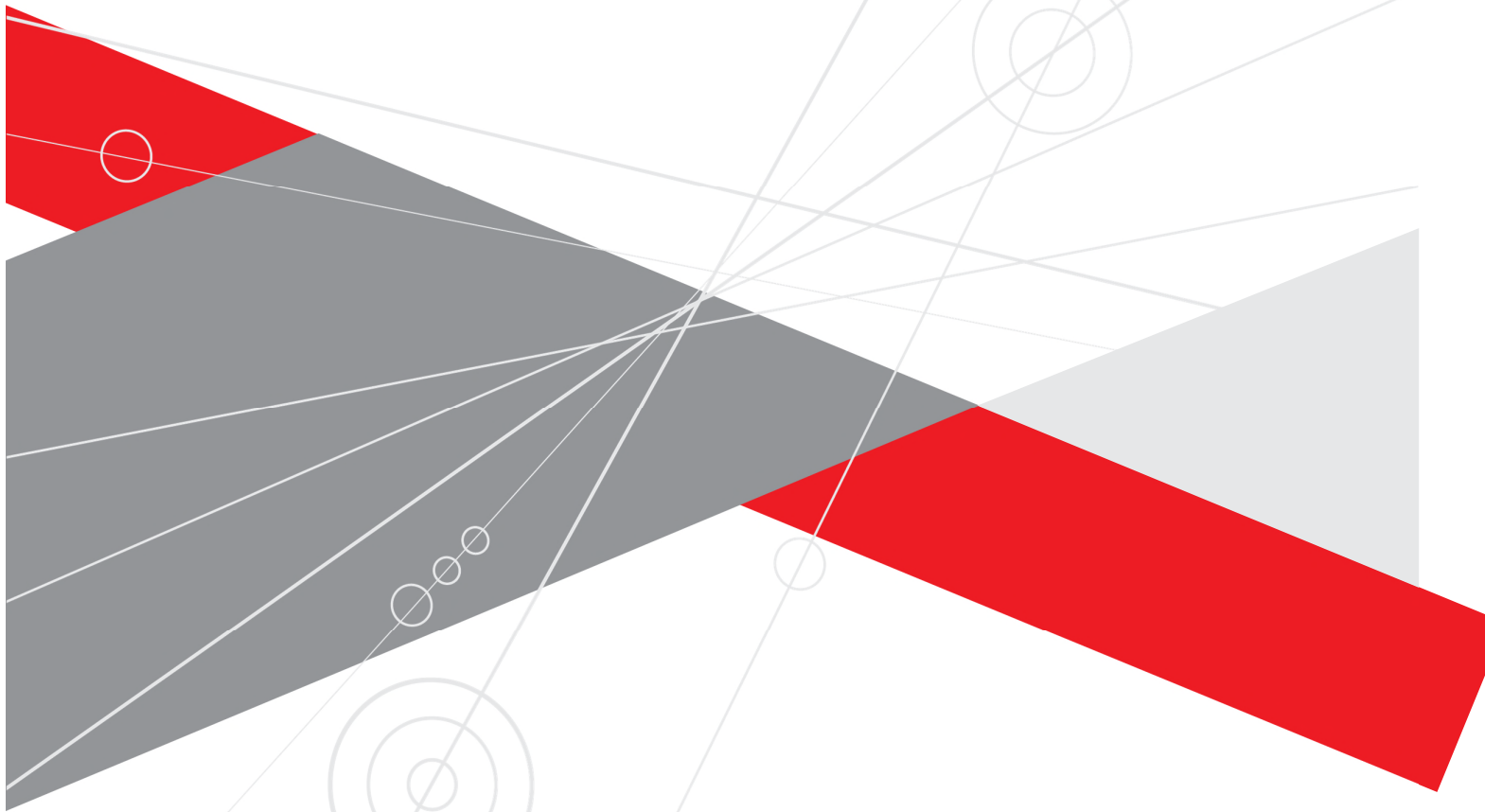


Zen Wind Energy Facility near Saron in the Western Cape Province

Motivation for amendment of Environmental Authorisation

DEA Ref.: 14/12/16/3/3/2/322

November 2019



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PROJECT DETAILS

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Client	:	Zen Wind Farm (Pty) Ltd
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PURPOSE OF THE REPORT

Zen Wind Farm (Pty) Ltd received an Environmental Authorisation (EA) for the establishment of the 140W Zen Wind Energy Facility near Saron in the Western Cape Province (DEA ref: 14/12/16/3/3/2/322) on 03 November 2016. The project is intended to be bid into future rounds of the Department of Energy's (DoE) Renewable Energy Independent Power Producers Procurement (REIPPP) Programme, the next round of which is expected to be announced shortly. There have been advancements to wind turbine technology since the issuing of the EA, and the turbines authorised in the EA will no longer be optimal for the project in terms of production and technical and economic viability of the project. In this regard, Zen Wind Farm (Pty) Ltd is considering an alternative turbine model for the project and is proposing the following amendments to the project description considered in the EIA process:

- » Reduction in the number of turbines from **46** to **27**;
- » Increase rated power of turbines from **3 MW** to up to **6 MW** per WTG
- » Increase rotor diameter from **122 m** to up to **165 m**;
- » Increase hub height from **110 m** to up to **140 m**;
- » Increase in the overall capacity of the wind energy facility from **140 MW** to up to **147 MW**;
- » Potential increase to dimensions of the crane pad and laydown area (storage area per turbine) from **2400 m²** to **5500 m²** per turbine;
- » Increase in the concrete foundation from **20m x 20m x 4m** to **25m x 25m x 6m**;
- » Update of the **layout**; and
- » Change the **holder of the EA**.

It is also requested that the property description be updated to be aligned with the current property details, as 3 properties have been consolidated since the Environmental Authorisation was issued in November 2016 (refer to Conveyance Certificates included in Appendix K). Remainder of Portion 4 of the farm Kleinbergvriev 1, Remainder of the farm Moolenaars Drift 85, and Remainder of Portion 1 of the farm Moolenaars Drift 85 were consolidated into one property namely i.e. Portion 0 of the farm Nayoth 458.

These amendments to the project description are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof. The proposed amendments in themselves are not listed activities and do not trigger any new listed activity. The layout has been updated to accommodate for the proposed changes to the turbine specifications. No additional properties will be affected by the amendments as the amendments are within the original authorised development footprint.

In terms of Condition 5 of the Environmental Authorisation and Chapter 5 of the EIA Regulations of December 2014 (as amended on 07 April 2017 and 13 July 2018), it is possible for an applicant to apply, in writing, to the competent authority for a change or deviation from the project description to be approved.

