist numbers, and subsequently on the revenues of the farms, the negative effect could translate into lower income levels and social benefits of dependent households (in the best-case scenario) or into the loss of employment and support of dependent households (in the worst-case scenario).

One of the causes of these outcomes is the visual disturbance created by the facility that changes the aesthetics and visual resources of the environment. Some of these factors can be mitigated and any measures aimed at reducing the visual effect and preserving the “Wild Africa” image of the area should be considered and implemented where feasible.

<i>Nature: Impact on the livelihoods of households dependent on the local tourism, game farming/hunting and related industries (directly or indirectly)</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local economies (3)	Local economies (3)
<i>Duration</i>	Long term (4)	Long term (4)
<i>Magnitude</i>	High (8)	Low (4)
<i>Probability</i>	Highly probable (4)	Probable (3)
<i>Significance</i>	60 (High)	33 (Medium)
<i>Reversibility</i>	Possible to reverse, but only after decommissioning	
<i>Status (positive or negative)</i>	Negative	Negative
<i>Irreplaceable loss of resources?</i>	No	No
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i>		
<ul style="list-style-type: none"> Implement all measures suggested to mitigate the impact on the sense of place In the case when employees of nearby farms are retrenched, and a strong causal link can be established between the retrenchments and the project activities, the developer should assist the retrenched workers to find alternative employment by either recruiting them to work at the facility or assisting them through the enterprise development programme and/or social development funding allocations prescribed by government In order to avoid exerting a negative impact on the families dependent on the game farming/hunting industry and any other household that could be affected by the project, the developer should seek to partner with the various game farms to support affect families and ensure that the aid given to them is retained 		
<i>Cumulative impacts:</i>		
<ul style="list-style-type: none"> Worsening of the unemployment situation in the area Possible increase in local poverty levels Stronger alienation towards future developments in the area 		
<i>Residual Impacts:</i>		
<ul style="list-style-type: none"> Possible income losses for the farm owners 		

5.4 DECOMMISSIONING PHASE IMPACTS

Upon the expiry of the Grahamstown WEFs lifespan the facility would need to be dismantled, although the developer has indicated that ideally the facility would be upgraded in order to maintain and prolong the lifespan of the facility.

If the facility is decommissioned, the land will be rehabilitated in order to return it to pre-project conditions. This also means that all impacts whether positive or negative, which take place during the operational phase will cease to exist. At the same time spending on the disassembly of the components and rehabilitation of land will increase the demand for construction services and other industries, thus stimulating economic activity in the local area, albeit over a temporary period.

Socio-economic impacts stimulated during the decommissioning phase are expected to be similar to those that took place during the construction phase. They will also be temporary in nature, but most likely will take a much shorter time than the construction phase. They will also be associated with some expenditure, although it will be considerably less than the investment required during the development phase. Besides the positive impacts on production, employment, household income and government revenue that could ensue from the project, some negative impacts could also occur. These would largely be related to a slight increase in noise in the area surrounding the site, increase in traffic congestion and concerns over local safety and security due to a greater number of people accessing the area.

All of the positive impacts can be enhanced to increase the benefits to the local communities, while the negative impacts could be mitigated. Mitigations and enhancement measures suggested for the construction phase would apply.

The proposed amendments are unlikely to change the overall decommissioning phase impacts. These impacts will be similar to those presented in 2013.

5.5 NET EFFECT AND TRADE-OFF ANALYSIS

The review of the proposed amendments to the approved Grahamstown WEF is associated with both positive and negative socio-economic impacts. In order to assess whether the project is beneficial, the additions to the environment brought about by the project need to be evaluated. The additional benefits of the intervention are the difference between the reference case position (i.e. the no-go option) and the position if the intervention is implemented. It involves the evaluation of the net effect and trade-offs associated with the proposed intervention.

Tables 11 and 12 provide summaries of the construction and operational phase socio-economic gains and losses that are expected to ensue from the project

5.5.1 Construction

Table 11: Summary of construction phase impacts

Factor	Nature	Significance without mitigation / 100	Significance with mitigation / 100
Temporary stimulation of national & local economy	Positive	60 High	60 High
Temporary increase in employment in national and local economy	Positive	56 Medium	56 Medium
Contribution to skills development in the country and in the local economy	Positive	39 Medium	52 Medium
Temporary improvement of the standard of living of the positively affected households	Positive	36 Medium	36 Medium
Temporary increase in government revenue	Positive	40 Medium	40 Medium
Impact on the sense of place experienced by the local community as a result of visual and noise effects that appear during the construction phase	Negative	48 Medium	44 Medium
Impact on the local tourism and game farming/hunting industry that ensue during the construction phase as a result of noise and visual effects	Negative	52 Medium	30 Low

Factor	Nature	Significance without mitigation / 100	Significance with mitigation / 100
Temporary increase in social conflicts associated with the influx of construction workers and employment seekers to the area	Negative	30 Low	6 Low
Added pressure on economic and social infrastructure during construction as a result of increase in local traffic and in migration of construction workers	Negative	32 Medium	18 Low
Impact on real estate dynamics and business activity in the immediately affected area	Negative	60 High	39 Medium

From an economic perspective direct, indirect and induced impacts on a national level resulting from the construction of the WEF are expected to outweigh losses in revenue and property value for the tourism sector on a local level. Construction of the WEF will also temporarily contribute positively to employment, skills development, government revenue and household income. Construction will, however, create socio-economic disbenefits to the local community through disruptions to the area's sense of place, property values and the local tourism sector.

5.5.2 Operation

Table 12: Summary of operation phase impacts

Factor	Nature	Significance without mitigation / 100	Significance with mitigation / 100
Sustainable increase in production and GDP-R nationally and locally	Positive	52 Medium	52 Medium
Creation of sustainable employment positions nationally and locally	Positive	52 Medium	52 Medium
Skills development of permanently employed workers	Positive	44 Medium	55 Medium
Improved standards of living for benefiting household	Positive	52 Medium	52 Medium
Sustainable increase in national and local government revenue	Positive	48 Medium	48 Medium
Local community and social development benefits derived from the project's operations	Positive	65 High	75 High
Impact on the sense of place experienced by the local community as a result of visual and noise effects that appear during the construction phase	Negative	70 High	48 Medium
Impact on the local tourism, game farming/hunting and associated activities due to the altered visual and aesthetic environment experienced during the operational phase	Negative	45 High	39 Medium
Impact on the livelihoods of households dependent on the local tourism, game farming/hunting and related industries (directly or indirectly)	Negative	60 High	33 Medium

The operation of the project is associated with multiple negative impacts on the local tourism sector as well as its downstream linked activities. The sense of place of the area will also be negatively affected. This in turn is linked to livelihoods based on the tourism value chain.

In operation the WEF will however, contribute significantly to national production and income and gains attributable to this investment will outweigh losses from risks posed to the tourism sector.

5.5.3 Decommissioning

The impacts that can occur during decommissioning would be similar to those observed during the construction phase. These impacts would however, be experienced over a much shorter period and would be associated with significantly lower gains. Some impacts on the local infrastructure and the lives of the communities in the area could take place, however, they will also be short lived. Overall, the trade-offs between positive and negative impacts would be small.

CHAPTER 6 RECOMMENDATIONS

The proposed amendments to the original design of the WEF proposed by Plan 8 are not likely to change the overall recommendations presented in the August 2013 SEIA (impact in terms of extent, duration, magnitude etc.). The proposed amendments have increased the overall positive impact on the economy during construction and operation as well as the number of FTE positions required during construction. The development will now inject a larger proportion of spend into the local economy which will create significant downstream impacts as presented in section 4 and 5.

Based on survey responses regarding visitor statistics, potential production losses to the local tourism sector associated with visual exposure are estimated at between R 0.1 million and R 6.8 million per year. These are to be compared with the proposed WEF’s once-off direct capital injection of R 124 million into the Makana Local Economy. This is estimated as potentially creating a further R 187 million for the local economy through indirect and induced production effects and a further R 70.69 million through GDP-R impacts. Annual production impacts of the facility once operational are expected to exceed R 20 million per annum. These impacts are higher than those initially considered for the original application in 2013 when adjusted for inflation. It is also likely that because of the increasing occurrence of WEFs in the region, as well as the Eastern Cape as a whole, there may be a higher degree of acceptance of the facilities. The table below provides a summary of the key impacts.

Table 13: Comparison of no-go option to Grahamstown WEF development for operational phase

Potential annual losses from a reduction in tourist numbers (hunting included)	Total positive impacts of the operational expenditure (OPEX) in South Africa as a result of the Grahamstown WEF	Total FTE employment positions created during the operation phase of the Grahamstown WEF
<ul style="list-style-type: none"> R 0.1 million – R 6.8 million 	<ul style="list-style-type: none"> R 20.6 million – Production impact R 9 .1 million GDP-R impact 	<ul style="list-style-type: none"> 10 direct FTE positions 16 indirect FTE positions 10 induced FTE positions
	<ul style="list-style-type: none"> Impacts include the CAPEX impacts – local content 	<ul style="list-style-type: none"> Impacts include the CAPEX impacts – local content

Benefits accruing to the region from investments and activity in the tourism sector are thus outweighed by those that would arise from the construction and operation of a WEF. As such, this report finds that the positive benefits anticipated from the WEF construction and operation will outweigh any potential negative losses within the local tourism industry. This is in line with the recommendations given for the initial application in 2013.

CHAPTER 7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 CONSTRUCTION PHASE

OBJECTIVE 1: Stimulate and enhance production impacts, employment impacts and benefits to households in the country, specifically in the Makana local economy during the construction phase		
Project component/s	Construction of the wind energy facility and associated infrastructure	
Potential Impact	Limited local economic benefits	
Activity/risk source	<ul style="list-style-type: none"> • Construction procurement practices employed by EPC contractor • Developer’s investment plan 	
Mitigation: Target/Objective	Increase the procurement of local goods and services and create new employment opportunities within the local economy as well as nationally	
Mitigation: Action/control	Responsibility	Timeframes
Encourage the EPC contractor to increase the local procurement practices and employment of people from local communities (as far as feasible) to maximise the benefits to the local economies	Plan 8 Infinite	Construction period
Where possible, engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers	Plan 8 Infinite	Construction period
Organise local community meetings to advise the local labour on the planned project and what employment could potentially be applied for	Plan 8 Infinite	Construction period
Establish a local skills desk (in Makhanda) to determine the potential skills that could be sourced in the area	Plan 8 Infinite EPC contractor	Construction period
Recruit local labour as far as feasible, with a minimum of 20% of employment created for local communities	EPC contractor	Construction period
Employ labour-intensive methods in construction where feasible	EPC contractor	Construction period
Where possible, sub-contract to local construction companies	EPC contractor	Construction period
Use local suppliers where feasible and arrange with the local Small and Medium Enterprises to provide transport, catering services and other services to the construction crew	EPC contractor	Construction period
Performance Indicator	<ul style="list-style-type: none"> • Developer has engaged with local authorities and business organisations (Yes/No) • Percentage of expenditure on the project spent in the local communities versus nationally • Percentage of person-years spent on construction by workers from the local community • Number of contracts and contract values signed between the EPC contractor/Developer and local construction companies and SME’s to supply goods and services directly used in construction or support the activities on site 	
Monitoring	Checklists, quarterly reports and post-construction report	

OBJECTIVE 2: Skills enhancement in the construction and manufacturing sectors in the local economy as well as in the country	
Project component/s	Construction of the wind energy facility and localisation of the project’s expenditure
Potential Impact	Limited or no local expertise development

Activity/risk source	<ul style="list-style-type: none"> • Construction procurement practice employed by the EPC contractor • Developer’s investment plan • Willingness of foreign experts to share knowledge and expertise 	
Mitigation: Target/Objective	Ensure knowledge transfer and skills development between foreign experts involved in the development and the local workforce involved directly or indirectly in the project	
Mitigation: Action/control	Responsibility	Timeframes
Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases focusing on turbine component assembly and tower manufacturing	Plan 8 Infinite EPC contractor	Pre-Construction period & Construction period
Set up apprenticeship programmes for construction workers to build on existing skills or develop new skills, especially those coming from local communities	Plan 8 Infinite EPC contractor	Construction period
Performance Indicator	<ul style="list-style-type: none"> • Hours spent by foreign technical experts on skills and knowledge transfer to South African based workforce • Number of apprenticeships offered 	
Monitoring	Quarterly reports and post-construction final report	

OBJECTIVE 3: Reduce the visual and noise disturbances during both day time and night time		
Project component/s	Construction activities associated with the wind energy facility and associated infrastructure	
Potential Impact	Changes in the sense of place that also result in the negative impact on the local tourism, game farm/hunting and associated industries	
Activity/risk source	<ul style="list-style-type: none"> • Construction activities • The wind turbines and associated infrastructure 	
Mitigation: Target/Objective	Reduce the visual and noise disturbances to minimise the losses in sense of place and potential decline in the business activity of the local tourism, game farm/hunting and associated industries	
Mitigation: Action/control	Responsibility	Timeframes
Natural areas that are not affected by the footprint should be retained as such and efforts should be made to avoid these areas during construction	Plan 8 Infinite EPC contractor	Construction period
Mitigation proposed by the visual and noise specialists should be adhered to and if possible, implemented during the beginning of the construction period	Plan 8 Infinite EPC contractor	Construction period
Heavy vehicles travelling on secondary roads should adhere to low speed limits to minimise noise and dust pollution and should follow the roads agreed with the property owners	Plan 8 Infinite EPC contractor	Construction period
Night-time lighting should be kept to a minimal and should be designed and positioned in such a way as to minimise the light intrusion during the night experienced from nearby properties, but without jeopardising the security and safety of the people working at the facility	Plan 8 Infinite EPC contractor	Construction period
Where possible construction activities limited to normal working hours	Plan 8 Infinite EPC contractor	Construction period

Performance Indicator	<ul style="list-style-type: none"> Meeting with the affected parties, specially local residents to determine their concerns regarding visual and noise impacts and find plausible but feasible solutions for all Adhere to mitigation measures proposed by the visual specialist (checklist) Periodic speed measurements on secondary roads
Monitoring	Checklists, quarterly reports during construction and annual report inclusive of other performance assessments during operations

OBJECTIVE 4: Reduce the possibility of an increase in crime and social conflicts in the area as well as the negative impacts associated with property damages and the loss of assets

Project component/s	Construction of the wind energy facility and associated infrastructure
Potential Impact	Spike in crime and social conflicts due to the influx of construction workers and employment seekers into the area; property damage and the loss of assets on nearby farms
Activity/risk source	<ul style="list-style-type: none"> Construction of the wind energy facility
Mitigation: Target/Objective	Reduce the chances of an increase in crime and other social conflicts in the area as well as an increase in property damage and the loss of assets

Mitigation: Action/control	Responsibility	Timeframes
Set up a recruitment office in the nearby town (i.e. Makhanda) and adhere to strict labour recruitment practices that would reduce the desire of potential employment seekers to loiter around properties in the hope of finding temporary employment	Plan 8 Infinite EPC contractor	Pre-Construction period & Construction period
Employ locals as far as feasible through the creation of a local skills database and the recruitment of suitable candidates	Plan 8 Infinite EPC contractor	Pre-Construction period & Construction period
Control the movement of workers between the site and areas of residence with the intention of minimising loitering around the proposed facility through the provision of scheduled transportation services between areas of residence and the construction site	EPC contractor	Construction period
Ensure that any damages or losses that nearby farms experience, and which can be linked to the conduct of the construction workers, are adequately reimbursed	Plan 8 Infinite EPC contractor	Construction period
Assign a person(s) to deal with the complaints and concerns of affected parties	Plan 8 Infinite EPC contractor	Construction period
Land owners should be adequately compensated for any unforeseen damage to property or loss of assets such as livestock	Plan 8 Infinite EPC contractor	Construction period
Ensure that construction/maintenance workers do not damage property or inflict other losses to land owners and households residing on the farms	Plan 8 Infinite EPC contractor	Construction period
Negotiate terms and conditions that would guide construction/maintenance activities on the properties as well as the behaviour and conduct of the construction/maintenance crew	Plan 8 Infinite EPC contractor	Pre-Construction period & Construction period
A predefined access route to the servitude should be chosen in consultation with the land owner and should be strictly adhered to by all construction/maintenance vehicles and crews; the chosen route should follow existing roads as far as feasible	EPC contractor	Construction period
Site clearance activities should be limited to the minimum required area to minimise potential damage to the environment and property	EPC contractor	Construction period
Construction/maintenance vehicles are to follow safe speed	EPC contractor	Construction period

limits and should avoid animals inhabiting the farms		
If feasible, construction/maintenance activity should only be undertaken during working hours	EPC contractor	Construction period
Performance Indicator	<ul style="list-style-type: none"> • A recruitment office(s) is set up prior to the construction period • Percent of workers employed in construction that come from local communities • Set up transport services for construction workers between the site and main towns of residence • Assignment of a dedicated person to deal with any complaints by nearby farmers and resolve concerns including damages to property and the loss of assets • Number of complaints regarding property damage and asset losses received from the affected properties and the percentage thereof that have been resolved • Agreement between the EPC contractor and property owners regarding access to properties, access routes and compensation conditions if property is damaged or an assets lost that can be proven to be as a result of the activities of the construction crews 	
Monitoring	Checklists, quarterly reports as well as the post-construction report inclusive of other performance assessments	