Savannah Environmental has prepared this motivation report in support of the amendment application on behalf of Zen Wind Farm (Pty) Ltd. This report aims to provide detail pertaining to the significance and impacts of the proposed change to the project description in order for interested and affected parties to be informed of the proposed amendments and provide comment, and for the competent authority to be able to reach a decision in this regard. This report is supported by specialist studies in order to inform the final conclusion regarding the proposed amendments (refer to **Appendix A to K** of this report). This main

report must be read together with these specialist studies in order to obtain a complete understanding of the proposed amendments and the implications thereof.

This amendment motivation report will be made available to registered interested and affected parties for a 30-day period from **13 November to 13 December 2019**. The availability of the report was advertised in Witzenberg Herald newspaper on the 08 November 2019 (refer to Appendix I4). This document is available for download at www.savannahsa.com. CD copies will be made available on request from the contact person below. To obtain further information, register on the project database, or submit written comment please contact:

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1. OVERVIEW OF THE PROJECT

1.1. Location:

The Zen Wind Energy Facility is located on a site ~7km south of Saron and ~10km north west of Gouda in the Drakenstein Local Municipality, and within the greater Cape Winelands District of the Western Cape Province. This development is proposed to comprise a cluster of up to 46 wind turbines (typically described as a wind energy facility or a wind farm) to be constructed within a larger area of approximately 3 542ha in extent. This area comprises the following farm portions as per the EA:

- » Portion 1 of the farm Bonne Esperance 83,
- » Portion 2 of the farm Bonne Esperance 83,
- » Portion 9 of the farm 88,
- » Remainder of Portion 4 of the farm Kleinberggrivier 1,
- » Remainder of the farm Moolenaars Drift 85, and
- » Remainder of Portion 1 of the farm Moolenaars Drift 85.

1.2. Potential Environmental Impacts as determined through the EIA Process

From the specialist investigations undertaken within the EIA process¹ for the proposed wind energy facility, the following environmental impacts relevant to the amendment application were identified:

- » Potential ecological impact;
- » Potential impacts on birds;
- » Potential impacts on bats;
- » Areas of visual impact;
- » Potential noise impact;
- » Potential impacts on heritage;
- » Potential impact on soils erosion; and
- » Potential impacts on social environment.

Key conclusions and recommendations of the EIA pertinent to this application:

From the specialist investigations undertaken as part of the EIA process for the wind energy facility, several environmentally sensitive areas were identified, and appropriate mitigation measures were proposed. The layout assessed during the EIA process undertaken for the project is illustrated in **Figure 1.1**. It was concluded that the majority of impacts associated with the Zen Wind Energy Facility are of moderate to low significance with the implementation of appropriate mitigation measures. Areas of sensitivity identified during the EIA process include:

- » *Ecosystem:* Remnants of Swartland Alluvium Fynbos and Swartland Shale Renosterveld occur on the eastern section of the site. These are Critically Endangered vegetation types and despite their disturbed nature, the presence of some species of conservation concern was confirmed for these areas. No turbines are located within the intact patches of remaining natural vegetation under the layout assessed

¹ Savannah Environmental (2015) Amended Final EIA Report: Proposed Zen Wind Energy Facility and Associated Infrastructure on a site near Saron, Western Cape

as part of the EIA process. The access road and presumably the cable trench from Turbine 35 to Turbine 45 traverse one of these intact patches.

- » *Agricultural potential:* Soils with high agricultural potential have been identified within the affected properties. No infrastructure is planned in this area of high agricultural potential, as well as in current irrigated fields. It has been agreed with the Department of Agriculture that wherever feasible, existing access routes should be utilised to minimise the need for new route establishment. Centre-pivot irrigation areas should be avoided.
- » *Bats:* The Berg River and the Klein Berg River have been identified as bat sensitive areas and a 200m buffer has been recommended. Roosts were observed on the project site and within the broader study area. No turbines are proposed to be located in the vicinity of the bat roosts site or on/within 200m of the Klein Berg River. The Saronsberg mountain range is also a bat sensitive habitat. No development of wind turbines is proposed on the elevated topography.
- » *Noise sensitive receptors within and around the site:* Three noise sensitive receptors are located within the project site and considered sensitive to noise during the construction and operation of the wind turbines. Noise modelling suggested that noise from the wind turbines during operation will be of a low significance.
- » *Visual receptors:* Receptors identified include farm homesteads and the town of Saron. The visual impacts of the wind energy facility will be of a medium to high significance.
- » *Potentially sensitive avifaunal species and habitats:* All turbines are sited more than 200m from the rivers, which are considered to be bird-sensitive habitat on the project site. Birds in agricultural land already tolerate major seasonal changes in micro-habitat and periods of major human disturbance (ploughing, harvesting, etc.) and therefore displacement for most species is unlikely to be severe. There is ample alternative habitat available and therefore the loss caused by the footprint of the development is considered unimportant. During operation of the facility, the threat of fatalities of avifauna is also considered a potentially significant impact. The main area of concern for avifauna is mortality through collisions with rotor blades. Of the 21 identified priority species, two local resident species – Blue Crane and Spurwinged Goose are at highest risk of mortality through collision and potentially also through displacement from breeding or foraging areas. Most of the other priority species e.g. Greater Flamingo and Martial Eagle, occur in the area of the wind energy facility in far smaller or negligible numbers, and/or too infrequently, to be a source of concern. Karoo Shelduck and Egyptian geese are other species occurring in the area noted to be at higher risk of collision.
- » *Heritage features of significance:* Heritage artefacts (albeit of no important heritage significance) were identified within the project site. These include two old structures /buildings which would require a permit from Heritage Western Cape should they need to be demolished for the project. Early Stone Age (ESA) material is common on the project site, but its density varies considerably according to location. The material at these sites are largely in secondary context having been left on the surface after erosion of the overlying deposits. Two small LSA scatters were found on the banks of the Berg River in the far west of the project site. Neither was dense, and the find was too dispersed to be able to distinguish any source areas. No graves were observed in the study area.

No environmental fatal flaws were identified to be associated with the Zen Wind Energy Facility. Environmental specifications for the management of potential impacts are detailed within the Environmental Management Programme (EMPr) compiled for the project.

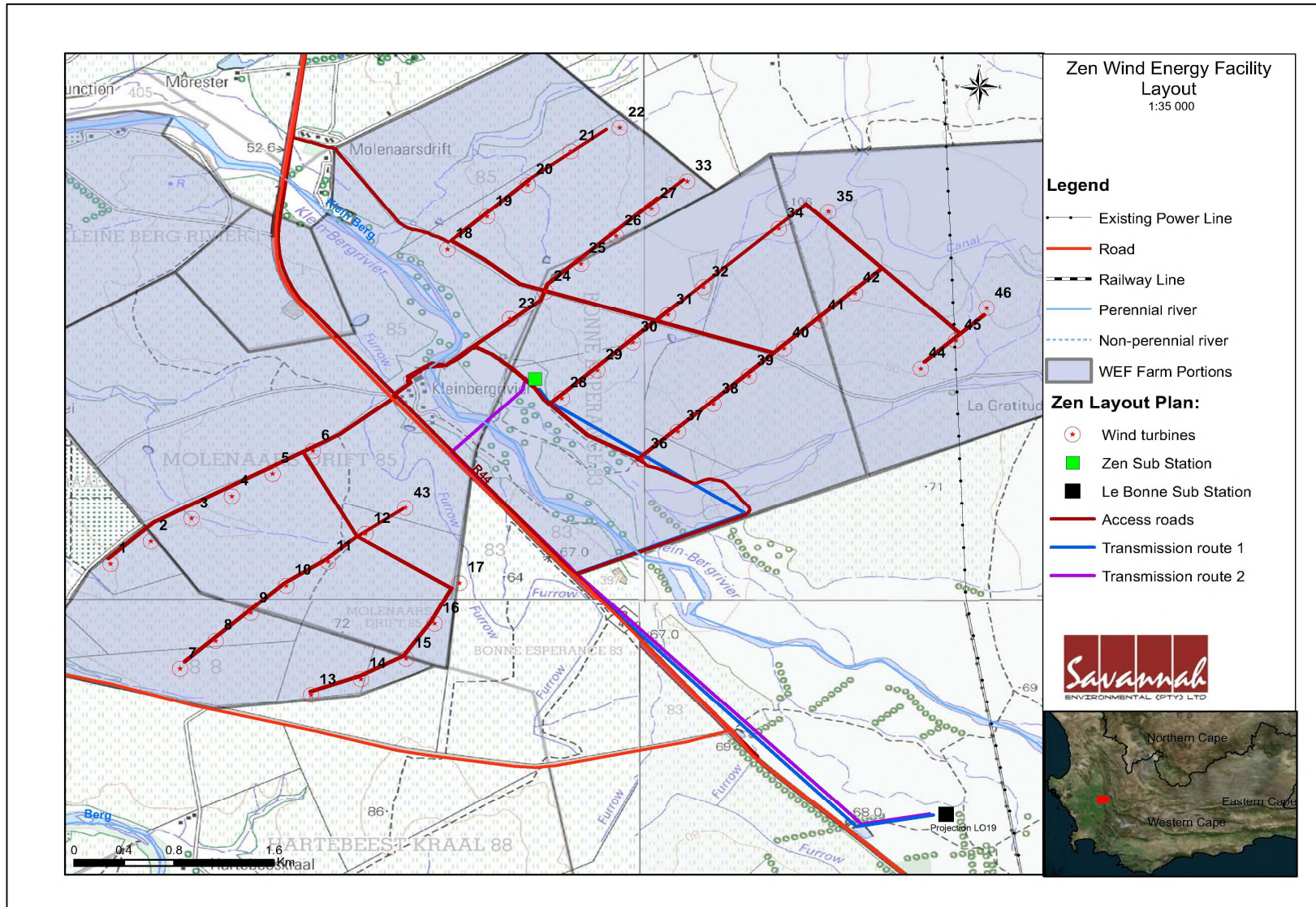


Figure 1.1: The turbine layout assessed during the EIA process undertaken for the project in 2015 (A3 Map included in **Appendix J**).

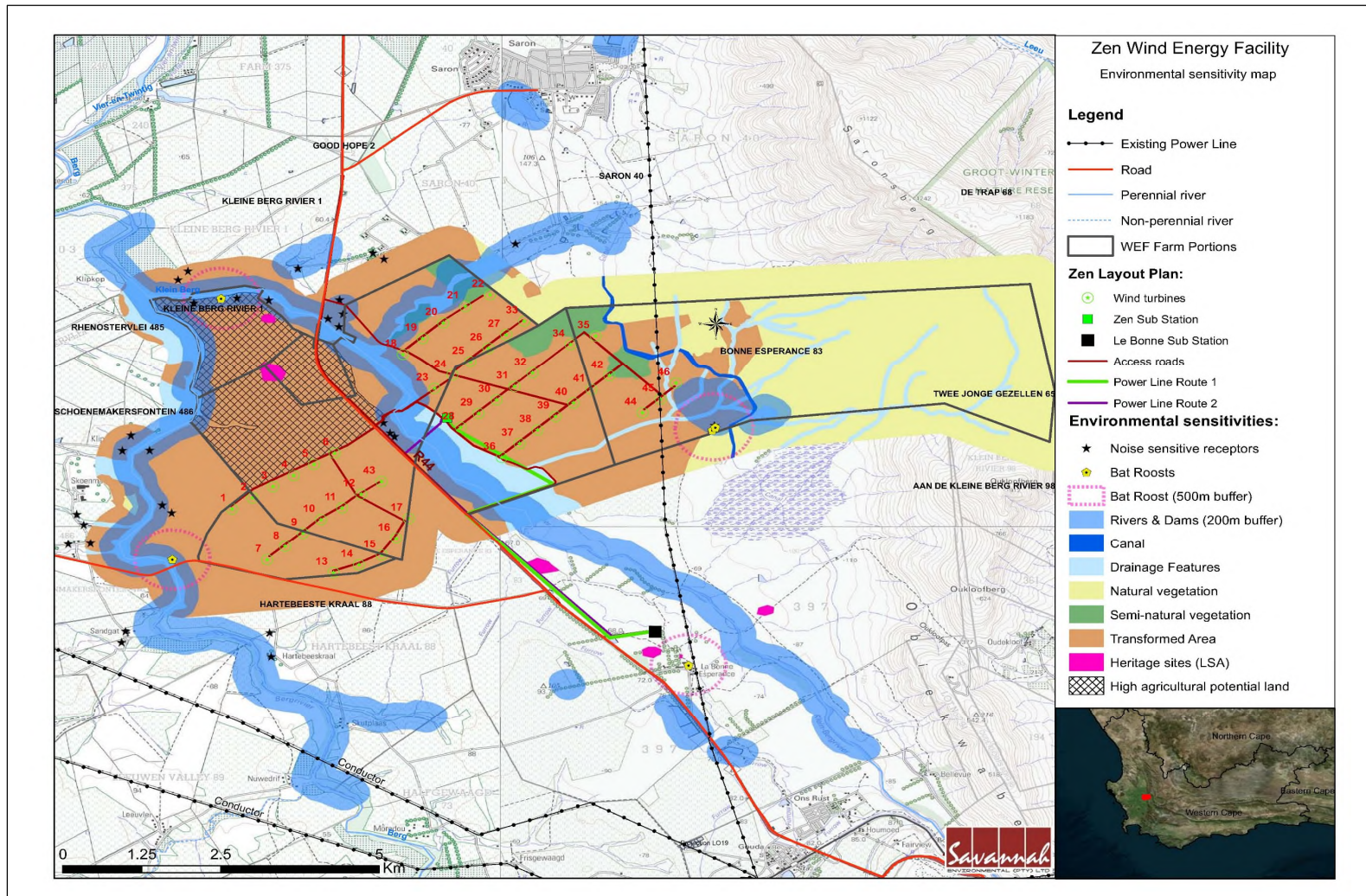


Figure 1.2: Overall sensitivity map as assessed for the EA (2015) (A3 Map included in Appendix J)