OBJECTIVE 5: Address the potential adverse effects on land, property and business values		
Project component/s	Construction of the wind energy facility and associated infrastructure	
Potential Impact	Reduced land, property and business values	
Activity/risk source	<ul style="list-style-type: none"> • Development of the wind energy facility 	
Mitigation: Target/Objective	Reduce the impact on land property and business values	
Mitigation: Action/control	Responsibility	Timeframes
Meet the affected owners and discuss their concerns over property and land values as well as educate and inform them on the potential environmental impacts that could occur	Plan 8 Infinite	Pre-Construction period
Mitigation measures to reduce the impact on the sense of place should be implemented	Plan 8 Infinite	Pre-Construction period & Construction period
Performance Indicator	<ul style="list-style-type: none"> • Number of meetings and awareness campaigns conducted • List of people attending the meetings and awareness campaigns and percentage of the affected land owners attending the sessions • Surveys and appraisals of the nearby properties • Negotiate with the affected land owners; the formal agreement concerning the compensation approaches in the case where property values are negatively affected and it can be clearly linked to the facility's operation • Mitigation measures proposed to address the impacts on sense of place implemented 	
Monitoring	Checklists and reporting	

OBJECTIVE 6: Reduce the pressure on local social and economic infrastructure	
Project component/s	Construction of the wind energy facility and associated infrastructure
Potential Impact	Dilapidation of local infrastructure and a decline in the quality of service offered
Activity/risk source	<ul style="list-style-type: none"> • Movement of vehicles

	<ul style="list-style-type: none"> Influx of migrant workers and employment seekers 	
Mitigation: Target/Objective	Reduce the pressure on local social and economic infrastructure	
Mitigation: Action/control	Responsibility	Timeframes
Provide adequate signage along the N2 to warn motorists of the construction activities taking place on the site	EPC contractor	Pre-Construction period
Engage with local authorities and inform them of the development as well as discuss with them the ability of the municipality to meet the demands for social and basic services created by the migrant construction workers	Plan 8 Infinite	Pre-Construction period
Assist the municipality where feasible in ensuring that the quality of the local social and economic infrastructure does not deteriorate	Plan 8 Infinite	Construction period
Performance Indicator	<ul style="list-style-type: none"> Adequate signage along the N2 provided Established relationship with the Makana Local Municipality. Assistance provided to the Makana Local Municipality with respect to the local infrastructure through the social responsibility programme 	
Monitoring	Checklists and annual report inclusive of performance assessments	

7.2 OPERATIONAL PHASE

OBJECTIVE 1: Maximise production, employment and local community benefits		
Project component/s	Operation and maintenance activities	
Potential Impact	Loss of opportunities to stimulate production and employment in the local economy	
Activity/risk source	<ul style="list-style-type: none"> Labour and procurement practices employed during operations 	
Mitigation: Target/Objective	Maximise the production and employment benefits in the local economy	
Mitigation: Action/control	Responsibility	Timeframes
As far as possible, the operator of the wind energy facility should be encourage to procure material, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy	Plan 8 Infinite	Operational period
Where possible, local labour should be considered for employment to increase the positive impact on the local economy	Plan 8 Infinite	Operational period
Local SME's should be approached to investigate the opportunities for supplying the inputs required for the maintenance and operation of the facility where possible	Plan 8 Infinite	Operational period
A three-year social, and economic development programme should be devised by the developer throughout the project's lifespan	Plan 8 Infinite	Operational period
The plan should be development in consultation with local authorities as well as the community in order to identify community projects that would result in the greatest social impact	Plan 8 Infinite	Operational period
This plan should be reviewed on an annual basis and, where necessary, updated	Plan 8 Infinite	Operational period
When devising enterprise development initiatives, the focus should be on creating sustainable and self-sufficient	Plan 8 Infinite	Operational period

enterprises		
In devising the programmes to be implemented through the Enterprise Development Funds and Community Trust allocations, the developer should take into account the IDP for the Makana Local Municipality.	Plan 8 Infinite	Operational period
Performance Indicator	<ul style="list-style-type: none"> Percentage of contract values allocated to the local SME's and companies Percentage of workers that were employed from local communities A three-year social and economic development programme that takes into account local policies, priorities and needs Consultation with local authorities and communities on the social and economic needs and priorities 	
Monitoring	Checklists and annual reports inclusive of other performance assessments	

OBJECTIVE 2: Contribute to skills development in the area		
Project component/s	Operation and maintenance activities	
Potential Impact	Loss of opportunities to develop skills in operating a wind energy facility in the area	
Activity/risk source	<ul style="list-style-type: none"> Operations and maintenance 	
Mitigation: Target/Objective	Contribute to the development of skills required to operate and maintain a wind energy facility	
Mitigation: Action/control	Responsibility	Timeframes
The developer should establish vocational training programmes for the local labour force to promote the development of skills required by the wind energy industry and thereby provide opportunities for the local community to be employed in other similar facilities elsewhere around the province and the country	Plan 8 Infinite	Operational period
Performance Indicator	<ul style="list-style-type: none"> Number of people attending vocational training on an annual basis 	
Monitoring	Annual reports inclusive of other performance assessments	

OBJECTIVE 3: Reduce the visual and noise disturbances during both daytime and at night		
Project component/s	Operation and maintenance of the facility and associated infrastructure	
Potential Impact	Changes in the sense of place that also leads to negative impacts on the local tourism, game farming and associated industries	
Activity/risk source	<ul style="list-style-type: none"> Wind turbines and associated infrastructure 	
Mitigation: Target/Objective	Reduce the visual and noise disturbance to minimise the losses to the sense of place and the potential decline in business activity of tourism and game farm/hunting establishments	
Mitigation: Action/control	Responsibility	Timeframes
Natural areas that are not affected by the facilities footprint should be retained as such and avoided during operations	Plan 8 Infinite	Operational period
Mitigation proposed by the visual specialist should be adhered to	Plan 8 Infinite	Operational period
Mitigation proposed by the noise specialist should be adhered to	Plan 8 Infinite	Operational period
Performance Indicator	<ul style="list-style-type: none"> Adhere to mitigation measures proposed by the visual specialist (checklist) Routine inspection of the lighting conditions 	

	<ul style="list-style-type: none"> Annual meeting with the affected property owners
Monitoring	Checklists and annual reports inclusive of other performance assessments during operations

OBJECTIVE 4: Minimise the negative impact on households dependent on the local tourism, game farming/hunting and associated industries

Project component/s	Operation and maintenance
Potential Impact	Loss of employment and income leading to the deterioration of the standard of living of the affected households
Activity/risk source	<ul style="list-style-type: none"> Wind turbines and associated infrastructure
Mitigation: Target/Objective	Reduce the potential losses of income and employment resulting from the visual disturbances associated with the proposed facility

Mitigation: Action/control	Responsibility	Timeframes
Implement all measures suggested to mitigate the impact on the sense of place	Plan 8 Infinite	Operational period
In the case when employees of the nearby farms are retrenched and that there is a strong causal link between these retrenchments and the project's activities, the developer should assist the retrenched workers to find alternative employment by either recruiting them to work at the facility, through the enterprise development programme or through social development funding allocations prescribed by government	Plan 8 Infinite	Operational period
In order to avoid exerting the negative impact on the families dependent on the local tourism and game farming/hunting industry, the developer should seek to partner with these industries in order to support these families and ensure that the aid given to them is retained at the same level	Plan 8 Infinite	Operational period

Performance Indicator	<ul style="list-style-type: none"> Partnership agreement with local tourism and game farming businesses or other proof that indicates the support of families dependent on these industries Number of retrenched workers assisted
Monitoring	Annual reports inclusive of other performance assessments

OBJECTIVE 5: Address the potential adverse effects on land, property and business values

Project component/s	Operation and maintenance of the wind energy facility and associated infrastructure
Potential Impact	Reduced land, property and business values
Activity/risk source	<ul style="list-style-type: none"> Wind turbines and associated infrastructure
Mitigation: Target/Objective	Reduce the impact on land, property and business values

Mitigation: Action/control	Responsibility	Timeframes
Mitigation measures to reduce the impact on the sense of place should be implemented	Plan 8 Infinite	Operational period
Ensure that the periods of maintenance of the servitude are negotiated with the land owners beforehand to align it with the periods of the lowest tourist activity	Eskom	Operational period
Ensure that property owners are adequately compensated for the use of their land for hosting associated wind infrastructure	Eskom	Operational period

Performance Indicator	<ul style="list-style-type: none"> • Negotiate with the affected land owners for the formal agreement concerning the compensation approaches in the case when property values are negatively affected and it can be clearly linked to the facility's operation • Mitigation measures proposed to address the impacts on sense of place implemented • Compensation and servitude maintenance schedule agreement signed between Eskom and the owners of the land that would be traversed
Monitoring	Checklists and reporting

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APPENDIX I: VISUAL SPECIALIST OPINION

Plan 8 Grahamstown Wind Energy Facility

VISUAL IMPACT ASSESSMENT OF THE PROPOSED AMENDMENTS

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EOH

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FINAL

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NAME	RESPONSIBILITY	DATE
Mr. M. Johnson	Report compilation	August 2018
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Relevant VIA experience:

Project	Responsibility
SANBI Kwelera National Botanical Garden	Viewshed Analysis
Bayview WEF	Author
Rietkloof WEF	Author

Dr Alan Carter, reviewer

Alan is an Executive of the East London Office, and has over 25 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 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 in South Africa (EAPSA) and as an ISO14001 EMS auditor with 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
Waaihoek 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
Rietkloof WEF	Review and Quality Control
Nqanakwe 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
Blacklight Solar PV Facility	Project Leader/ Author
Peddie Solar PV Facility	Project Leader/ Author

EXECUTIVE SUMMARY

Plan 8 (Pty) Ltd. received Environmental Authorisation (DEA Ref number: 12/12/20/2523) from the DEA to construct the Plan 8 Grahamstown WEF near Grahamstown in the Eastern Cape Province.

Plan 8 (Pty) Ltd. now wishes to increase the turbine size from 3 MW turbines to 4.5MW turbines, resulting in an increase in hub height (125m) and rotor diameter (149m). There have been no proposed changes in the number of turbines or the layout.

In terms of Regulation 31 and 32 of the 2014 National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, as amended on 2017, Plan 8 (Pty) Ltd. wishes to apply for an amendment to the EA issued.

One of the significant environmental issues identified during the scoping phase for the previous, EIA process was the visual impact of the proposed development on the landscape. A Visual Impact Assessment (VIA), conducted by Henry Holland of Map(this), was therefore included as one of the specialist studies.

This report provides specialist input to assess the proposed changes in the context of the former 2012 VIA (amended 2013) in order to determine the visual impacts resulting from the proposed amendments. This VIA is to be read in conjunction with the original 2012/2013 VIA, as it does not repeat information that is still relevant.

From a visual impact assessment perspective, the most significant changes are the proposed increase in the hub height (91.5m to 125m) and rotor diameter (117m to 149m). Two viewsheds (one as per the EA and a second as per the proposed changes) were created, followed by an analysis looking at the number of potentially affected buildings.

The following impacts were identified and assessed:

Impact	Pre-Mitigation	Post Mitigation
Impact 1: Impact of introducing highly visible wind turbines into a rural-agricultural landscape	MODERATE-	MODERATE-
Impact 2: Intrusion of large and highly visible construction activity on sensitive viewers	MODERATE-	MODERATE-
Impact 3: Intrusion of large wind turbines on the existing views of sensitive visual receptors	HIGH-	HIGH-
Impact 4: Impact of night lights on the existing nightscape	MODERATE-	MODERATE-
Impact 5: Impact of shadow flicker	MODERATE-	LOW-

It was found that the proposed changes will increase the visibility, exposure and visual intrusion of the project. However, the proposed changes will not introduce any new visual impacts, nor significantly alter the visual impacts as assessed in the original 2012/2013 VIA Report, for which the original project received Environmental Authorisation.

Concluding Remarks

The Plan 8 Grahamstown WEF will undoubtedly impose the visual landscape for nearby visual receptors. While the HIGH residual visual impacts cannot be completely mitigated, these should be considered within the context of the following:

- The wind farm is not permanent and the turbines and other superstructure will be removed on decommissioning of the wind farm;

- The landscape can be restored through rehabilitation prior to decommissioning;
- Although limited, certain mitigation recommendations can mitigate the impacts to some extent;
- Although there are local losses in terms of visual impacts, there will also be local, regional and national environmental, social and economic gains in the form:
 - Economic investment
 - Job creation and skills development,
 - Energy security
 - Climate change mitigation
- In terms of the REIPPPP, certain benefits will accrue to:
 - Local communities through the establishment of local community trusts.
 - BBBEE partners through shareholding targets.

It is also very important to note that renewable energy (including wind) forms an integral part of the National Development Plan (NDP), both in terms of energy security and climate change mitigation.

It is concluded that potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed changes. Therefore, there is no reason, in terms of visual concerns, why the amended project should not receive authorisation.

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1. INTRODUCTION

In 2011, EOH Coastal and Environmental Services (CES) was appointed by Plan 8 (Pty) Ltd. as independent environmental assessment practitioners (EAP) to conduct the Full Scoping and Environmental Impact Assessment (EIA) for the proposed Plan 8 Grahamstown Wind Energy Facility (WEF). Subsequently, in October 2015, Plan 8 (Pty) Ltd. received Environmental Authorisation (EA), dated 22 October 2015, from the Department of Environmental Affairs (DEA) to construct and operate the Grahamstown WEF. The EA authorised Plan 8 (Pty) Ltd. to develop a 66MW WEF which included authorisation to construct 22 wind turbines, each with a hub height of 91.5m above ground level and a rotor diameter of 100m-117m.

Plan 8 (Pty) Ltd. now wishes to increase the turbine size from 3 MW turbines to 4.5MW turbines, resulting in an increase in hub height (125m) and rotor diameter (149m). There have been no proposed changes in the number of turbines or the layout.

In terms of Regulation 31 and 32 of the 2014 National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations 2014, as amended, Plan 8 (Pty) Ltd. wishes to apply for an amendment to the EA issued. Regulation 31 (Part 2) of the 2014 NEMA EIA Regulations states that:

“An environmental authorisation may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in an increased level or nature of impact where such level or nature of impact was not -

- (a) assessed and included in the initial application for environmental authorisation; or*
- (b) taken into consideration in the initial environmental authorisation; and the change does not, on its own, constitute a listed or specified activity.”*

As per sub-regulation (a) the proposed application for the amended changes were not considered as part of the in the initial EIA process, therefore these (potential) impacts need to be assessed according to the change in level or nature of impact.

1.1. Scope of Study

One of the significant environmental issues identified during the scoping phase for the former EIA process was the visual impact of the proposed development on the landscape. A Visual Impact Assessment (VIA), conducted by Henry Holland of Map(this) in June 2012 (amended March 2013), was therefore included as one of the specialist studies.

This report provides specialist input to assess the proposed changes in the context of the former 2012/3 VIA in order to determine the visual impacts resulting from the proposed amendments. This VIA is to be read in conjunction with the former 2012/3 VIA as it does not repeat information that is still relevant. The Terms of Reference were therefore to review the visual impacts of the proposed larger turbines, compare them with the impacts of the approved machines and, if necessary, identify new impacts and mitigation measures to be included in the EMPr.