2. DETAILS OF THE AMENDMENTS APPLIED FOR

The amendments being applied for relate to the authorised wind turbine specifications as detailed in the EA dated 06 November 2016, as amended, as well as to administrative details of the EA. The requested amendment of the turbine specifications will result in an optimisation of the facility assessed within the EIA.

This section of the report details the amendments considered within this report and by the specialist investigations (refer to **Appendix A – H**). Each amendment applied for is detailed below.

2.1. Turbine specifications

A Part 2 substantive amendment is being applied for to amend the turbine specifications as follows:

	Authorised specifications	Amended specifications
Number of turbines	46	27
WTG rating	3MW	6MW
Rotor Diameter	122m	Up to 165m
Hub Height	110m	Up to 140m
Overall capacity of the WEF	140MW	Up to 147MW
Concrete foundation	20m x 20m x 4m	25m x 25m x 6m

The following amendments to the project description are requested as a result of the change in turbine specifications:

- » An increase to dimensions of the crane pad and laydown area (storage area per turbine) from **2400m²** to approximately **5500 m²** per turbine (Note that this condition has not been included within the EA but has been specified within the EIA, it is therefore requested that this description be included within the "the infrastructure associated with this facility includes:" on page 6 of the EA.
- » Update of the layout. The number of turbines have been reduced and the locations of turbines have been updated. This amended layout falls within the originally assessed development area of the facility. The final layout will be submitted to the DEA for final approval following the selection of the preferred turbine for implementation and final design, as per condition 14 of the Environmental Authorisation.

It is requested that these turbine specifications be amended and added into the project description on page 6 of the EA so that the EA reads:

"-for the establishment of the 147MW Zen Wind Energy Facility near Saron in the Western Cape, hereafter referred to as "the property".

The infrastructure associated with this facility includes:

- The site is proposed to accommodate up to 27 wind turbines with a rotor diameter of up to 165m. The facility would be operated as a single facility with each turbine being up to 6MW in capacity.
- Each wind turbine is expected to consist of a concrete foundation (25m x 25m x 6m), a steel tower, a hub (up to 140m above ground level) and three blades.
- Each turbine will have a flat hardened laydown area and crane pad of 5500m² during the construction process.

2.2. Amend the property description to correspond with the Conveyance Certificate for the consolidated properties

While the footprint, and thus the assessed land portions remain unchanged, the property descriptions are to be amended to reflect the property names as per the latest conveyance certificates as 3 properties were consolidated after the EA was issued. Remainder of Portion 4 of the farm Kleinberggrivier 1, Remainder of the farm Moolenaars Drift 85, and Remainder of Portion 1 of the farm Moolenaars Drift 85 were consolidated into one property namely i.e. Portion 0 of the farm Nayoth 458.

It is therefore requested that the property descriptions be amended from:

- » Portion 1 and 2 of the farm Bonne Esperance 83,
- » Portion 9 of the Farm No. 88,
- » Remainder of Portion 4 of the farm Kleinberggrivier No. 1,
- » Remainder of the farm Moolenaars Drift 85, and
- » Remainder of Portion 1 of the farm Moolenaars Drift 85

To:

- » Portion 1 of the farm Bonne Esperance 83
- » Portion 2 of the farm Bonne Esperance 83
- » Portion 9 of the farm No. 88
- » Portion 0 of the farm Nayoth 458

It is requested that the amended property descriptions be added to the "Location of the activity" on page 1 of the EA so that the EA reads as follows (underlined property amended):

Location of activity:	On Portions 1 and 2 of the Farm Bonne Esperance 83, Portion 9 of the Farm No.88 and <u>Portion 0 of the Farm Nayoth 458</u> within Drakenstein Local Municipality, Western Cape Province
-----------------------	--

It is also requested that the amended farm names and the centre co-ordinates of the consolidated property to be updated within the Site Alternatives on page 6 of the EA so that the EA reads (underlined property amended):

Site Alternative

Alternatives S1 (Farm centre points)	Latitude (S)	Longitude (E)
Bonne Esperance 1/83	33° 13'26.83"S	19°2'50.89"E
Bonne Esperance 2/83	33° 14'0.56"S	19°0'8.59"E
Hartebeeste Kraal	33° 13'18.93"S	18°57'47.82"E
<u>Nayoth</u>	<u>33°14'1.46"S</u>	<u>18°58'36.92"E</u>
Substation	33°14'0.34"S	18°59'32.16"
Powerline		
Start:	33°14'0.34"S	18°59'32.16"
Middle:	33°15'16.43"S	19°0'7.49"

Alternatives S1 (Farm centre points)	Latitude (S)	Longitude (E)
End:	33°15'57.51"S	19° 1'18.87"

2.3. Update the contact details of the Holder of the EA

Change in contact details of the Holder of the EA from:

Sibongile Mduli
Tel: 011-237 0189
Cell: 082-045-5117
Fax: 086-684-0547
Email: Sibongile.mduli@ge.com

To:

Thomas Condesse
Tel: 021 206 0655
Cell: + 336 28 79 25 84
Physical address: 168 Vasco Boulevard Goodwood, 7459
Email: Thomas.condesse@energyteam.co.za

3. MOTIVATION FOR THE PROPOSED AMENDMENTS

3.1. Technical Motivation for the amendment of turbine specifications

Wind turbine generators are constantly under development to increase the potential energy output capacity per wind turbine. Following the issuing of the EA for the project, there have been advancements to wind turbine technology with newer turbines becoming larger and able to generate more energy. In light of this, the turbines authorised in the EA are no longer considered to be the most suitable in terms of production and economic considerations. In this regard, Zen Wind Farm (Pty) Ltd is considering alternative turbine models for the project and wishes to amend the EA to cater for larger turbine specifications, to enable the use of the latest, most efficient turbines available on the market. The amendment in the rotor diameter, hub height and individual wind turbine rating capacity will allow for this and will result in the optimisation of the facility layout which was assessed within the EIA for the project. The increase in the generation capacity for each turbine, will subsequently reduce the number of turbines from 46 to 27 and will increase the capacity of the wind energy facility from 140MW to 147MW. The layout has been adjusted to accommodate for the changes in turbine specifications and reduction in the number of turbines including the changes to concrete foundation required and increase in laydown areas.

These amendments to the project are proposed in order to increase the efficiency of the facility and consequently may reduce the electricity tariff charged by the project, which would be to the benefit of all electricity consumers in South Africa.

3.2. Update of the property description to reflect the consolidated property description as per the Conveyance Certificate

The property descriptions currently do not match the conveyance certificates as certain Portions and Remainder of properties were consolidated since the EA was issued and need to be updated and reflected correctly in the EA. 3 of the 6 properties specified for this project were consolidated into one property, and therefore the EA should only reflect 4 property descriptions. No new properties have been added or removed from the property description.

3.3. Motivation for the change in contact person

The contact person and associated details have changed and this needs to be reflected in the EA.

4. CONSIDERATIONS IN TERMS OF THE REQUIREMENTS OF THE EIA REGULATIONS

In terms of Regulation 31 of the EIA Regulations 2014, as amended, an environmental authorisation may be amended by following the process in this Part (i.e. a Part 2 amendment) if it is expected that the amendment may 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 authorisation.

In this instance, the amended turbine specifications and resulting amendment to the layout were not considered in the initial authorisation. This change does not however, on its own, constitute a listed or specified activity. Therefore, the application is made in terms of Regulation 31(a).

5. POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE EIA AS A RESULT OF THE PROPOSED AMENDMENTS

An application for the requested amendments will be submitted to the DEA with Draft Motivation report. In terms of Regulation 32(1)(a)(i), the following section provides an assessment of the impacts related to the proposed change in turbines specifications. The administrative changes will have no environmental impacts and are therefore not assessed here. Understanding the nature of the proposed amendments and the impacts associated with the project (as assessed within the EIA), the following has been considered:

- » Impacts on avifauna
- » Impacts on bats
- » Visual impacts
- » Noise impacts
- » Heritage impacts
- » Paleontological impacts
- » Impacts to soils and agricultural potential
- » Impacts on ecology

The change in rotor diameter, hub height and generating capacity of each turbine of the wind energy facility are expected to have **no effect** on the findings of the Social Impact Assessment Report and Traffic Impact Assessment reports as included as part of the EIA process. Therefore, only the above listed specialist studies have been included as part of the current amendment application.

The potential for change in the significance of impacts based on the proposed amendments as described within this motivation report is discussed below. Detailed specialist's assessment addendum Reports are contained in **Appendix A-H**. Additional mitigation measures recommended by the specialists have been underlined within this report for ease of reference. These should be included within the Environmental Management Programme (EMPr) for the project when finalised in terms of the requirements of Condition 15 of the EA. This section of the main report must be read together with these specialist studies in order to obtain a complete understanding of the proposed amendments and the implications thereof.

5.1. Impacts on avifauna

A pre-construction bird monitoring programme and radar survey was undertaken for the Zen site and at a control site. A pre-construction programme of bird monitoring was conducted across a 27-month period from September 2012 to December 2014, and for a total observation period of > 400 hours. During the Avifauna Assessment undertaken for the EIA it was determined that a total of 214 bird species may occur in the Zen region (Jenkins 2012). Of these, 161 species were recorded during the field surveys of which 94 species were recorded within 750 m of the proposed turbine strings. Ten species in the current national red-data list (Taylor 2014) were recorded during the two years of pre-construction monitoring. Only three red-listed species were resident in the Zen area. These were: Black Harrier – rated Endangered; Southern Black Korhaan – Vulnerable; and Blue Crane – Near Threatened. The other 7 red-listed species were seldom recorded and or were recorded in very small numbers. There were five birds of prey and two waterbirds recorded on the site.

The results of the pre-construction bird monitoring revealed that the collision hazard indexes for the different groups (waterbirds, cranes, accipitrid raptors and falcons) and for the general bird community were higher within 200m from rivers, streams and water bodies. The Blue Crane was not affected by this factor, and therefore its distribution was expected to be conditioned mainly by other environmental factors, such as the agriculture practices or food availability. Waterbirds were abundant in the area and were considered to present the highest collision risk of all the groups, however the radar survey undertaken during the monitoring indicated that waterbirds use the study area for foraging at night but the tracks were located outside of the Zen WEF area, further reducing the risks of collision for waterbirds. The Klein Berg and Berg Rivers were areas of potential collision risk for accipitrid raptors and waterbirds. This was particularly evident at the junction of these two rivers, to the north of the development area, where no turbines are planned to be constructed.

The main area of concern identified for avifauna was mortality through collisions with rotor blades. Of the bird species that were determined to be affected, many have large populations across the Swartland and most of the others occur in the Zen area in very small numbers so that a low level of collision mortality would have no marked effect. Of the 21 identified priority species, two local resident species – Blue Crane and Spurwinged Goose - are at highest risk of mortality through collision and potentially also through displacement from breeding or foraging areas. Most of the other priority species (e.g. Greater Flamingo and Martial Eagle) occur in the Zen area in far smaller or negligible numbers, and/or too infrequently to be a source of concern. Karoo Shelduck and Egyptian geese are other species occurring in the area noted to be at higher risk of collision.

For the current study, additional monitoring has been undertaken on the site, starting in January 2019. Each session lasted 4 days split between 2 days of vantage points (for a total a 16 hours) and 2 days of observation transects. During the 2019 survey, 178 species have been recorded on the study area, among which 10 are considered as priority species on the current BLSA checklist of birds in South Africa (Lotz, 2019).

2019 fieldwork	J	F	M	A	M	J	J	A	S	O
African Marsh Harrier								x	x	
Black Harrier	x	x	x		x	x	x	x	x	x
Black Stork			x							
Blue Crane	x	x	x	x	x	x	x	x	x	x
Denham's Bustard		x		x	x		x	x	x	x
Lanner Falcon				x					x	
Ludwig's Bustard									x	x
Secretary bird				x	x		x			
Southern Black Korhaan			x					x		x
Verreaux's Eagle				x	x					

4 of these species (in bold type) can be considered as resident (or probable local breeders), which indicates that they have been seen during every season and the 6 others have only been spotted a few times.

During the pre-construction monitoring undertaken in support of the EIA, the wind farm located southward from this project (hereafter Gouda 1) was in construction. The 46 wind turbines are now fully operating. With Zen WEF, there will be a total of 73 turbines in the Zen region (against 92 before this amendment); resulting in a cumulative impact on avifauna.