1.2. Limitations and Assumptions

This report is based on currently available information and, as a result, the following limitations and assumptions are implicit:

- It is assumed that the project information provided by the client is accurate.

- The original 2012/2013 VIA comprehensively described the baseline information, such as description of the site and surrounding area. The emphasis of this VIA is thus placed on the impact assessment of the proposed amendments.
- Spatial data used for visibility analysis originate from various sources and scales. Inaccuracy and errors are, therefore, inevitable. Where relevant, these are highlighted in the report. Every effort was made to minimise their effect.
- The following relates to the Viewshed Calculations:
 - Calculation of the viewsheds is based on the use of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) 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 m²), and is assigned a single height value.
 - 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.

1.3. Methodology

A GIS was used to calculate two viewsheds for the project. The first was based on the components that received EA and the second was based on components of the proposed changes. These viewsheds, as well as information gathered by the original 2012/2013 VIA and site photographs were used to define criteria such as visibility, viewer sensitivity, visual exposure and visual intrusion for the proposed changes. These criteria are, in turn, used to determine the intensity of potential visual impacts on sensitive viewers. All information and knowledge acquired as part of the assessment process were then used to determine the potential significance of the impacts according to the standardised rating methodology as described in the previous EIA.

2. PROJECT DESCRIPTION

2.1. Overview of Project

Plan 8 (Pty) Ltd. received EA (DEA Ref number: 12/12/20/2523) from the DEA to construct the Plan 8 Grahamstown WEF. The site is located approximately 30 kilometres from Grahamstown along the N2 in an easterly direction towards East London, in the Eastern Cape Province of South Africa.

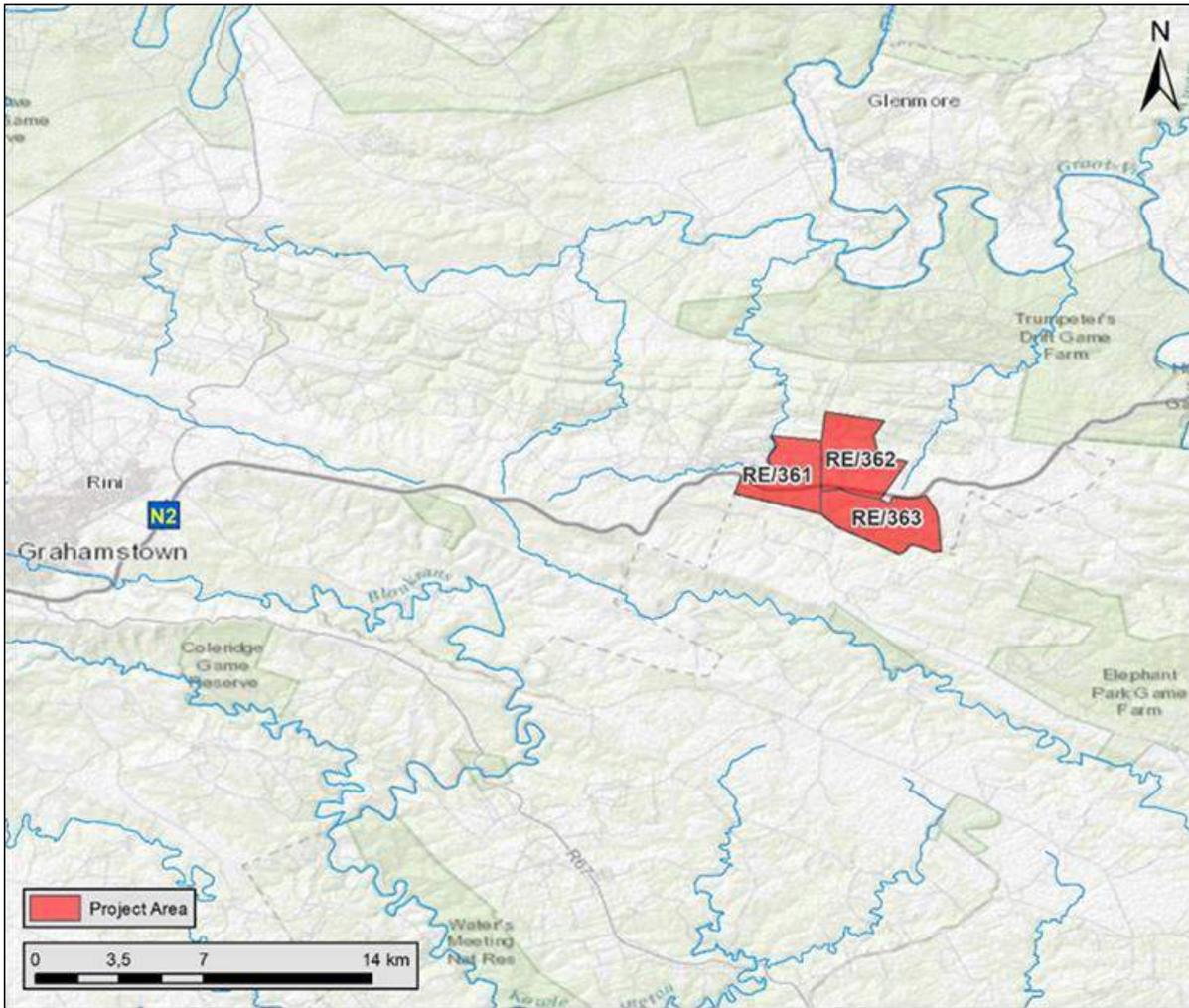


Figure 3: Location of the Plan 8 Grahamstown WEF

2.2. Previously-approved Project Components and Activities

The previously-approved components of the Plan 8 Grahamstown WEF include, the following:

- **Farm Properties**
 - Farm Gilead 361 (SG C00200000000036100000)
 - Farm Tower Hill 363 (SG C00200000000036300000)
 - Farm Peynes Kraal 362 (SG C00200000000036200000)

Total area of properties is approximately 2 550ha
- **Number of Turbines**

Up to 22 turbines
- **Turbine Locations**

Turbine locations are set out in Figure 2.4 - Layout of Project Infrastructure on a 1:50000 topocadastral map – p19, in CES 2015a, the approved EIA Report.

Table 1: Approved coordinates of wind turbines

Turbine No	Latitude (°S)	Longitude (°E)
1	33° 16' 50.06" S	26° 49' 29.08" E
2	33° 16' 48.24" S	26° 49' 47.62" E
3	33° 16' 46.58" S	26° 51' 29.70" E
4	33° 17' 08.37" S	26° 50' 12.87" E

Turbine No	Latitude (°S)	Longitude (°E)
5	33° 17' 07.94" S	26° 50' 32.60" E
6	33° 17' 34.26" S	26° 50' 38.22" E
7	33° 17' 40.50" S	26° 51' 08.92" E
8	33° 17' 29.75" S	26° 51' 52.93" E
9	33° 17' 49.21" S	26° 51' 44.26" E
10	33° 17' 41.18" S	26° 52' 06.07" E
11	33° 17' 47.59" S	26° 52' 22.01" E
12	33° 17' 53.91" S	26° 52' 32.16" E
13	33° 17' 05.47" S	26° 49' 39.80" E
14	33° 17' 02.96" S	26° 49' 55.44" E
15	33° 16' 52.52" S	26° 51' 01.32" E
16	33° 16' 57.28" S	26° 51' 22.41" E
17	33° 17' 07.54" S	26° 49' 20.57" E
18	33° 16' 11.01" S	26° 50' 11.37" E
19	33° 16' 01.21" S	26° 49' 37.07" E
20	33° 16' 07.21" S	26° 49' 52.78" E
21	33° 16' 03.14" S	26° 50' 51.31" E
22	33° 16' 07.17" S	26° 51' 06.54" E

- **Total Generating Capacity**

Each turbine 2.5–3MW; total up to 66MW

- **Hub height**

Up to 91.5m above ground level

- **Rotor Diameter**

100m–117m

- **Foundation Size:**

Plan Size: 20m x 20m

Base Thickness: 2 – 6m

- **Turbine Interconnections**

Underground cables connecting the wind turbines

- **Access and Site Roads**

Internal site roads between 4.7 and 8m wide

- **Substation**

Alternative, Option 2:

Centre point 33.276784°S, 26.831437°E

Plan area approximately 100m by 65m

- **Development Footprint (disturbed area)**

Estimated disturbed area during construction: 9.8 ha (includes roads, material laydown / hardstanding areas, turbine bases and substation)

Estimated disturbed area during operation: 7.8 ha (includes roads, turbine bases and substation)

- **Evacuation Power Line**

Alternative, Option 2:

Start: 33°16'34.59"S, 26°49'51.89"E

End: 33°16'23.56"S, 26°49'51.17"E

Connection, via 132kV overhead power line, 350m long, to existing Eskom 132kV overhead

line from Pembroke to Albany sub-station (shown in Figure 2.4, CES 15a)

2.3. Proposed Amendments

The proposed changes to the development description entail the following components:

- **Total Generating Capacity**
Each turbine up to 4.5MW; total up to 99MW
- **Hub height**
Up to 125m above ground level
- **Rotor Diameter**
Up to 149m

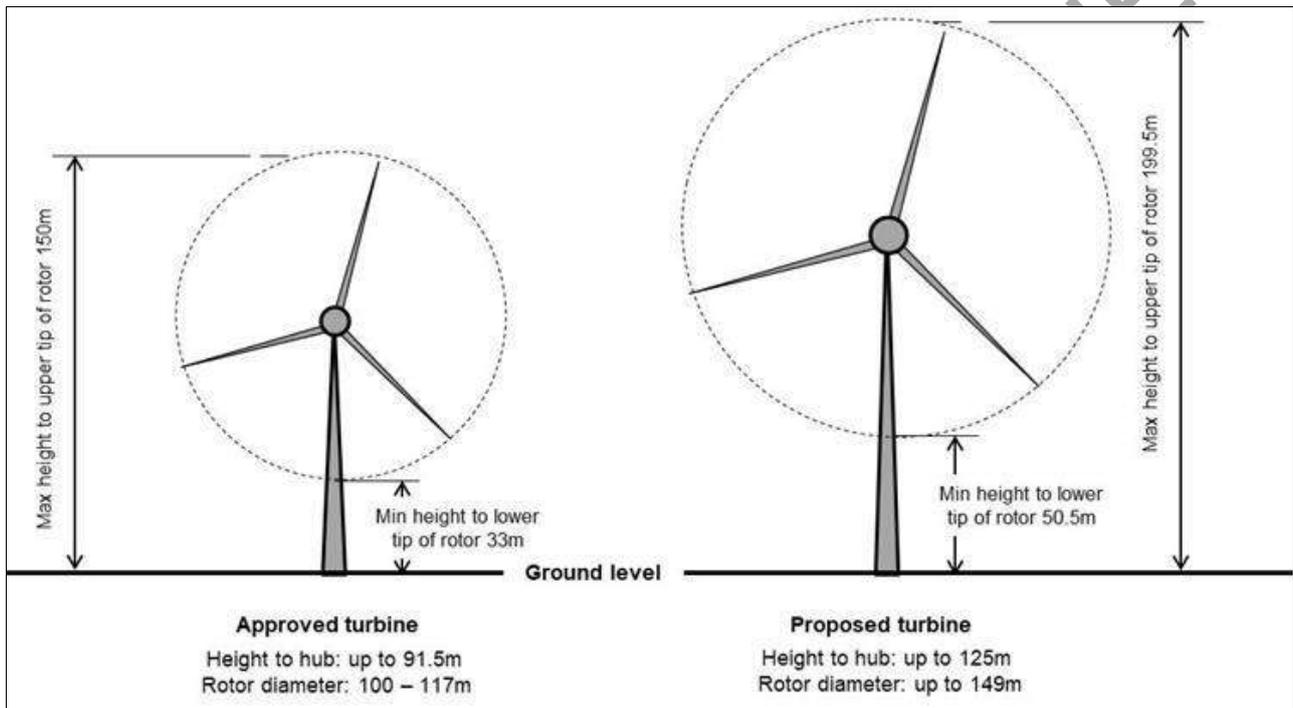


Figure 4: Schematic comparison of approved and proposed turbine sizes
(Dimensions are internally consistent)

- **Foundation Size:**
Plan Size: Circular base 26.5m diameter (area = 550 square metres)
Base Thickness: approx 3m, but depends on substrate conditions
Exposed area after rehabilitation: 6m diameter (area = 28.3m²)
- **Development Footprint (disturbed area)**
Turbine bases: 22No circular bases 26.5m dia – total area **1.21ha**
Laydown areas/hardstandings: 22No laydown areas/hardstandings 80mx50m (includes 25m² for turbine transformer) – total area **8.8ha**
Roads: 16.35km of roads average width 4.8m – total area **7.68ha**
Substation: 100mx65m (includes operations instrument/control centre and store) – total area **0.65ha**
Estimated area of disturbance for construction and operation is therefore **18.35ha** (0.72% of the total project area of 2 550 ha). This assumes that materials laydown areas/hardstandings used during construction will remain in place as hardstandings during operation to facilitate repairs and maintenance activities, including the use of large mobile cranes. The total disturbed area for the proposed amendment is about 45% greater than the approved project, which is accounted for by the increased area of the laydown areas/hardstandings and the

larger turbine bases.

From a visual impact assessment perspective, the most significant changes are those to the hub height and rotor diameter, as described above and seen in Figure 2. The assessment of these changes is therefore the focus of this report.

3. DESCRIPTION OF THE ENVIRONMENT

The description of the environment in the original 2012/2013 VIA remains the same except for the following:

- Since the original VIA by Henry Holland the construction and upgrade of the N2 national highway, which dissects the study area, has commenced.



Figure 5: Construction and upgrade of the N2 highway

4. ASSESSMENT OF THE PROPOSED CHANGES

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. Visual impact criteria

Two viewsheds were calculated in order to assess the impacts of the proposed changes to the Plan 8 Grahamstown WEF.

- Viewshed 1 was calculated as per the EA (i.e. hub height of 91.5m and a rotor diameter of 117m)
- Viewshed 2 was calculated as per the proposed changes (i.e. hub height of 125m and a rotor diameter of 149m)

4.1.1. Visibility and Exposure

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

Visual exposure is defined as the relative visibility of a project or feature in the landscape, and is related to the distance between the observer and the project. Exposure and visual impact tend to diminish exponentially with distance since the observed element comprises a smaller part of the view (as seen in Figure 4). The visual exposure of buildings in the surrounding landscape for each scenario was calculated using the viewsheds and distances from the proposed turbines. Visual exposure is classified as follows:

- High – dominant or clearly noticeable;
- Moderate – recognisable to the viewer; and
- Low – not particularly noticeable to the viewer

In this report the following distances from the site are used as proxy for categories of exposure:

- High exposure – 0 to 5km from the development.
- Moderate exposure – 5km to 10km from the development.
- Low exposure – 10km to 20km from the development.