5.1.1. Comparative Assessment

The impacts on avifauna identified during the EIA were determined to be the same as that predicted with the proposed amendments, i.e.: temporary displacement, habitat loss, electrocution and mortality through collision with power lines, reduction of ecosystem services and direct collision with the turbine blades. During the construction phase, birds using the site will suffer a temporary displacement because of the noise and the increase of human presence on the lands. These lands consist of already transformed habitat in crops or pastures. The animals who succeed in living in these human habitats are used to adapt themselves in changing condition due to human intervention. For these reasons, and because other areas with the same characteristics are available in the vicinity of the WEF project area, the temporary displacement is not considered as a major impact.

The amended project layout requires 25 m x 25 m of concrete foundation because of the bigger turbines proposed. Each platform will be 625 m² in extent, with a total of 16 875 m² being required for the full facility. In comparison, the overall transformed surface for the turbines is reduced. In addition, the number of roads created or upgraded will also be reduced. During construction, however, the temporary displacement impact will be similar as that associated with the construction of the authorised project.

The Zen WEF project is located on agricultural lands which means that all natural or semi-natural habitats within the project development area have already been transformed for human purposes. Birds living in such conditions are used to habitat loss and to adapt themselves to changing conditions. The construction phase will induce a disturbance for resident birds which will result in a temporary displacement of the concerned species regardless of the amendment of the layout from that of the authorised layout.

Nature of impact: During construction phase, workers movements and noise are likely to have an impact on resident species and induce a temporary displacement				
	Authorised		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short (1)	Short (1)	Short (1)	Short (1)
Magnitude	Small (2)	Small (2)	Minor (2)	Minor (2)
Probability	Definite (5)	Definite (5)	Definite (5)	Definite (5)
Significance	20 (Low)	20 (Low)	20 (Low)	20 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	High
Irreplaceable loss of resources?		Unlikely		Unlikely
Can impacts be mitigated?	To a limited extent		To a limited extent	
Mitigation: Not deemed necessary. The priority bird species affected are accustomed to substantial disturbance from agricultural activities and will merely move to similar habitat in nearby undisturbed areas.				
Cumulative impacts: Considering that the other windfarm in the vicinity is already operating, there are no cumulative impacts expected.				
Residual Risks: The construction phase is only temporary as the impacts should be if the affected birds come back after the end of the construction work.				

Nature of impact:

Permanent habitat loss concerns all transformed areas that won't be usable by resident species anymore. It is a main concern for large species and especially the Blue Crane that will endure permanent destruction of part of its habitat				
	Authorised		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Low (1)	Low (1)	Low (1)	Low (1)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	28 (Low)	21 (Low)	28 (Low)	21 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Medium
Irreplaceable loss of resources?	Possible	Probably not	Possible	Probably not
Can impacts be mitigated?	Yes		Yes	
Mitigation: Minimising the development area by clustering turbines. If artificial water points need to be destroyed, others can be created elsewhere with a stream connecting the waterbodies.				
Cumulative impacts: With the other windfarm already constructed the surface of lost habitat, especially for the Blue Crane and Harriers, will be increased.				
Residual Risks: Recreating habitat on agricultural land nearby for these target species will compensate for the loss of habitat and can also move individuals away from the windfarm and reduce the risk of collision.				

With fewer turbines, the surface of the area needed for the amended layout is reduced. Moreover, fewer turbines are planned on the west side of R44 where habitats are better for a good bird diversity (pastures, meadows and fallow lands) so the impact should be affecting fewer species.

The intention for Zen WEF is to bury power lines where deemed practical, which will reduce the impact associated with collisions and electrocution (should all power lines will be buried):

Nature of impact: Collision and/or electrocution (possibly leading to bad or fatal injuries) with powerlines. This will vary with the location and the type of powerlines.				
	Authorised		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Regional (3)	Local (1)	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)	Small (0)	Small (0)
Probability	Definite (5)	Highly probable (4)	Very improbable (1)	Very improbable (1)
Significance	50 (Medium)	24 (Low)	6 (Low)	6 (Low)
Status (positive or negative)	Negative	Negative	Neutral	Neutral
Reversibility	Low	Very low	High	High
Irreplaceable loss of resources?	Yes	Possible	No	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: With buried powerlines were applicable, there will be reduced impacts on birds. However, to do so, they will need to dig into the soil. The mitigation will be to assist the developer and guide them to follow the roads and cross rivers at the good spots to minimise the impact of the work.				
Cumulative impacts: With no collision risks, no cumulative impacts are expected.				
Residual Risks:				

After the recommended measures being undertaken, no residuals risks are expected.

The major impact that threatens local birds will be the collision with blades. The 27 wind turbines associated with the amended layout will have hub heights of up to 140 m with a rotor diameter of up to 165m - i.e. the rotor blade arc will be from 57.5 m to 222.5 m above ground (for a surface of a little bit more than 2 hectares per turbine).

With smaller population and lower density, the risk is greater for large birds such as cranes, bustards and raptors which are, usually, priority species. The risk will also be for birds that fly in flocks at night. For this reason, a radar survey was undertaken during the monitoring completed as part of the EIA. This showed that most night movements concerning water-birds like geese roosting by day at Voelviei dam (up to 10 km southward) and using the study area for foraging at night. The average height of this mainly NW-SE flight track was 93 m above ground which would lead them directly to the blade arcs. However, most of the tracks were outside the Zen WEF area.

Mortality through collision with wind turbines is the main impact expected. With fewer turbines and better location (i.e. avoiding more sensitive habitats), the risk should be lowered, but with higher turbines, the risk should be increased. In order to double the rated power of the turbines (from 3MW to 6MW) the rotor diameter and hub height will increase. The result is that the vertical surface used per rotor blades is increased. The authorised project proposed turbines with a rotor surface of almost 11 700m² per turbine (for a total of close 538 000 m² for the full WEF). The proposed amended turbine results in a rotor surface of 21 400 m² (with a total of 577 000 m² for the full WEF). Even with a reduced number of turbines the space used "in the air" with turning blades is increased by almost 40 000 m² which potentially increases the risk of collision for birds. With bigger blades and higher hub, the blades will spin less quickly so the risk of colliding for birds and especially night flying water birds should be reduced. Moreover, distance between the ground and the lower tip of the blades is raised which will decrease the risk of collision for ground birds such as bustards and Secretary birds but also, displaying Blue Cranes and hunting harriers.

Nature of impact:				
Collision with wind turbines. Some species are more vulnerable than others hence more at risk.				
	Authorised		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local to regional (3)	Local (2)	Local to regional (3)	Local (2)
Duration	Lifetime of facility (5)	Lifetime of facility (5)	Long-term (5)	Long-term (5)
Magnitude	High (8)	Medium-high (7)	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	64 (Medium)	42 (Medium)	56 (Medium)	33 (Medium)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes		Yes	
Mitigation:				
<p>(Not currently permitted by the CAA) Painting turbine towers dark and one blade a different colour from the other two. Nocturnal illumination of rotor blades using green or blue light if CAA regulations will allow this. Closure of turbines during periods of agricultural activities likely to attract raptors. Implementing curtailment at dawn and dusk for limiting the risk for night-flyers water birds and roosting Blue Crane and Secretarybird during breeding season only if fatality rates are deemed unacceptable. (This mitigation is also efficient to decrease the number of collisions for bats).</p>				
Cumulative impacts:				

A 46 turbines windfarm is currently operating south of this project increasing the cumulative impact.

Residual Risks:

Some mortalities will occur regardless of mitigation.

The cumulative impacts of the already operating Gouda WEF and the proposed Zen WEF will lead to a rise of almost all the identified impacts; the temporary displacement is only due to the construction phase and becomes a permanent habitat loss when the turbines are operating. The Zen WEF site footprint area is already transformed in terms of agricultural lands (crops and pastures), so birds living there are adapted to this ever-changing environment and will find other suitable habitats if needed in the vicinity. The risks of colliding and or being electrocuted by power lines has already been studied for the operating WEF. The proposed Zen WEF will not add to this impact as the power lines are proposed to be buried.

Concerning the risk of collision with rotor blades, the addition of wind turbines (Gouda and Zen) will enhance the risk of mortality. However, the increase of the number and density of turbines also enhances the deterring effect on birds which might more easily avoid this artificial barrier. Moreover, the radar survey undertaken in the EIA indicated that the main flight route of night movements is NW-SE to and from Voelmei dam which is situated after Gouda 1, and therefore if birds succeed in avoiding the first windfarm, they will also avoid Zen WEF.

Updated layout

In order to reduce the impact of a windfarm, one of the main factors to take into account is the location (BIRDLIFE INTERNATIONAL, 2018). The overall area used for the authorised project and the amended layout is fairly the same as the authorized layout, with the difference being the density of turbines and the location of each of these turbines. When considering the habitat sensitivity mapping below compiled by Calidris, and based on the 2019 spring surveys, west of the R44, habitats are mainly occupied by crops like wheat, resulting in a Low sensitivity rating.

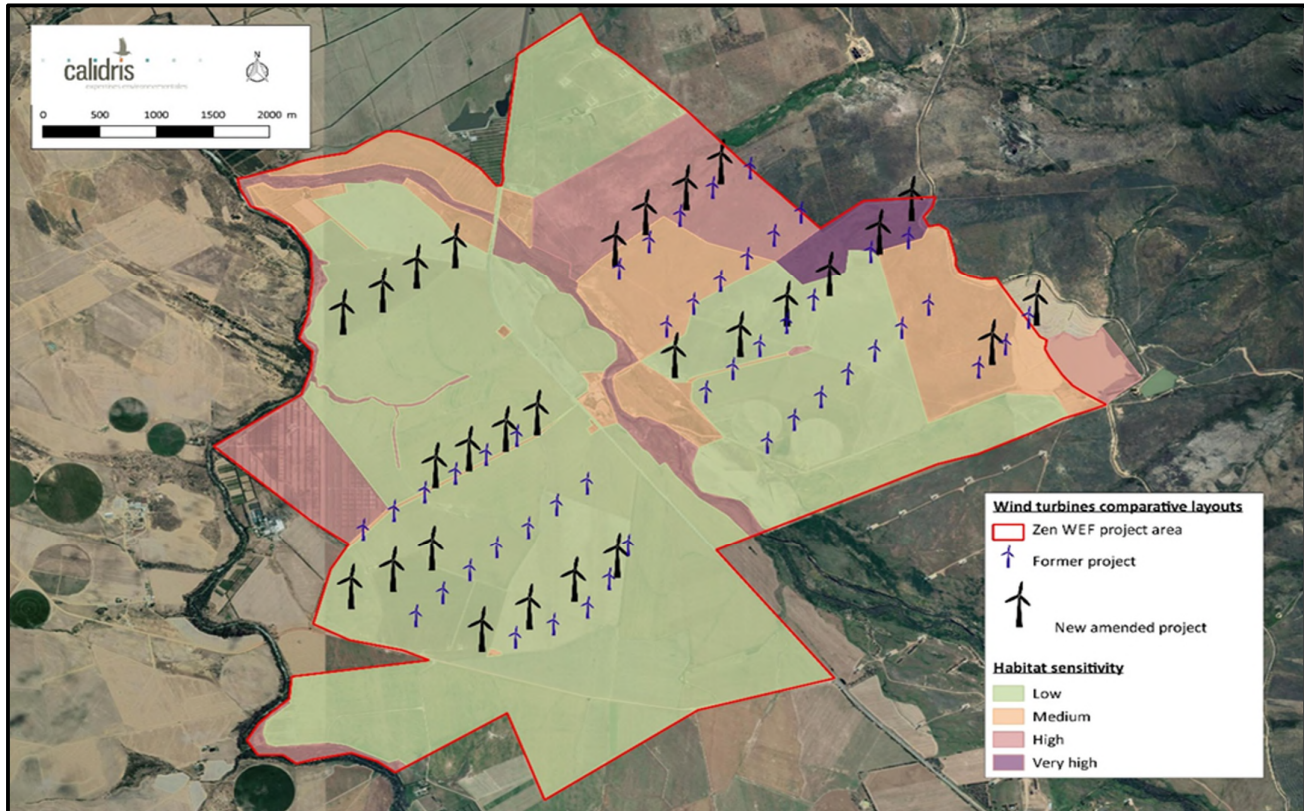


Figure 5.1: Wind turbines comparative layouts above sensitivity habitat mapping (Source: Calidris).

5.1.2. Conclusion

Overall, it is unlikely that the amendments to the turbine dimensions, number and layout proposed at Zen Wind Energy Facility would result in significant change in impacts. The amendments will impact species differently, depending on their ecology and behaviour. The results of 2019 surveys indicated that the overall impact is expected to be reduced.