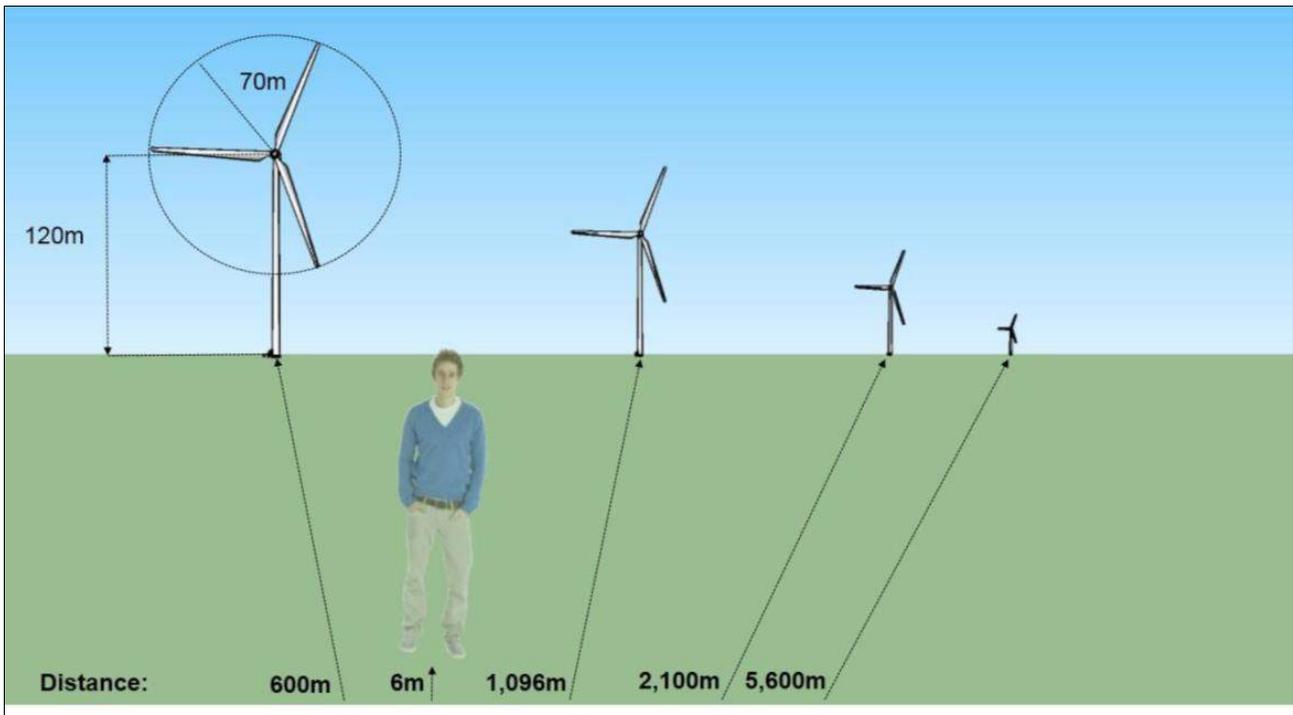


Figure 6: Conceptual example of the diminishing visual effect of a wind turbine
(120m high turbine, 140m rotor diameter)

Wind turbines are highly visible structures in most landscapes due to their height, colour (in contrast with most background colours) and motion of the blades. Their visibility is also a function of the layout and the topography of the landscape. Table 1 shows the viewshed areas for the two scenarios – approved and proposed turbine size - as well as the number of buildings³ that will potentially have views of wind turbines. The screening effect of buildings and vegetation is not taken into account.

Table 2: Viewshed analyses for the two scenarios

WEF Layout	Viewshed Area (within 20 km distance from the turbines)	Visual Exposure (Number of buildings affected)			
		Low	Medium	High	Total
Viewshed 1 (approved)	490,5 km ²	2 992	122	168	3 282
Viewshed 2 (proposed)	545.2 km ²	3 331	148	184	3 663

The viewshed analysis shown in Table 1, and in the figures below (Figures 5 and 6), provides an indication of the potential effect that a change in turbine height and rotor diameter may have on the significance of visual impacts as discussed in the original 2012/2013 VIA Report. It is clear from the results that there will be an increase of approximately 55km² (an 11% increase) in viewshed area, as well as a slight increase in the number of potential sensitive visual receptors that may be highly or moderately exposed to the wind turbines.

The increase in the number of buildings (as proxy for sensitive visual receptors) for moderate and high visual exposure is mainly limited to buildings located on the surrounding farms. Many of these buildings are not residences but are other farm buildings. The most significant change occurs at distances beyond 10 km from the turbines. In general, due to topography and the number of wind turbines, an increase in turbine height will mainly affect visual receptors further away in that the

³ The number of buildings was estimated using the Dwelling Frame Update dataset, 1st February to 31st March 2016, part of the South African Demographic and Health Survey, 2016, compiled by Stats SA.

rating might change from 'Not Visible' to 'Low' visual exposure. The topography of the region, although highly varied, cannot efficiently hide structures of this height and number.

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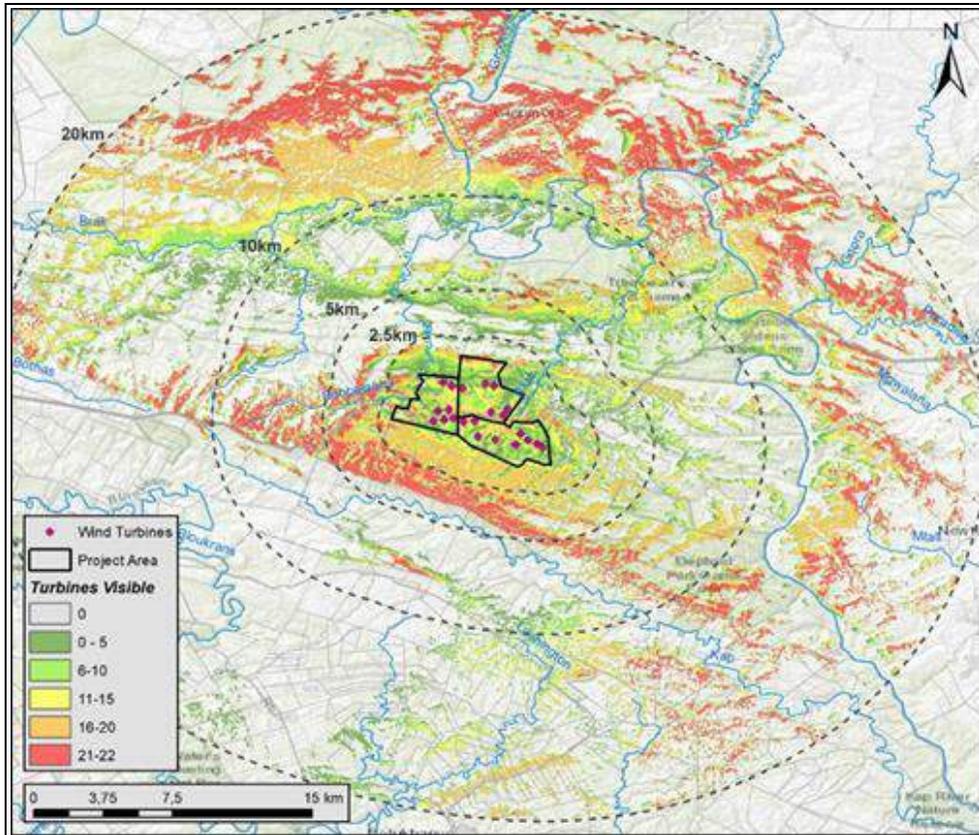


Figure 7: Cumulative viewshed 1 (approved: hub height 91.5m; rotor diameter 117m)

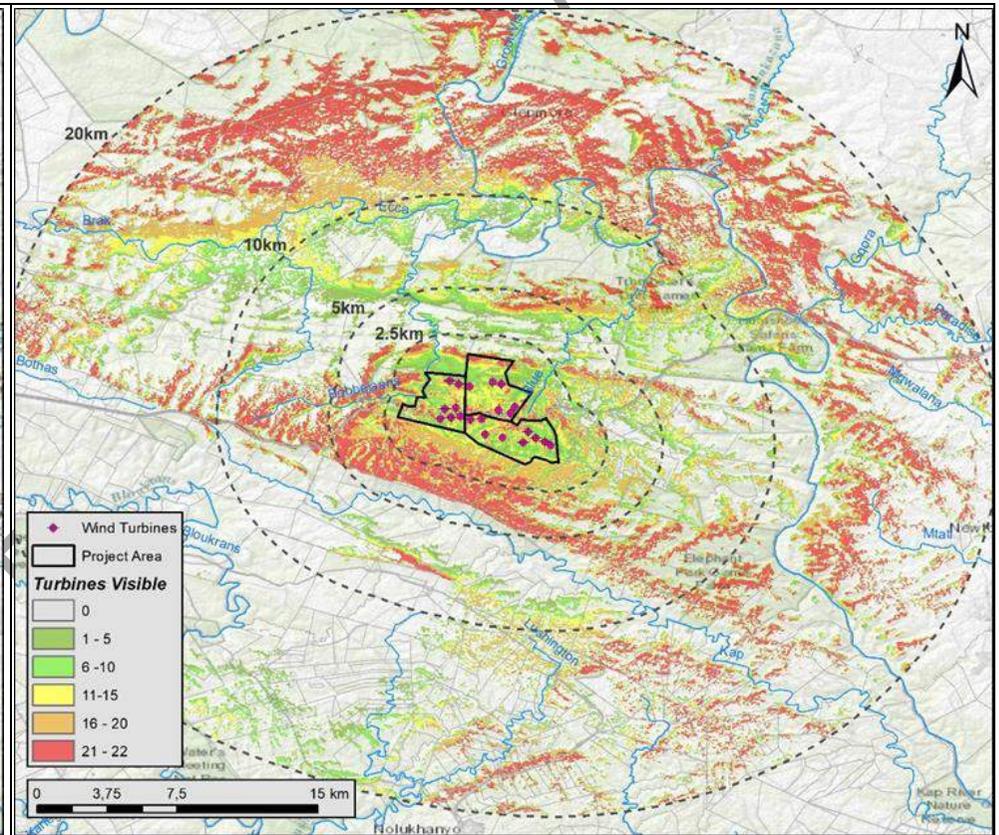


Figure 8: Cumulative viewshed 2 (proposed: hub height 125m; rotor diameter 149m)

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4.1.2. Visual Intrusion

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.

- 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;
- 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.

In general, the proposed increase in turbine size will increase the visual intrusion of the wind turbines as they will be more noticeable.

4.2. Significance of visual impact on the landscape

4.2.1. Impact 1: Introduction of highly visible wind turbines into a rural-agricultural landscape

The original 2012/2013 VIA identified three main landscape types: rural villages, stock and game farms, and crop farms. These were all identified as having a low sensitivity to the proposed wind farm development, since they were regarded as not pristine or prized for their natural beauty. This is because much of the land has been transformed in some way, resulting in man-made structures, activities and effects being present in most views of the landscape.

The likelihood of the impact is definite, and the overall significance is rated as Moderate negative. As mentioned in the original 2012/2013 VIA there are no mitigation measures that will change the significance of the landscape impact, other than avoiding the site entirely.

Table 3: Significance of the visual impact of wind turbines on the landscape

Impact (Operation Phase only)	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
All Alternatives					
Without Mitigation	Long Term	Regional	Moderate	Definite	Moderate Negative
With Mitigation	Long Term	Regional	Moderate	Definite	Moderate Negative

4.3. Significance of visual impact on viewers

Although the sensitivity of the general landscape in the area to changes, such as the introduction of a wind energy facility into the area, is considered to be low, the same cannot necessarily be said of all viewers/ visual receptors in the area. Sensitive viewers are considered to be residents in urban areas, rural villages and on nearby farms, visitors to scenic viewpoints and protected areas and, in this particular case, trophy hunters in game hunting areas in the surrounding area. Impacts

relate to the construction and operation phases of the project.

4.3.1. Impact 2: Intrusion of large and highly visible construction activity on sensitive viewers

The overall significance of this impact during the construction of the facility has been changed from High negative in the original 2012/2013 VIA to Moderate negative in the current VIA. This is because the temporal scale of the impact is short term, and because construction activities and large vehicles on busy roads in the region are currently a familiar occurrence and will therefore not seem out of place.. This is particularly so in the immediate vicinity of the project due to the upgrade of the N2 highway. Mitigation measures for this impact as proposed in the original 2012/2013 VIA remain relevant and must be implemented.

Table 4: Significance of the visual impact of construction activities on sensitive viewers (as per the original 2012/2013 VIA)

Impact (Construction Phase only)	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
All Alternatives					
Without Mitigation	Short Term	Regional	Moderate	Definite	Moderate Negative
With Mitigation	Short Term	Regional	Slight	Definite	Moderate Negative

4.3.2. Impact 3: Intrusion of large wind turbines on the existing views of sensitive visual receptors

Although the proposed amendment will increase the overall size of the turbines, the changes are not sufficient to affect the overall significance of Impact 3, as described in the original 2012/2013 VIA by Henry Holland, which remains High negative. As before, there are no mitigation measures that will change the significance of the impact, other than avoiding the site entirely.

Table 5: Significance of the visual impact of the proposed wind farm on sensitive viewers (as per the original 2012/2013 VIA)

Impact (Operation Phase only)	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
All Alternatives					
Without Mitigation	Long Term	Regional	Severe	Definite	High Negative
With Mitigation	Long Term	Regional	Severe	Definite	High Negative

4.3.3. Impact 4: Impact of night lights on the existing nightscape

Wind farms are required by law to be lit at night, as they represent potential hazards to low-flying aircraft due to the height of the turbines. Marking of turbines depends on wind farm layout and not all turbines need to be lit. Marking consists of a red flashing light of medium intensity (2 000 candela).

As described in Section 4.1 the proposed changes will increase the visibility of the Plan 8 Grahamstown WEF. This will, therefore, potentially increase the number of night lights that will be visible from the surrounding areas.

While light pollution does exist in the form of single or multiple lights related to farmsteads, communication towers, vehicles travelling along the N2 and the background glow caused by towns such as Grahamstown, Peddie and the rural villages spread out along the north bank of the Fish River, the sight of a large number of closely, albeit irregularly spaced synchronised flashing lights is unique to wind energy facilities, and can be quite conspicuous, with the bright red of the lights contrasting highly with the nearly black backdrop.

The severity of Impact 4 has thus been increased from slight in the original 2012/2013 VIA to moderate in terms of the current VIA. However, the change in severity will not increase the overall significance of this impact. Mitigation measures as proposed in the original 2012/2013 VIA remain relevant and must be implemented.

Table 6: Significance of the visual impact of night lighting on sensitive viewers

Impact (Operation Phase only)	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
All Alternatives					
Without Mitigation	Long Term	Study Area	Moderate	Probable	Moderate Negative
With Mitigation	Long Term	Study Area	Moderate	Probable	Moderate Negative

4.3.4. Shadow flicker effect

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 an opening in a building’s wall, 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, if any, the health risks may be. 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). It is therefore assumed for the purpose of this report that the situation in South Africa is opposite, that is, only properties within 130 degrees either side of south of a particular turbine can be affected by shadows.

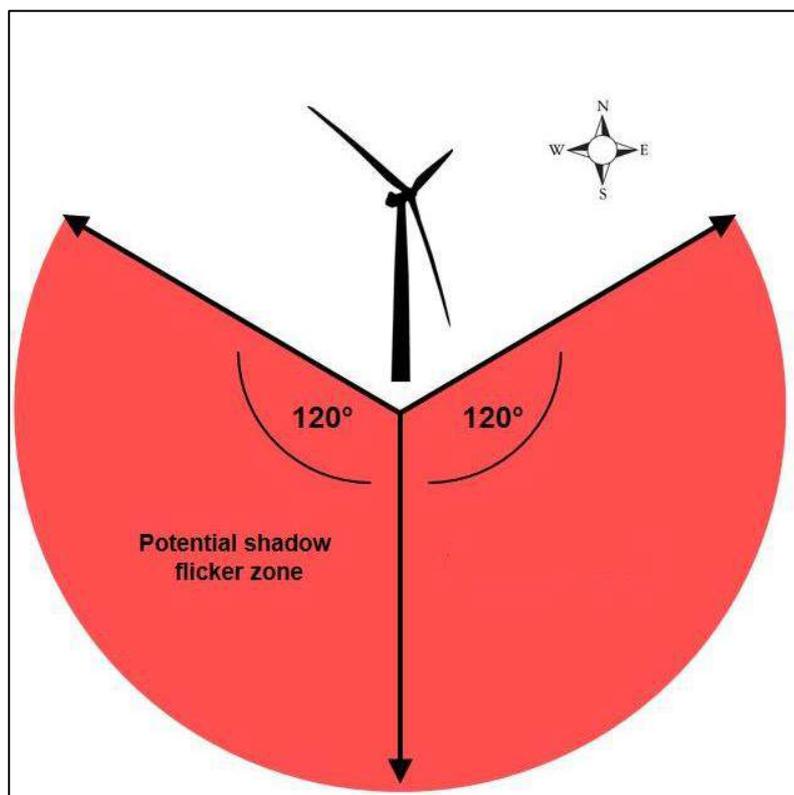


Figure 9: Potential shadow flicker zone in the southern hemisphere

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

1. 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).

2. The hub height

When the hub is higher, the same shadow will be spread over a larger area resulting in a reduced intensity of shadow in the vicinity of the turbine. The proposed changes to Plan 8 Grahamstown WEF are to increase the hub height from 91.5m to 125m.

3. Intervening vegetation

Vegetation may screen shadows. In the study area, vegetation is not dense or tall enough to reduce potential shadow flicker impacts.

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 original 2012/2013 VIA, shadow flicker modelling indicated that only one building (a homestead) is at a slight risk of being affected more often than international guidelines suggest as the threshold (30 hours/year, or 30 minutes on the worst affected day) at which mitigation measures should be implemented to reduce the impact. Residents of the house own the property on which the turbines will be installed. As discussed above the increase in hub height is likely to cause a reduction in the severity of this impact. Therefore the proposed changes to the previously-approved Plan 8 Grahamstown WEF would not affect Impact 3 as the severity was already classified as slight in the original 2012/2013 VIA by Henry Holland. Mitigation measures proposed in the original 2012/2013 VIA remain relevant and must be implemented.

Table 7: Significance of the visual impact of shadow flicker

Impact (Operation Phase only)	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
All Alternatives					
Without Mitigation	Long Term	Study Area	Slight	May Occur	Moderate Negative
With Mitigation	Long Term	Study Area	Slight	Unlikely	Low Negative

4.3.5. Cumulative visual impacts

At the time of submission of the Second Final Amended EIA Report for the Plan 8 Grahamstown WEF, in April 2015, there were a number of facilities in the general area of the Plan 8 site that were operational (or close to operational), had been approved, or had been proposed by their developers. The facilities that were within 70km of the Plan 8 site were as follows:

Operational:

- Grahamstown Wind Energy Facility: 36km from the Plan 8 site.

Approved:

- Peddie Wind Energy Facility: 25km from the Plan 8 site.
- Canyon Springs Wind and Solar Facility: approximately 45km from the Plan 8 site.
- Uncedo Lwethu Wind Energy Facility: approximately 50km from the Plan 8 site.
- Riverbank Wind Energy Facility: adjacent to Uncedo Lwethu, approximately 50km from the Plan 8 site.
- Lushington Park WEF: approximately 65 km from the Plan 8 site.

Proposed:

- The proposed Terra Power Solutions Riebeeck East WEF (approximately 30 km away)
- The Spitskop WEF (approximately 45 km away)
- The Amakhala Emoyeni WEF (approximately 70 km away)

The locations of these facilities, and other facilities further than 70km from the Plan 8 site, are shown on Figure 8.

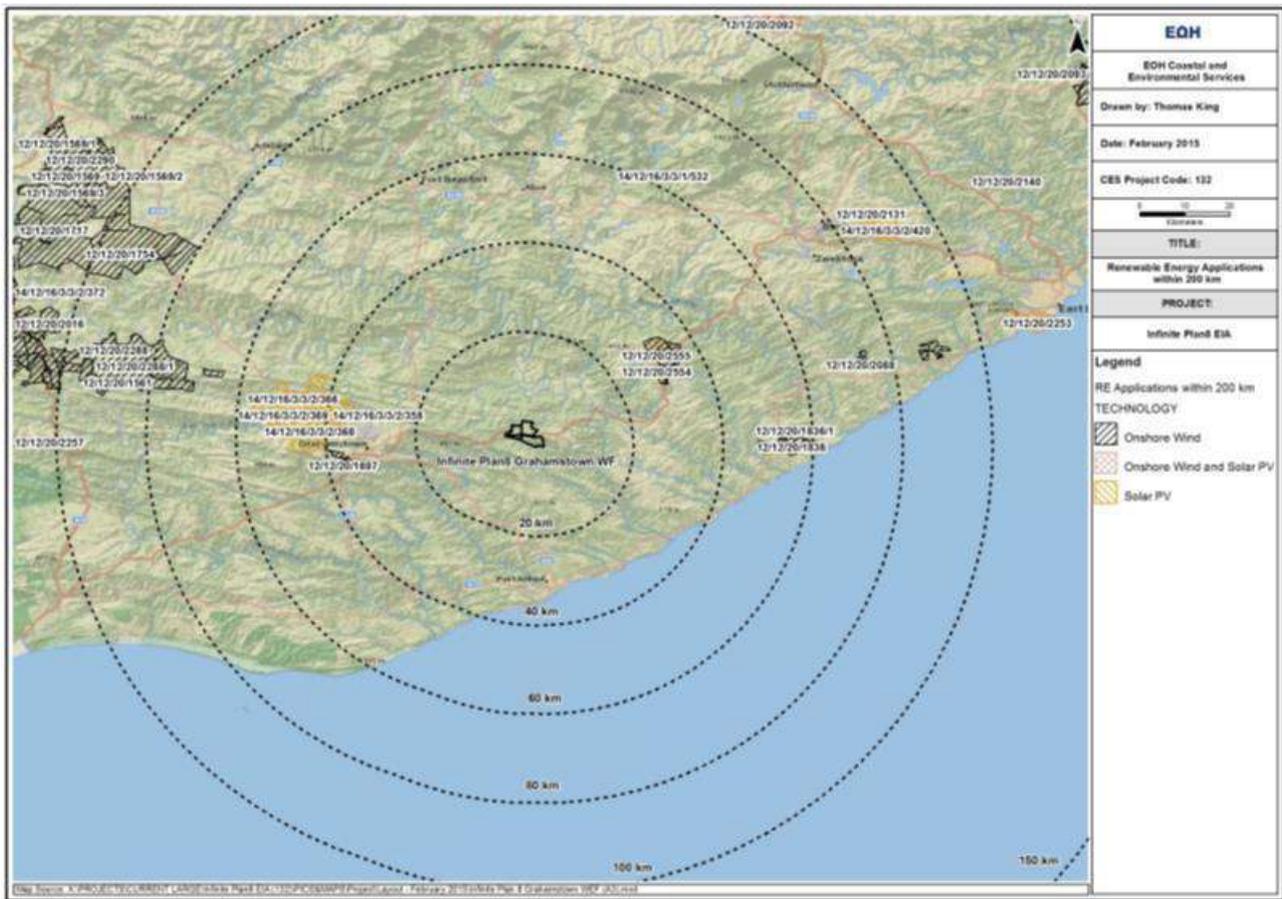


Figure 8: Renewable energy projects in the general area of the proposed Plan8 WEF

Source: Figure 7.1, Second Final Amended EIA Report, CES 2015

Since the nearest facility (the Peddie WEF) is 25km away, the contribution of the Plan 8 facility to cumulative impacts was considered to be negligible.

However, in recent months an EIA has been commenced for the proposed Albany Wind Energy Facility, the site for which is situated between the Plan 8 site and Grahamstown. The Albany facility will comprise up to 66 turbines, with a total installed capacity of up to 297MW. The hub height of the turbines is planned to be up to 150m, with blade lengths of up to 75m. The location of the proposed Albany facility in relation to the Plan 8 facility is shown on Figure 9. The closest turbines on the two sites will be separated by about 6km.

The visual impact of the Albany facility will be considerable. Given that there will be up to 66 turbines on the Albany site (compared with 22 on the Plan 8 site), and the maximum height from ground level to the tip of the blades will be up to 225m (compared with up to 199m for the Plan 8 facility), the visual impact will be significantly higher.

The cumulative visual impacts of the two facilities will be high, with the proposed Albany WEF making the largest contribution to the impact.

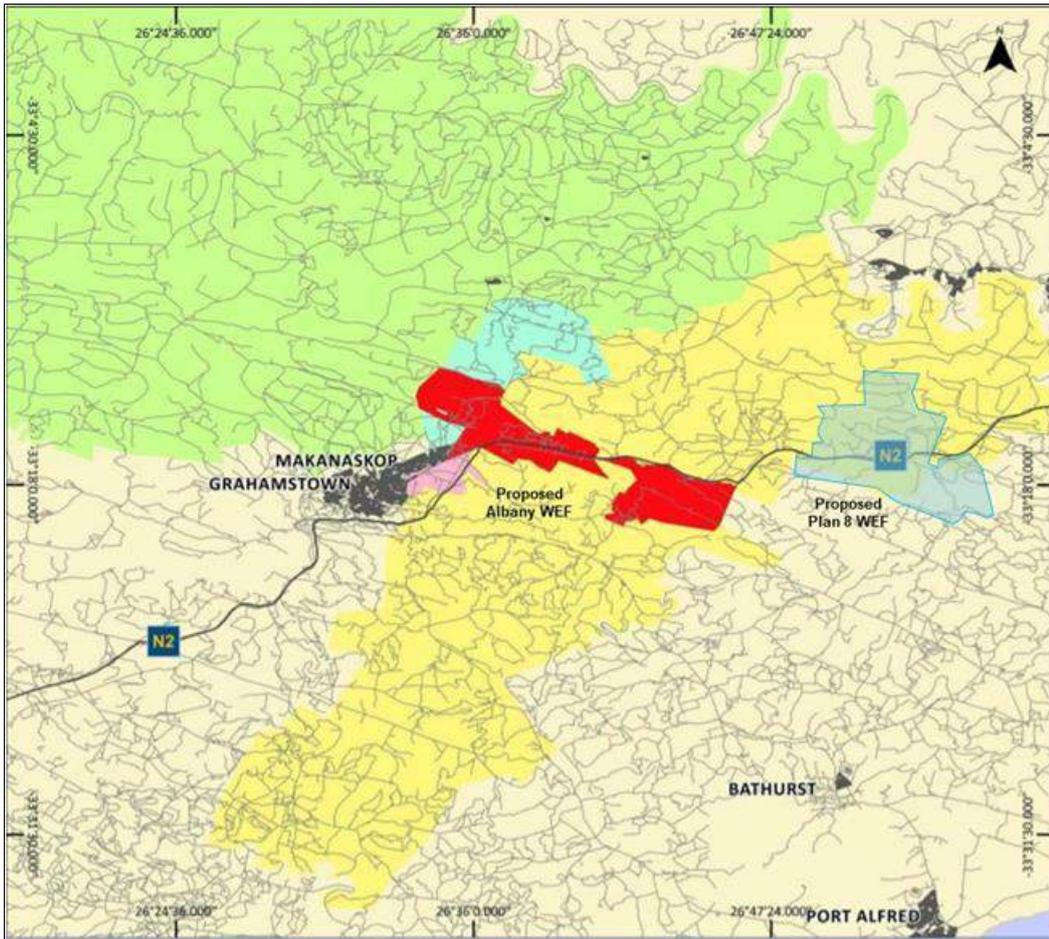


Figure 9: Location of the proposed Albany WEF in relation to the Plan 8 WEF

5. CONCLUSIONS & RECOMMENDATIONS

Plan 8 (Pty) Ltd. received EA (DEA Ref number: 12/12/20/2523) from the DEA to construct the Plan 8 Grahamstown WEF. In terms of Regulation 31 and 32 of the 2014 National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations, as amended. Plan 8 (Pty) Ltd. wishes to apply for an amendment to the EA issued. From a visual impact assessment perspective, the most significant changes are the proposed increase in the hub height (91.5m to 125m) and rotor diameter (117m to 149m). There have been no proposed changes in the number of turbines or the layout.

Summary of Impacts:

Impact	Pre-Mitigation	Post Mitigation
Impact 1: Impact of introducing highly visible wind turbines into a rural-agricultural landscape	MODERATE-	MODERATE-
Impact 2: Intrusion of large and highly visible construction activity on sensitive viewers	MODERATE-	MODERATE-
Impact 3: Intrusion of large wind turbines on the existing views of sensitive visual receptors	HIGH-	HIGH-
Impact 4: Impact of night lights on the existing nightscape	MODERATE-	MODERATE-
Impact 5: Impact of shadow flicker	MODERATE-	LOW-

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.

The change in turbine height and rotor diameter for the proposed Plan 8 WEF will not introduce any new visual impacts, nor significantly alter the visual impacts as assessed in the original 2012/2013 VIA Report, for which the original project received Environmental Authorisation. The changes will however increase the visibility, exposure and visual intrusion of the project.

5.1. Concluding Statement

The Plan 8 Grahamstown WEF will undoubtedly impose the visual landscape for nearby visual receptors. While the HIGH residual visual impacts cannot be completely mitigated, these should be considered within the context of the following:

- The wind farm is not permanent and the turbines and other superstructure will be removed on decommissioning of the wind farm;
- The landscape can be restored through rehabilitation prior to decommissioning;
- Although limited, certain mitigation recommendations can mitigate the impacts to some extent;
- Although there are local losses in terms of visual impacts, there will also be local, regional and national environmental, social and economic gains in the form:
 - Economic investment
 - Job creation and skills development,
 - Energy security
 - Climate change mitigation
- In terms of the REIPPPP, certain benefits will accrue to:
 - Local communities through the establishment of local community trusts.
 - BBBEE partners through shareholding targets.

It is also very important to note that renewable energy (including wind) forms an integral part of the National Development Plan (NDP) both in terms of energy security and climate change mitigation.

It is concluded that potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed changes. Therefore, there is no reason, in terms of visual concerns, why the amended project should not receive authorisation.

6. REFERENCES

CES 2015a: Second Final Amended Environmental Impact Assessment Report: Proposed Plan 8 Grahamstown Wind Energy Project, Makana Municipality. Volume 3, CES, Grahamstown, April 2015.

CES 2015b: Addendum to Second Final Amended EIA Report, CES, Grahamstown, April 2015.

DEA 2015: Environmental Authorisation in terms of Regulation 36 of the Environmental Impact Assessment Regulations, 2010,: Establishment of the Plan 8 Grahamstown Wind energy Facility (WEF) and its associated infrastructure within the Makana Local Municipality, Eastern Cape, Cacadu District Municipality, Department of Environmental Affairs, 22nd October 2015.

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Holland, H (MapThis). 2012. Visual Impact Assessment of Proposed Plan 8 Grahamstown Wind Energy

Facility. (Revised March 2013)

Oberholzer, B. 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Parsons Brinckerhoff. 2011. Update of UK Shadow Flicker Evidence Base - Final Report, London, England: Department of Energy and Climate Change.

Plan 8, July 2018: Personal communications via e-mail, Zuben Jessa, July 2018.

APPENDIX A: CURRICULA VITAE OF STUDY TEAM

MICHAEL JOHNSON

CONTACT DETAILS

Name of Company EOH Coastal & Environmental Services
Designation Environmental Consultant
Profession Environmental Consultant

E-mail michael.johnson@eoh.com
m.johnson@cesnet.co.za

Office number 082 746 43610

Nationality South African

Key areas of expertise

- Remote Sensing
- Geographic Information Systems

PROFILE

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 CSIR in Stellenbosch. During this time, in addition to his Master's studies, he conducted work in collaboration with the CSIR Coastal Systems Research Group and 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.

EMPLOYMENT EXPERIENCE

Consultant, EOH Coastal and Environmental Services
May 2018 - present

Sub consultant, EOH Coastal and Environmental Services
April 2018 – May 2018

Student/Junior project researcher, CSIR
February 2016 – November 2018

Course tutor, Stellenbosch University
February 2016 – November 2018

ACADEMIC QUALIFICATIONS	Stellenbosch University, 2016- March 2018 MSc: Geoinformatics
	Stellenbosch University, 2015 BSc (Hons) cum laude: Geoinformatics
	Stellenbosch University, 2012-2014 BSc: Geoinformatics
COURSES	Rhodes University and CES, Grahamstown EIA Short Course 2017
CONFERENCE PROCEEDINGS	37th Symposium of Remote Sensing of the Environment Extracting near-shore ocean wave characteristic parameters using remote sensing and computer vision technologies March 2017
	Society of South African Geographers Student Conference Deriving bathymetry from multispectral Landsat 8 imagery in South Africa September 2016
	CSIR NRE Science week Detection of coastal ocean wave characteristics from remotely sensed imagery April 2016
CONSULTING EXPERIENCE	King Cetshwayo Environmental management Framework, 2018. -Creating, updating and mapping Landcover
	Buffalo City Metropolitan Municipality Invasive Alien Species Plan, 2018. -Mapping of alien plant species using remote sensing
	Swartland Municipality Invasive Alien Plant Species Plan, 2018. -Mapping of alien plant species
	Northcliff Nature Reserve, 2018. -Environmental Management Plan
	Bayview WEF, 2018. -Visual Impact Assessment
	Rietkloof WEF, 2018. -Visual Impact Assessment
	SANBI Kwelera National Botanical Gardens, 2018. -Viewshed analysis for visual impact study

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Michael Johnson

Date: 18th August 2018

ALAN CARTER

CONTACT DETAILS

Name of Company	EOH Coastal & Environmental Services
Designation	Executive
Profession	Environmental Consultant
Years with firm	16 Years
E-mail	alan.carter@eoh.co.za a.carter@cesnet.co.za
Office number	043-726 7809 / 8313
Nationality	South African
Professional body	SACNASP: South African Council for Natural Scientific Profession EAPSA: Environmental Assessment Practitioners Southern Africa IWMSA: Institute Waste Management Southern Africa TSBPA: Texas State Board of Public Accountancy (USA)
Key areas of expertise	Marine Ecology Environmental and coastal management Waste management Financial accounting and project feasibility studies Environmental management systems, auditing and due-diligence

PROFILE

Alan has extensive training and experience in both financial accounting and environmental science disciplines with international accounting firms in South Africa and the USA. He is a member of the American Institute of Certified Public Accountants (licensed in Texas) and holds a PhD in Plant Sciences. He is also a certified ISO14001 EMS auditor with the American National Standards Institute. Alan has been responsible for leading and managing numerous and varied consulting projects over the past 25 years.

Employment Experience

- October 2013 – Present: Executive (EOH Coastal & Environmental Services, East London, South Africa)
- January 2002 – September 2013: Director (Coastal & Environmental Services, East London, South Africa)
- January 1999 – December 2001: Manager (Arthur Andersen LLP, Public Accounting Firm, Chicago, Illinois USA)
- December 1996 – December 1998: Senior Accountant/Auditor (Ernst & Young LLP, Public Accounting Firm, Austin, Texas, USA.)
- January 1994 – December 1996: Senior Accountant/Auditor (Ernst & Young, Charteris & Barnes, Chartered Accountants, East London, South Africa)

	<p>Africa)</p> <ul style="list-style-type: none"> • July 1991 – December 1994: Associate Consultant (Coastal & Environmental Services, East London, South Africa) • March 1989 – June 1990: Data Investigator (London Stock Exchange, London, England, United Kingdom)
<p>Academic Qualifications</p>	<ul style="list-style-type: none"> • Ph.D. Plant Science (Marine) Rhodes University 1987 • B. Compt. Hons. Accounting Science University of South Africa 1997 • B. Com. Financial Accounting Rhodes University 1995 • B.Sc. Hons. Plant Science Rhodes University 1983 • B.Sc. Plant Science & Zoology Rhodes University 1982
<p>Courses</p>	<ul style="list-style-type: none"> • Environmental Management Systems Lead Auditor Training Course - American National Standards Institute and British Standards Institute (2000) • ISO 14001:2015 Implementing Changes - British Standards Institute (2015) • Numerous other workshops and training courses
<p>CONSULTING EXPERIENCE</p>	<p><u>Environmental Impact Assessment, Feasibility and Pre-feasibility Assessments</u></p> <ul style="list-style-type: none"> • Managed numerous projects and prepared environmental impact assessment (EIA) reports in terms of relevant EIA legislation and regulations for development proposals including: Infrastructure projects: bulk water and waste water, roads, electrical, mining, ports, aquaculture, renewable energy (solar and wind), industrial processes, housing developments, golf estates and resorts, etc. (2002 – present). • Projects have also included preparation of applications in terms of other statutory requirements, such as water-use and mining licence /permit applications. • Managed projects to develop pre-feasibility and feasibility assessments for various projects, including various tourism developments, infrastructure projects, etc. • Managed project for the East London Industrial Development Zone (ELIDZ) to develop a Conceptual Framework for a Mariculture Zone within the ELIDZ (2009). • Managed pre-feasibility study to establish a Mariculture Zone within the Coega Industrial Development Zone (2014). • Assisted City of Johannesburg in the process to proclaim four nature reserves in terms of relevant legislation (2015-2016). • Acted as Environmental Control Officer (ECO) for numerous projects including solar and wind farms, roads, industrial processes, etc. <p><u>Strategic Environmental Assessment</u></p> <ul style="list-style-type: none"> • Managed Strategic Environmental Assessment (SEA) project toward the development of a Biofuel Industry in the Eastern Cape Province of South Africa (2014-2016) • Managed Strategic Environmental Assessment (SEA) projects for two South African ports (2006 – 2007). • Managed Strategic Environmental Assessment (SEA) projects for five (5) local municipalities in the Eastern Cape as part of the municipal Spatial Development Framework plans (2004 – 2005). • Involved in the financial assessment of various land-use options and carbon credit potential as part of a larger Strategic Environmental

Assessment (SEA) for assessing forestry potential in Water Catchment Area 12 in the Eastern Cape of South Africa (2006).

Climate change, emissions trading and renewable energy

- Provided specialist peer review services for National Department of Environmental Affairs relating to climate change impact assessments for large infrastructure projects (2017-2018).
- Conducted climate change impact assessment for a proposed coal-fired power station in Africa (2017-2018).
- Participated in the development of a web-based Monitoring & Evaluation (M&E) system for climate change Mitigation and Adaptation in South Africa for National Department of Environmental Affairs (DEA) (2015-2016).
- Managed project to develop a Climate Change Strategy for Buffalo City Metro Municipality (2013).
- Managed projects to develop climate change strategies for two district municipalities in the Eastern Cape Province (2011).
- Conducted specialist carbon stock and greenhouse gas emissions impact and life cycle assessment as part of the Environmental, Social and Health Impact Assessment for a proposed sugarcane to ethanol project in Sierra Leone (2009 - 2010) and a proposed Jatropha bio-diesel project in Mozambique (2009 - 2010).
- Managed project to develop the Eastern Cape Province Climate Change Strategy (2010).
- Managed project to develop a Transnet National Ports Authority Climate Change Risk Strategy (2009).
- Participated in a project to develop a Renewable Energy roadmap for the East London Industrial Development Zone (ELIDZ) (2013).
- Participated in a project for the East London Industrial Development Zone (ELIDZ) and Eastern Cape Government to prepare a Renewable Energy Strategy (2009).
- Contributed to the development of Arthur Andersen LLP's International Climate Change and Emissions Trading Services (2001).
- Conducted carbon credit (Clean Development Mechanism - CDM) feasibility assessment for a variety of renewable energy projects ranging from biogas to solar PV.
- Participated in the preparation of CDM applications for two solar PV projects in the Eastern Cape.

Waste Management

- Managed project to develop Integrated Waste Management Plans for six local municipalities on behalf of the Sarah Baartman District Municipality in the Eastern Cape Province (2016).
- Managed project to develop Integrated Waste Management Plans for four local municipalities on behalf of Alfred Nzo District Municipality in the Eastern Cape Province (2015).
- Managed project to develop Integrated Waste Management Plans for eight local municipalities on behalf of Chris Hani District Municipality in the Eastern Cape Province (2011).
- Managed a project to develop a zero-waste strategy for a community development in the Eastern Cape Province (2010).
- Managed waste management status quo analysis for a District Municipality in the Eastern Cape Province (2003).
- For three consecutive years, managed elements of the evaluation of the environmental financial reserves of the three largest solid waste companies (Waste Management, Inc., Republic Services, Inc., Allied

Waste, Inc.) and number of smaller waste companies in the USA as part of the annual financial audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.

- Managed elements of the evaluation of the environmental financial reserves of the largest hazardous waste company in the USA (Safety-Kleen, Inc.), as part of the audit process for SEC reporting purposes. Ensured compliance with RCRA and CERCLA environmental regulations.

Environmental Due Diligence and Business Risk

- Participated in the
- Conducted environmental due diligence projects on behalf of the German Development Bank for a forestry pulp and paper operation in Swaziland (2010) and for a large diversified South African agricultural/agro-processing company (2011)
- Managed project for the Transnet National Ports Authority to identify the environmental risks and liabilities associated with the operations of the Port of Durban as part of a broader National initiative to assess business and financial risks relating to environmental management (2006).
- Managed project to determine the financial feasibility of various proposed tourism developments for the Kouga Development Agency in the Eastern Cape Province (2006)
- Contributed significantly to a study to determine the financial and environmental feasibility of three proposed tourism development projects at Coffee Bay on the Wild Coast (2004).
- Conducted sustainability and cost/benefit analysis of various waste water treatment options (including a marine pipeline at Hood Point) for the West Bank of East London (2004).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).
- Involved in the determination of the historical cost element of environmental remediation insurance claims for a number of multinational companies, including Dow Chemicals, Inc. and International Paper, Inc.
- Evaluated the environmental budgeting process of the US Army and provided best practice guidance for improving the process.

Policy and Guidelines

- Development of Administration / Application Fee Structure for the Reclamation of Land, Coastal Use Permits, Coastal Waters
- Discharge Permits, Dumping Of Waste at Sea, Off-Road Vehicle Regulations Promulgated in Terms of the National Environmental Management Act: Integrated Coastal Management Act (Act No. 24 Of 2008) (2017).
- Managed project to develop an Estuarine Management Plan for the Buffalo River Estuary for the National Department of Environmental Affairs (2017).
- Managed project to develop a Coastal Management Programme for Amathole District Municipality, Eastern Cape (2015 – 2016).
- Managed project to develop a sustainability diagnostic report as part of the development of the Eastern Cape Development Plan and Vision 2030 (2013).
- Managed project for the Department of Environmental Affairs and Tourism, Marine & Coastal Management to determine the cost implications associated with the implementation of the Integrated Coastal Management Act (2007).
- Managed project to develop a Conservation Plan and Municipal Open

Space System (MOSS) for Buffalo City Municipality (2007)

- Managed project to develop a Sanitation Policy and Strategy for Buffalo City Municipality, Eastern Cape (2004 – 2006).
- Managed project to develop an Integrated Environmental Management Plan and Integrated Coastal Zone Management Plan for Buffalo City Municipality, Eastern Cape (2004 – 2005).
- Managed projects to develop and implement an Environmental Management System (EMS) for the Chris Hani and Joe Gqabi (formerly Ukhahlamba) District Municipalities in the Eastern Cape generally in line with ISO14001 EMS standards (2004 – 2005).
- Managed project to develop a State of the Environment Report and Environmental Implementation Plans for Amathole, Chris Hani, OR Tambo and Joe Gqabi District Municipalities in the Eastern Cape Province (2005 – 2010).
- Conducted analysis of permit fees and application processing costs for off-road vehicle use on the South African coastline for the Department of Environmental Affairs and Tourism, Marine & Coastal Management (2003).

Environmental auditing and compliance

- Conducted environmental legal compliance audit for various large Transnet Freight Rail facilities (2018).
- Managed projects to develop Environmental & Social Management Systems (ESMS) in line with IFC Performance Standards for three (3) wind farms in South Africa (2015-2018).
- Managed project to develop an Environmental & Social Management System (ESMS) in line with IFC Performance Standards for a telecoms company in Zimbabwe on behalf of the German Development Bank (2013)
- Participated in numerous ISO14001 Environmental Management System (EMS) audits for large South African corporations including SAPPI, BHP Billiton, SAB Miller, Western Platinum Refinery, Dorbyl Group and others (2002 – present).
- Reviewed the SHE data reporting system of International Paper, Inc. (IP) for three successive years as part of the verification of the IP SHE Annual Report, which included environmental assessments of 12 IP pulp and paper mills located throughout the USA.
- Conducted Environmental Management System (EMS) reviews for a number of large US corporations, including Gulfstream Aerospace Corporation

Public financial accounting

- While with Ernst & Young LLP, (USA), functioned as lead financial auditor for various public and private companies, mostly in the technology business segment of up to \$200 million in annual sales. Client experience included assistance in a \$100 million debt offering, a \$100 million IPO and SEC annual and quarterly reporting requirements.
- Completed three years of articles (training contract) in fulfilment of the certification requirements of the South African Institute of Chartered Accountants which included auditing, accounting and preparation of tax returns for many small to medium sized commercial entities.

Publications**Refereed Publications**

- Carter, A.R. 1985. Reproductive morphology and phenology, and culture studies of *Gelidium pristoides* (Rhodophyta) from Port Alfred in South Africa. *Botanica Marina* 28: 303-311.
- Carter, A.R. 1993. Chromosome observations relating to bispore production in *Gelidium pristoides* (Gelidiales, Rhodophyta). *Botanica Marina* 36: 253-256.
- Carter, A.R. and R.J. Anderson. 1985. Regrowth after experimental harvesting of the agarophyte *Gelidium pristoides* (Gelidiales: Rhodophyta) in the eastern Cape Province. *South African Journal of Marine Science* 3: 111-118.
- Carter, A.R. and R.J. Anderson. 1986. Seasonal growth and agar contents in *Gelidium pristoides* (Gelidiales, Rhodophyta) from Port Alfred, South Africa. *Botanica Marina* 29: 117-123.
- Carter, A.R. and R.H. Simons. 1987. Regrowth and production capacity of *Gelidium pristoides* (Gelidiales, Rhodophyta) under various harvesting regimes at Port Alfred, South Africa. *Botanica Marina* 30: 227-231.
- Carter, A.R. and R.J. Anderson. 1991. Biological and physical factors controlling the spatial distribution of the intertidal alga *Gelidium pristoides* in the eastern Cape Province, South Africa. *Journal of the Marine Biological Association of the United Kingdom* 71: 555-568.

Published reports

- Water Research Commission. 2006. Profiling Estuary Management in Integrated Development Planning in South Africa with Particular Reference to the Eastern Cape. Project No. K5/1485.
- Turpie J., N. Sihlophe, A. Carter, T. Maswime and S. Hosking. 2006. Maximising the socio-economic benefits of estuaries through integrated planning and management: A rationale and protocol for incorporating and enhancing estuary values in planning and management. Un-published Water Research Commission Report No. K5/1485

Conference Proceedings

- Carter, A.R. 2002. Climate change and emission inventories in South Africa. Invited plenary paper at the 5th International System Auditors Convention, Pretoria. Held under the auspices of the South African Auditor & Training Certification Association Conference (SAATCA).
- Carter, A.R. 2003. Accounting for environmental closure costs and remediation liabilities in the South African mining industry. Proceedings of the Mining and Sustainable Development Conference. Chamber of Mines of South Africa, Vol. 2: 6B1-5
- Carter, A.R. and S. Fergus. 2004. Sustainability analysis of wastewater treatment options on the West Bank of East London, Buffalo City. Proceedings of the Annual National Conference of the International Association for Impact Assessment, South African Affiliate: Pages 295-301.
- Carter, A., L. Greyling, M. Parramon and K. Whittington-Jones. 2007. A methodology for assessing the risk of incurring environmental costs associated with port activities. Proceedings of the 1st Global Conference of the Environmental Management Accounting Network.
- Hawley, GL, McMaster AR and Carter AR. 2009, Carbon, carbon stock and life-cycle assessment in assessing cumulative climate change impacts in the environmental impact process. Proceedings of the Annual National Conference of the International Association for Impact Assessment, South African Affiliate.

- Hawley, GL, McMaster AR and Carter AR. 2010. The Environmental and Social Impact Assessment and associated issues and challenges. African, Caribbean and Pacific Group of States (ACP), Science and Technology Programme, Sustainable Crop Biofuels in Africa.
- Carter, A.R. 2011. A case study in the use of Life Cycle Assessment (LCA) in the assessment of greenhouse gas impacts and emissions in biofuel projects. 2nd Environmental Management Accounting Network- Africa Conference on Sustainability Accounting for Emerging Economies. Abstracts: Pages 69-70.

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



ALAN CARTER

Date: 18th August 2018

APPENDIX J: TELKOM – CONDITIONAL APPROVAL LETTER



Office of the Executive Integrated Network
Planning

Telkom SA SOC Limited

Private Bag X74

Pretoria

0001, South Africa

Tel : +27 12 311 2012

Fax : +27 12 311 1686

Email : Shawis@telkom.co.za

17 September 2018

Pan 8 Infinite Energy (Pty) Ltd
4 Bideford Rd
Woodstock
Cape Town
7925

Dear Zuben Jessa

RE: APPLICATION FOR APPROVAL OF THE GRAHAMSTOWN WIND ENERGY FACILITY

The above matter refers.

Kindly take note that Telkom SA SOC Ltd ("Telkom") has received an application from Pan 8 Infinite Energy (Pty) Ltd, hereafter referred to as THE APPLICANT, who wishes to construct a wind farm approximately 28 km east of Grahamstown with a turbines layout as defined in annexure 1, hereafter referred to as the THE SITE, in accordance with the provisions of Section 29(1) (b) of Electronic Communications Act no. 36 of 2005 ("the Act").

Telkom has analysed the information provided by the Applicant in accordance with the provisions of Section 29(1)(c) of the Act, and specifically the location of the site. Telkom SA hereby grants the Applicant the approval to proceed with the construction of its energy project at the site subject to the following terms and conditions:

- Take note that the findings made by Telkom are based on simulation and calculated on a theoretical model, using available data and assumptions where no data was provided. Therefore, such findings may change at any time should any further information be made available to or come to Telkom's attention.
- At any time after the approval, and during construction of the project, should any radio transmissions be affected by construction activities, Telkom will give the Applicant 30 (thirty) days' written notice to minimise or reduce and/or remove the cause of the interference. Under no circumstances will Telkom be liable to the Applicant or any other third party for any damages, of any nature whatsoever, suffered as a consequence of the aforementioned request.
- Construction activities underneath, along, across or within close proximity to Telkom infrastructure must comply to the applicable Telkom guidelines relating to clearances between equipment and the proposed construction activity. Furthermore, the Applicant must strictly adhere to and all installations must be fully compliant with the Occupational Health and Safety Act, 1993 (Act 85 of 1993).

Telkom SA SOC Limited: Reg no 1991/005476/30

Directors: JA Mabuza (Chairman), SN Maseko (Group Chief Executive Officer), JH Schindehütte (Chief Financial Officer), S Botha, Dr. CA Fynn, N Kapila*, I Kgaboesele, K Kweyama, L Maasdorp, K Mzondeki, F Petersen, LL Von Zeuner.

Company Secretary: X Makasi

*India

- This approval is further subject to the submitted application's boundaries or structures listed in annexure 1 below, the materials used as well as the size and positioning of structures declared in the application. If any radio system is compromised by a deviation of this submission and the deviation cannot be reversed, the Applicant shall be liable for the cost to re-establish or relocate the service and under no circumstances will Telkom be liable to the Applicant or any other third party for any damages, of any nature whatsoever, suffered as a consequence.
- This approval is valid and applicable to and between Telkom and the Applicant. It does not include approval by other electronic communication operators that have a co-sharing agreement for use on Telkom radio masts.
- Any additions, amendments, additional structures to be built or change to the energy farm boundaries will require a fresh application to Telkom.
- The validity of this approval is for a period of 12 (twelve) months. If construction of the designed project commences after the expiry of the twelve month period, the application must be re-submitted to Telkom for evaluation and approval.
- This approval does not imply any right of access to Telkom property or use of Telkom's access roads for construction or maintenance of the design project. Permission must be obtained from Telkom in this regard. Furthermore Telkom reserves the right to claim damages in terms of Section 108 of the Post Office Act No. 44 of 1958, for any loss sustained as a result of damage to our electronic communications infrastructure.
- the Applicant shall, in the carrying out of any work or project take all necessary precautions for the safety of Telkom's employees, contractors, representatives and its property including the radio links on or near the Site against damages as result of construction of the Applicant's energy project. the Applicant shall be liable for all and any direct and / or indirect, and / or consequential damages or injury that may be caused by the Applicant, its contractors, subcontractors, employees or representatives to any employee, contractor, representative or property of Telkom including radio links or land which may have been disturbed.
- Any work in connection with the construction of the Applicant's energy project shall be carried out by the Applicant, in such a way as to avoid any possible loss or inconvenience to the Telkom, its customers or the public, and on completion of such work, any property of Telkom, including radio links or land which may have been disturbed shall be restored to the same condition which it was in before commencement of the construction of energy project.
- In no event will Telkom, its employees, contractors, subcontractors or representatives be liable to the Applicant or anyone else for special, collateral, exemplary, direct, indirect, incidental, consequential or any other damages (including without limitation, loss of goodwill, loss of profits or revenues, loss of savings, loss of use, interruptions of business, and claims of the Applicant or injury) whether or not such damages or injury occurred prior or subsequent to, or are alleged as a result of any Telkom radio links approved and/or not approved in terms of this letter or as result of delict, even if Telkom SA has been advised of the possibility of such damages or injury.

We trust you find the above in order.

Regards,

Leonard Shaw Pr. Tech (Eng.)
Specialist
Integrated Network Planning

Telkom SA SOC Limited: Reg no 1991/005476/30

Directors: JA Mabuza (Chairman), SN Maseko (Group Chief Executive Officer), JH Schindehütte (Chief Financial Officer), S Botha, Dr. CA Fynn, N Kapila*

I Kgaboesele, K Kweyama, L Maasdorp, K Mzondeki, F Petersen, LL Von Zeuner.

Company Secretary: X Makasi

Annexure 1

Telkom has one radio link running through the wind farm and one link terminating in the wind farm. These radio links supply connectivity to Vodacom sites. The link running through the wind farm connects our site at Governorskop to Vodacom's site at Radiesvlei via our equipment. The link terminating in the wind farm at Houkoers, is linked with our radio equipment to a Vodacom site at Great Fish River Vodacom site. The turbines have been placed with the required 300m clearance from the radio paths to blade tip.

A simulation was run to test the effect of any back scatter on the radio links. No effect was detected on the calculated data provided with the 22 turbines. The turbines were modelled with a 100m mast and 58,5m blades. The location of the wind turbines are given below in decimal degree on the WGS84 datum. If any dispute arises with respect to the position of these points then the Chief Directorate National Geo-spatial Information trigonometrical system will be used to verify them.

Points	Longitude	Latitude
1	26.824745	-33.280571
2	26.829895	-33.280067
3	26.85825	-33.279606
4	26.836907	-33.285657
5	26.842388	-33.285538
6	26.84395	-33.29285
7	26.852479	-33.294584
8	26.864703	-33.291597
9	26.862294	-33.297003
10	26.868354	-33.294773
11	26.872781	-33.296554
12	26.8756	-33.298307
13	26.827722	-33.284853
14	26.832068	-33.284156
15	26.850367	-33.281256
16	26.856224	-33.282579
17	26.82238	-33.285427
18	26.836493	-33.269725
19	26.822089	-33.266331
20	26.8313271	-33.268669
21	26.847585	-33.267539
22	26.851818	-33.268658

End lists

Telkom SA SOC Limited: Reg no 1991/005476/30
 Directors: JA Mabuza (Chairman), SN Maseko (Group Chief Executive Officer), JH Schindehütte (Chief Financial Officer), S Botha, Dr. CA Fynn, N Kapila*,
 I Kgaboesele, K Kweyama, L Maasdorp, K Mzondeki, F Petersen, LL Von Zeuner.
 Company Secretary: X Makasi

APPENDIX K: SENTECH – CONDITIONAL APPROVAL LETTER



Private Bag X06
Honeydew
2040
Tel: (011) 471 - 4561
Enquiries:
motlhakes@sentech.co.za

Grahamstown Wind Energy Facility
Plan 8 Infinite Energy (Pty)
4 Bideford Road
Woodstock 7925

Email: zubenj@gmail.com
Office Tel: 021 207 2180

Date: 17 September 2018

Attention: Mr Zuben Jessa

Proposed establishment of Grahamstown Wind Energy Facility

1. The above matter refers.
2. We wish to advise that Sentech SOC Ltd ("Sentech") has received an application from Plan 8 Infinite Energy (Pty) Ltd ("the applicant"), which plans to construct Wind Energy Facility (WEF) farm as described in annexure 1 hereto, at Grahamstown hereafter referred to as "Grahamstown Wind Energy Facility", in accordance with the provisions of Section 29(1) (b) of the Electronic Communications Act no. 36 of 2005 ("the Act").
3. Sentech has analysed the information provided by the applicant in accordance with the provisions of Section 29(1) (c) of the Act, and specifically the location of the site and confirm that there would be limited degradation of Sentech transmitted Terrestrial UHF/VHF Television (TV), and/or FM radio services in the planned deployment area, as indicated in annexure 1.

DIRECTORS:

Mr. M Mello (Chairperson), Mr. M Bool (CEO), Mr. S Mthethwa CA (SA) (CFO), Mr. T Leshope (COO),
Ms. J Huntley, Ms. Z Mbele CA (SA), Mr. L Mtindie, Ms. L Ndlovu, D. S Malinga, Ms T Malaka
Company Secretary: Melanie Naidoo

SENTECH SOC Ltd Reg no: 1990/001791/30

4. Sentech hereby grants the applicant approval to proceed with the construction of its energy project at the site subject to the following terms and conditions:
 - 4.1 Due to the fact that the findings made by Sentech are based on simulations and calculated on a theoretical model, using available data and assumptions where no data was provided, such findings may change at any time should any further information be made available to or come to Sentech's attention;
 - 4.2 At any time after the approval, and during construction of the project, should any radio transmissions be affected by construction activities, Sentech will give the applicant 7 (seven) day's written notice to remove the cause of the interference.
 - 4.3 Under no circumstances whatsoever will Sentech be liable to the applicant or any third party for any damages, loss or costs, of any nature whatsoever or howsoever arising, suffered as a consequence of the aforementioned request and the applicant fully indemnify Sentech ;
 - 4.4 Sentech prior written consent must first be obtained before any construction activities underneath, along, across or within close proximity to Sentech infrastructure can begin and shall comply with the applicable Sentech guidelines relating to clearances between equipment and the proposed construction activity. Furthermore, the applicant shall clearly adhere to, and ensure all installations shall be fully compliant with the Occupational Health and Safety Act No. 85 of 1993.
5. This approval is further subject to the submitted applications boundaries or structures listed in annexure 1 hereto, the materials used, as well as the size and positioning of structures declared in the application. If the services of Sentech or its clients is in any way compromised by a deviation or change of this submission, the applicant shall be liable for all costs to re-establish, or relocate the services, and under no circumstances whatsoever will Sentech be liable to the applicant or any other third party for any damages, loss or costs, of any nature whatsoever or howsoever arising, suffered as a consequence.
6. This approval is valid and applicable between Sentech and the applicant only. It does not include any approval for any of the other electronic communication operators which have current co-sharing agreements to utilise Sentech's radio masts.
7. Any additions, amendments, additional structures to be built, or any change to the energy farm boundaries, will require a new application to Sentech.
8. The validity of this approval is for a period of 12 (twelve) months. If construction of the designed project commences after the expiry of the twelve month period, the application must be re-submitted to Sentech for further evaluation and approval.
9. This approval does not imply any rights of access whatsoever to Sentech property or use of Sentech's access roads for construction or maintenance of the design project. Separate permission must be obtained from Sentech in this regard. Furthermore, Sentech reserves the right to claim damages in terms of Section 29 of the Act, for any loss or damages sustained as a result of damages to any of Sentech's electronic broadcast and communications infrastructure.
10. The applicant shall, in carrying out any work or project, take all the necessary precautions for the safety of Sentech's employees, contractors, representatives and its property, including the radio transmitters and links on or near the site against damages as a result of construction of the applicant's energy project.



11. The applicant shall be liable for all and any direct and/or indirect, and/or consequential damages or injury that may be caused by the applicant, its contractors, subcontractors, employees, agents or representatives to any employee, contractor, representative or property of Sentech including radio network transmitters and/or links or land which may have been disturbed shall be restored to the same condition in which it was before commencement of the construction of the energy project.

12. In no event will Sentech, its employees, contractors, or representatives be liable to the applicant or any third party whatsoever for special, collateral, exemplary, direct, indirect, incidental, consequential or any other damages of any nature whatsoever or howsoever arising (including without limitation, loss of goodwill, loss of profits or revenues, loss of savings, loss of use, interruptions or noisiness, or injury) whether or not such damages or injury occurred prior or subsequent to, or are alleged as a result of any Sentech radio network approved and/or not approved in terms of this letter, even if Sentech has been advised of the possibility of such damages or injury.

All Sentech rights are fully reserved.

Regards.

Mr Serame Motlhake

Date

17 SEPTEMBER 2017

Manager: Broadcast Planning

DIRECTORS:

Mr. M Mello (Chairperson), Mr. M Bool (CEO), Mr. S Mthethwa CA (SA) (CFO), Mr. T Leshope (COO),
Ms. J Huntley, Ms. Z Mbele CA (SA), Mr. L Mtimde, Ms. L Ndlovu, Dr S Malinga, Ms T Malaka
Company Secretary: Melanie Naidoo

SENTECH SOC Ltd Reg no: 1990/001791/EO

ANNEXURE 1

The planned 22 Grahamstown Wind Energy Facility (WEF) will be located in the Grahamstown area according to the developer. The wind farm will be located ± 27 Km east of Grahamstown town. Grahamstown wind farm will be located ± 11 km east of the Grahamstown transmitter station (C9) and ± 100 km south-east of Bedford transmitter station (C17).

WTG interference calculations and predictions which included 22 planned WTG's was completed, the interference calculations and predictions indicated that the WTG's will have the potential to cause limited interferences on the existing UHF TV broadcast services. Analogue services that might be affected are SABC 3 and e-TV within the Grahamstown (C9) area, and SABC 2, 3 and e-TV in the Bedford (C17) transmitter stations coverage areas.

Digital services that might be affected are Mux1 and Mux2 within the Grahamstown (C9) area, and Mux1 and Mux2 in the Bedford (C17) transmitter stations coverage areas.

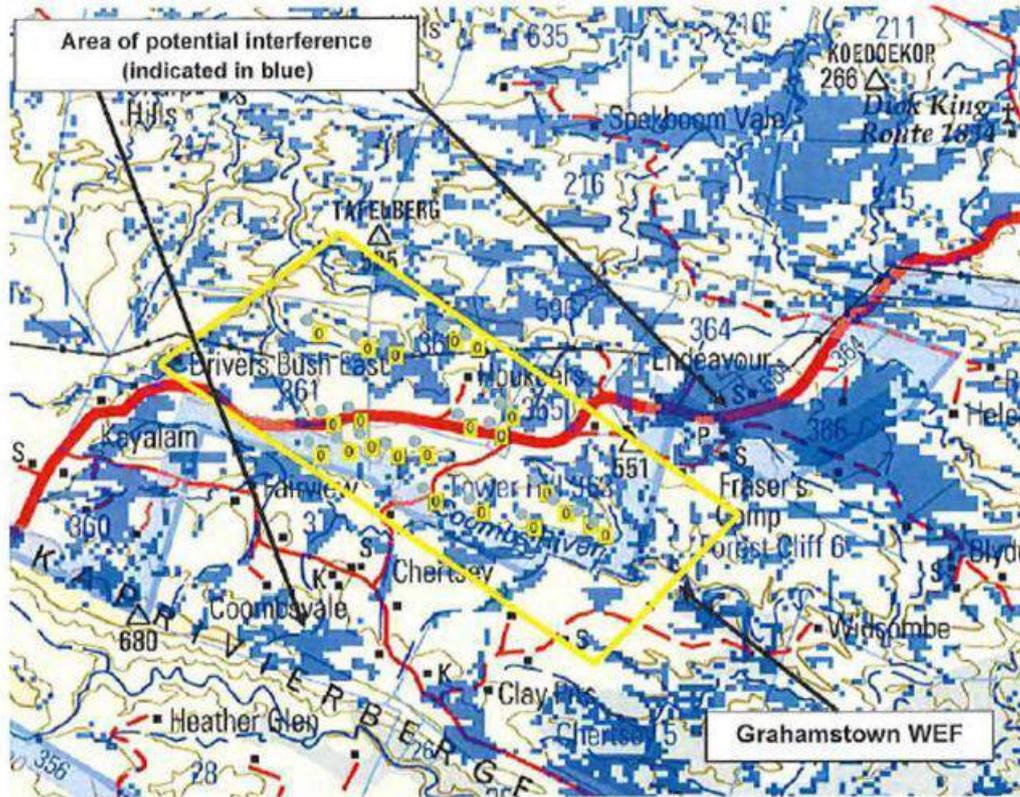
Conclusion on the results and findings of the planned 22 Grahamstown WTG's can be summarised as follow:

1. Potential interferences on analogue and DTT TV coverage will have the potential to affect the quality of viewer services in lodges (e.g. Bushmans Gorge Lodge and Coombs Lodge) and viewers staying north-east and east of the WTGs in villages namely: Ndlame, Sinqumeni, Nobumba, Ntloko, KwaGwalani and Emabaleni.
2. Most of the interferences are located in farming areas surrounding the WTG's.
3. None of the existing analogue or DTT RBR broadcast feeds in the area will be affected;
4. No interference on FM services will be experienced;
5. None of the existing FM RBR feeds broadcast feeds in the area will be affected.

The analogue and DTT service problem can technically be solved by implementing the following:

- Provide users in the interference areas with quality terrestrial TV installations with quality directional receive antennas.
- Provide viewers located in the identified potential interference areas with alternative service via Sentech's Direct-To-Home (DTH) satellite service.
- Provide additional 'gap-filling' transmitter stations to cover interference areas by using the existing wind turbine farm infrastructure.

The potential interference problem should be discussed and an amicable solution found through a meeting amongst Sentech, the affected broadcasters SABC, Multichoice, e-TV and Grahamstown Wind Farm Company Ltd.



Map 1: Map indicating the cumulative interference affected area (blue) caused by 22 WTG's by both UHF TV transmitter stations (C17 & C9) coverage areas. (ATDI ICS Telecom map).

DIRECTORS:

Mr. M Mello (Chairperson), Mr. M Boozi (CEO), Mr. S Mithethwa CA (SA) (CFO), Mr. T Leshope (COO),
Ms. J Huntley, Ms. Z Mbele CA (SA), Mr. L Mtimde, Ms. L Ndlovu, Dr S Malinga, Ms T Malaka
Company Secretary: Melanie Naidoo

SENTECH SOC Ltd Reg no: 1990/001791/30

APPENDIX L: DEPARTMENT OF MINERAL AFFAIRS APPROVAL (MPRDA S53) AND LETTER OF NO-OBJECTION FROM KAOLIN QUARRY OWNER

Note that the approval is valid for a period five years.

DMR 10



mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Private Bag X 6076, Port Elizabeth, 6000, 444 Govan Mbeki Avenue, 3rd Floor Pier 14, Port Elizabeth, 6001, Tel (041) 4035600
3600, Ref No: EC 30/5/4/2/11049 SU, e-mail: Edwina.Stevens@dmr.gov.za, Enquiries: E.Stevens

Registered Mail
THE MANAGER
GRAHAMSTOWN WIND FARM (PTY) LTD
100 NEW CHURCH STREET
TAMBOERSKLOOF
CAPE TOWN
8001

Att: Zuben Jessa
Sir/Madam

APPLICATION FOR A SURFACE USE IN TERMS OF SECTION 53 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT 28 OF 2002) (HEREINAFTER REFERRED TO AS "the Act"): BY GRAHAMSTOWN WIND FARM (PTY) LTD ON FARM GILEAD 361, TOWER HILL 363 & PEYNES KRAAL 362, SITUATED IN THE MAGISTERIAL DISTRICT OF ALBANY.

According to the available information the proposed consolidation as shown on the accompanying plan EC-30/5/4/2/11049-SU will not interfere with mining or purposes incidental thereto. In terms of Section 53 of the Mineral and Petroleum Resources Development Act 2002 (Act 28 of 2002), we have no objection against the proposed wind farm development provided that the consent of the holders of the issued mining right and borrow pit over the same property as that of the proposed wind farm is obtained.

Should the proposed development however not be finalized within five years, you will be required to consult with this office again in respect of this matter.

Yours faithfully


REGIONAL MANAGER: MINERAL REGULATION
EASTERN CAPE REGION
DATE: 17/02/2016

Acting

Application For A Surface Use In Terms Of Section 53 Of The MPRDA, 2002 (Act 28 Of 2002): By Grahamstown Wind Farm (Pty) Ltd, Situated In The Magisterial District Of Albany, Ref No. 11049 SU ES.



AQUARELLA
INVESTMENTS 389 (PTY) LTD

AQUARELLA INVESTMENTS 389 (PTY) LTD
(Registration No. 2006/018898/07)

Farm 2
Old Potchefstroom Road
Vereeniging
Gauteng
South Africa

PO Box 2247
Vereeniging
1930
South Africa

Telephone : +27 (0)16 930 3600
Telefax : +27 (0)16 930 3650

To:- Zuben Jesse
From:- Victor Lupuwana
Date:- 08 Feb. 17

Dear Zuben,

RE -: APPLICATION FOR INSTALLATION OF WIND FARM

Aquarella Investments has no objections in your proposed development of wind farm, provided the distances specified by the regulator are adhered to.

I hope all is in order.

Kind Regards,

Victor Lupuwana

Aquarella Investments (Pty) Ltd Reg. no. 2006/018898/07
Directors: L A Foxcroft, E Alli, V M Lupuwana

APPENDIX M: SANRAL – CONDITIONAL APPROVAL LETTER





SANRAL
BUILDING SOUTH AFRICA
THROUGH BETTER ROADS

Reference:	S11/1/1	Fax Number:	+27 (0) 41 492 0200/01
Date:	10 January 2019	Contact No.:	+27 (0) 41 398 3200
Enquiries:	Chumisa Njingana	Direct Line:	+27 (0) 41 398 3251
Email:	njinganac@nra.co.za	Website:	www.nra.co.za

EOH Coastal & Environmental Services
P.O. Box 94
Grahamstown
6140
Attention: Mr. Bill Rowlston
E-mail: billrowlston@gmail.com

Dear Madam

THE SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED AND NATIONAL ROADS ACT, 1998 (ACT 7 OF 1998): NATIONAL ROAD N2 SECTION 13 - PROPOSED PLAN 8 INFINITE ENERGY (PTY) LTD GRAHAMSTOWN WIND ENERGY FACILITY, LOCATED IN THE MAKANA LOCAL MUNICIPALITY

Your email received on the 04 January 2019, requesting comments on the above mentioned matter, refers.

The South African National Roads Agency (SOC) Limited (SANRAL) have the following comments with regards to the proposed Grahamstown Wind Energy Facility:

- The wind turbines must be erected at least 200 metres from the National Road Reserve boundary. If this requirement cannot be met, then a good motivation has to be submitted to SANRAL as to why the wind turbines should be erected closer.
- All other buildings / structures should be erected at least 60 metres from the National Road Reserve boundary and / or 500 metres from any intersection.
- If access is required from the National Road, an approval from SANRAL is required, otherwise access can be obtained from the nearest numbered route.
- A formal application together with the plans of the proposed wind farm must be submitted to SANRAL for approval.

Southern Region 20 Shoreward Drive, Bay West, Port Elizabeth, 6025 | PO Box 24210, Bay West, Port Elizabeth, South Africa, 6084 | Tel +27 (0) 41 398 3200
Fax +27 (0) 41 492 0201 | Email info@sanral.co.za | Visit us at www.sanral.co.za

Directors: Mr T Mbebe (Chairperson), Mr S Makoona (CEO), Mr K Hlawel, Ms L Madala, Mr T Matsoa, Ms N Mpoelane, Mr C Hlabisa, Ms A Vintzof | Company Secretary: Ms A Matlwa

Reg. No. 1998/009584/SO. An agency of the Department of Transport.

Page 1 of 2

- No installation of any infrastructure inside the Road Reserve.
- Construction of all work may only commence after written approval has been obtained from SANRAL.

Yours sincerely



C. C. Njingana
For M.S. Peterson
Regional Manager: Southern Region

Copy to: Route Manager – Shami Eksteen
 s.eksteen@eesc.co.za

APPENDIX N: SPECIALIST DECLARATIONS OF INTEREST

The first page of the Declaration is common to all, is not signed (and, contrary to the page number, is the first page of two, not three. It is reproduced here for completeness and to confirm the project title. Subsequently only the second page, which is specific to each specialist, is reproduced under the specialist's name.

 environmental affairs Department: Environmental Affairs REPUBLIC OF SOUTH AFRICA	
DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH	
File Reference Number:	(For official use only)
NEAS Reference Number:	DEA/EIA/
Date Received:	
Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)	
PROJECT TITLE Plan 8 Grahamstown Wind Energy Facility within the Makana Local Municipality, Eastern Cape Province	
Kindly note the following:	
<ol style="list-style-type: none"> 1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority. 2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms. 3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration. 4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate. 5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted. 	
Departmental Details	
Postal address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Private Bag X447 Pretoria 0001	
Physical address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Environment House 473 Steve Biko Road Arcadia	
Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at: Email: EIAAdmin@environment.gov.za	
Details of Specialist, Declaration and Undertaking Under Oath	
Page 1 of 3	

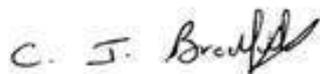
Mr Chris Bradfield: Agricultural Resources**1. SPECIALIST INFORMATION**

Specialist Company Name:	isi-Xwiba Consulting cc			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Christopher John Bradfield			
Specialist Qualifications:	National Diploma Agricultural Extension			
Professional affiliation/registration:	South African Council for Natural Scientific Professions Registration Number 400354/04			
Physical address:	16 Milner Street, Queenstown			
Postal address:	PO Box 2097, Komani			
Postal code:	5322	Cell:	083 441 1189	
Telephone:	083 441 1189	Fax:	086 618 4327	
E-mail	isix@icom.co.za			

2. DECLARATION BY THE SPECIALIST

I, Christopher John Bradfield, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

isi-Xwiba Consulting cc

Name of Company:

2018/12/18

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

Mr Jon Smallie: Avifauna

1. SPECIALIST INFORMATION

Specialist Company Name:	Wildskies Ecological Services (Pty) Ltd		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
Specialist name:	Jon Smallie		
Specialist Qualifications:	BSC MSC		
Professional affiliation/registration:	SACNASP		
Physical address:	36 Utrecht Avenue, Bonnie Doon, East London, 5241		
Postal address:	36 Utrecht Avenue, Bonnie Doon, East London, 5241		
Postal code:	5241		
Telephone:	082 444 8919	Cell:	082 444 8919
E-mail:	jon@wildskies.co.za	Fax:	086 615 5654

2. DECLARATION BY THE SPECIALIST

I, Jon Smallie, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist _____

Wildskies Ecological Services (Pty) Ltd
Name of Company: _____

7/1/2019
Date _____

Details of Specialist, Declaration and Undertaking Under Oath

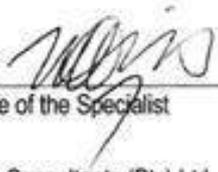
Mr Werner Marais: Chiroptera**1. SPECIALIST INFORMATION**

Specialist Company Name:	Animalia Consultants (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Level 4	Percentage Procurement recognition	0% (EME)
Specialist name:	Werner Marais			
Specialist Qualifications:	MSc Biodiversity and Conservation			
Professional affiliation/registration:	Pr.Sci.Nat (Zoological Science) – 400169/10			
Physical address:	3 Godetia str, Heldervue, Somerset West			
Postal address:	3 Godetia str, Heldervue, Somerset West			
Postal code:	7130	Cell:	+27 (0)78 190 3316	
Telephone:		Fax:		
E-mail:	werner@animalia-consult.co.za			

2. DECLARATION BY THE SPECIALIST

I, Werner Marais, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.


Signature of the Specialist

Animalia Consultants (Pty) Ltd

Name of Company:

22 January 2019

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

Mr Roy de Kock: Ecology**1. SPECIALIST INFORMATION**

Specialist Company Name:	EOH Coastal & Environmental Services		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)		Percentage Procurement recognition
Specialist name:	Roy de Kock		
Specialist Qualifications:	PhD Candidate Botany (Current) MSc Botany BSc (Hons) Geology		
Professional affiliation/registration:	SACNASP (400216/16)		
Physical address:	25 Tecoma Street, Berea, East London, 5241		
Postal address:	PO Box 8145, Nahoon, East London, 5210		
Postal code:	5210	Cell:	076 281 9660
Telephone:	043 726 7809 / 8313	Fax:	043 726 8352
E-mail:	r.dekock@cesnet.co.za		

2. DECLARATION BY THE SPECIALIST

I, Roy de Kock, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

EOH Coastal & Environmental Services

Name of Company:

12 February 2019

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

Dr Peter Nilssen: Archaeology

1. SPECIALIST INFORMATION

Specialist Company Name:	Dr Peter Nilssen		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
Specialist name:	Dr Peter Nilssen		
Specialist Qualifications:	BA, BA (hons), PhD		
Professional affiliation/registration:	Association of Southern African Professional Archaeologists		
Physical address:	30 Vincent Street, Mossel Bay		
Postal address:	PO Box 2635, Mossel Bay		
Postal code:	6500	Cell:	082 783 5896
Telephone:	044 691 0051	Fax:	
E-mail:	peter@carm.co.za		

2. DECLARATION BY THE SPECIALIST

I, Peter Nilssen, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information: in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Peter Nilssen

Signature of the Specialist

Dr Peter Nilssen

Name of Company:

Date

9 January 2019

Details of Specialist, Declaration and Undertaking Under Oath

Mr Brett Williams: Noise

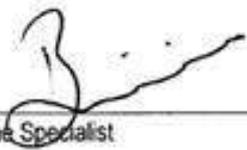
1. SPECIALIST INFORMATION

Specialist Company Name:	Safetrain cc T/A Safetech		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Non-Compliant	Percentage Procurement recognition
			0%
Specialist name:	Dr Brett Williams		
Specialist Qualifications:	PhD		
Professional affiliation/registration:	Registered Occupational Hygienist		
Physical address:	64 Worraker Street, Newton Park, Port Elizabeth. 6045		
Postal address:	PO Box 27607, Greenacres, Port Elizabeth		
Postal code:	6057	Cell:	+27 (0)82 550 2137
Telephone:	+27 (0)41 365 6846	Fax:	+27 (0)41 365 2123
E-mail:	brett.williams@safetech.co.za		

2. DECLARATION BY THE SPECIALIST

I, Dr Brett Williams, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.


Signature of the Specialist

Safetech

Name of Company:

12/2/2019

Date


GERALD CARL ZANDBERG
Commissioner of Oaths * Ex Officio
Professional Accountant (SA)
SAIPA Membership Number - 8732
19 HELY ROAD, FERNGLEN
PORT ELIZABETH, 6045

ABT
12 FEB 2019

Details of Specialist, Declaration and Undertaking Under Oath:

Dr Robert Gess: Palaeontology

1. SPECIALIST INFORMATION

Specialist Company Name:	Rob Gess Consulting		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition
Specialist name:	Dr Robert W Gess		
Specialist Qualifications:	Palaeontological Society of South Africa Research Fellow, Albany Museum, Grahamstown		
Physical address:			
Postal address:	PO Box 40, Bathurst		
Postal code:	6166	Cell:	082 759 5848
Telephone:		Fax:	
E-mail:	robg@imagnet.co.za		

2. DECLARATION BY THE SPECIALIST

I, Dr Robert Wolfgang Gess, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

Rob Gess Consulting

Name of Company:

08 February 2019

Date

Details of Specialist, Declaration and Undertaking Under Oath

Mr Conrad Swart: Socio-economics

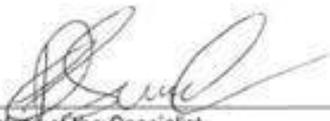
1. SPECIALIST INFORMATION

Specialist Company Name:	Urban-Econ Development Economists		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	3	Percentage Procurement recognition
			110%
Specialist name:	Conrad Swart		
Specialist Qualifications:	Development Economist		
Professional affiliation/registration:			
Physical address:	127 Cape Road, Mount Croix, Port Elizabeth, 6001		
Postal address:			
Postal code:		Cell:	
Telephone:	041 585 6640	Fax:	041 585 6151
E-mail:	ec@urban-econ.com		

2. DECLARATION BY THE SPECIALIST

I, Conrad Swart, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



 Signature of the Specialist

Urban-Econ Development Economists

 Name of Company:

07/01/2019

 Date

Details of Specialist, Declaration and Undertaking Under Oath

Mr Michael Johnston: Visual

1. SPECIALIST INFORMATION

Specialist Company Name:	EOH Coastal & Environmental Services		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition
			135%
Specialist name:	Michael Johnson		
Specialist Qualifications:	BSc Geoinformatics, Stellenbosch University BSc (Hons) cum laude Geoinformatics, Stellenbosch University MSc Geoinformatics, Stellenbosch University		
Professional affiliation/registration:			
Physical address:	The Point, Suite 408, 4th Floor, 76 Regent Road, Sea Point, Cape Town, 8060		
Postal address:	The Point, Suite 408, 4th Floor, 76 Regent Road, Sea Point, Cape Town, 8060		
Postal code:	8060	Cell:	+27 (82) 746 4380
Telephone:	(+27) 021 045 0900	Fax:	+27 (46) 622 6564
E-mail:	m.johnson@cesnet.co.za		

2. DECLARATION BY THE SPECIALIST

I, Michael Johnson, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

EOIH Coastal & Environmental Services

Name of Company:

21/12/2018

Date

Details of Specialist, Declaration and Undertaking Under Oath

REVISED DRAFT FOR REVIEW