The specialist has indicated that the mitigation measures previously included within the EIA and EMP remain applicable and are to be implemented. The implementation of mitigation measures should reduce the identified impacts and result in acceptable residual impacts. The specialist recommended that the following measures be adhered to and included within the conditions of the EMP and EA were applicable:

- » Should artificial water points need to be destroyed, other can be created elsewhere with a stream connecting the waterbodies;
- » The mitigation will be to assist the developer and guide them to follow the roads and cross rivers at the good spots to minimise the impact of the work associated with burial of powerlines;
- » Implementing curtailment at dawn and dusk for limiting the risk for night-flyers water birds and roosting Blue Crane and Secretary birds during breeding season for approximately 4 months only if fatality rates are deemed unacceptable;
- » Painting turbine towers dark and one blade a different colour from the other two. Nocturnal illumination of rotor blades using green or blue light if CAA regulations will allow this.

Layout design must continue to take sensitive areas for birds into consideration and respect buffer distances indicated in order to reduce the impacts on bird communities as far as possible. The implementation of mitigation measures for the proposed amendment should reduce the identified impacts and result in acceptable residual impacts. Following the results of the 2019 bird monitoring the proposed amendment is deemed acceptable by the specialist.

5.2. Impacts on bats

The pre-construction programme of bat community monitoring was conducted across a 12 months period from September 2012 to August 2013. Based on several data sources available for the study area (ACR, 2018 ; MONADJEM, 2010), 16 species were considered to potentially occur in the vicinity of the site, according to bat species distribution and ecology. The 12-months bat monitoring confirmed the presence of 9 bat species: Natal long-fingered bat (*Miniopterus natalensis*), Long-tailed serotine (*Eptesicus hottentotus*), Temminck's myotis (*Myotis tricolor*), Cape serotine (*Neoromicia capensis*), Cape horseshoe bat (*Rhinolophus capensis*), Geoffroy's horseshoe bat (*Rhinolophus clivus*), Darling's horseshoe bat (*Rhinolophus darlingi*), Robert's flat-headed bat (*Sauromys petrophilus*) and Egyptian free-tailed bat (*Tadarida aegyptiaca*).

Tadarida aegyptiaca was the most common and active species in the study area, as it was detected in all surveys and throughout the year. *Neoromicia capensis*, *Eptesicus hottentotus* and *Miniopterus natalensis* were the other main species recorded almost all year long. The remaining 5 species were recorded more occasionally: *Rhinolophus clivus* was detected in November, April and May, *Myotis tricolor* in October and November. *Sauromys petrophilus*, *Rhinolophus darlingi*, *Rhinolophus capensis* were recorded only in a single month, respectively in February, April and July. Bat activity varied depending on the season and habitats. It was higher during late winter and early spring, decreased during summer and increased in late summer and autumn. 23 potential roosts sites were identified, exclusively in human infrastructures. Among those 23 roosts, 12 showed evidence of bat occupancy with the observation of traces or individuals. According to the analysis of bat activity and environmental features by Bio3 and the results of the ongoing monitoring, sensitive areas for bat communities should be avoided or modified as little as possible.

Bat community monitoring was conducted for the current study from January 2019 by Calidris, covering all seasons. Active detection surveys were conducted once a month from 9 sampling points, using 3 recorders per night for 3 nights. 8 species have since been identified: Long-tailed serotine (*Eptesicus hottentotus*), Natal long-fingered bat (*Miniopterus natalensis*), Cape serotine (*Neoromicia capensis*), Cape horseshoe bat (*Rhinolophus capensis*), Geoffroy's horseshoe bat (*Rhinolophus clivus*), Darling's horseshoe bat (*Rhinolophus darlingi*), Robert's flat-headed bat (*Sauromys petrophilus*) and Egyptian free-tailed bat (*Tadarida aegyptiaca*).. The Temminck's myotis (*Myotis tricolor*) has not been recorded.

Bat activity was determined to be higher closer to rows of trees, riparian vegetation or water-related features, and to a lesser extent in open-areas like pastures or cereal croplands. On the western part of the study area, a hedgerow extends from east to west and connects the two main rivers, the Berg River and Klein Berg River, bisecting the study area. According to the results of the ongoing monitoring, this is deemed to be an important feature for bat communities for both foraging and commuting.

5.2.1. Comparative Assessment

The impacts on bats identified during the EIA are: habitat loss, mortality through, reduction of ecosystem services provided by bats and direct collision with the turbine blades or barotrauma for bats. As the number

of turbines will decrease from 46 to 27 and the power lines will be buried, only the mortality of species due to collision with turbines blades or due to barotrauma, and cumulative impacts, are deemed as relevant impacts to the proposed amendment.

The potential collision impact to bats was previously rated as medium, and low after mitigation with adherence to the sensitivity buffers being the major mitigation measure proposed. No wind turbines should be implemented within the 500 m buffer surrounding bat roost and within the 200 m buffer surrounding riparian vegetation and rows of trees. The 27 wind turbines associated with the amended layout will have hub heights of up to 140 m with a rotor diameter of up to 165m, i.e. the rotor blade arc will be from 57.5 m to 222.5 m above ground (for a surface of a little bit more than 2 hectares per turbine). As the distance between the ground and the blade tips will increase, some bat species foraging at the ground level will be less at risk in the amended project. However, as the hub height and rotor diameter will increase, this would result in a greater rotor swept area and a potentially greater likelihood of bat collision with turbine blades or barotrauma, especially for open-air species like free-tailed bats. Therefore, these impacts would remain **medium** before and **low** after mitigation.

Nature of impact:				
Mortality of bat species due to collision with wind turbines blades or barotrauma caused by turbines operation.				
	Authorised		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Local (1)	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)	Highly probable (4)	Probable (3)
Significance	Medium (44)	Low (16)	Medium (44)	Low (16)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes	-	Yes	
Mitigation:				
The minimisation of deaths caused by wind turbines can be achieved through the avoidance of turbines installation in sensitive areas for bats, particularly in foraging areas or close to riparian vegetation, natural rows of trees or roosting sites. Mitigation measures such as the utilisation of red lights in the turbines instead of white in order to minimise insect attraction and bat foraging behaviours near turbines can be implemented. As curtailment has been shown to be an effective mitigation measure, it should be implemented when appropriate.				
Cumulative impacts:				
Since there is already an operating wind farm close to the study area, cumulative fatalities of bats can be expected resulting from the operation of all facilities simultaneously.				
Residual Risks:				
Some collisions are expected despite the implementation of mitigation. This will result in bat fatalities which have potential to result in residual impacts.				

Curtailment has also been recommended as a mitigation measure in line with this recommendation proposed by Bio3, (2013) should high collision bat fatalities be recorded.

Figure (5.2) below indicated that with the new layout, turbines are farther from sensitive zones or in a smaller number. According to the analysis of bat activity and environmental features by Bio3 and the results of the ongoing monitoring, sensitive areas for bat communities should be avoided or modified as little as possible,

As per Figure 5.2. below it can be seen that the amended layout achieves this there are now a fewer number of turbines located outside the designated buffer zones and sensitive features.

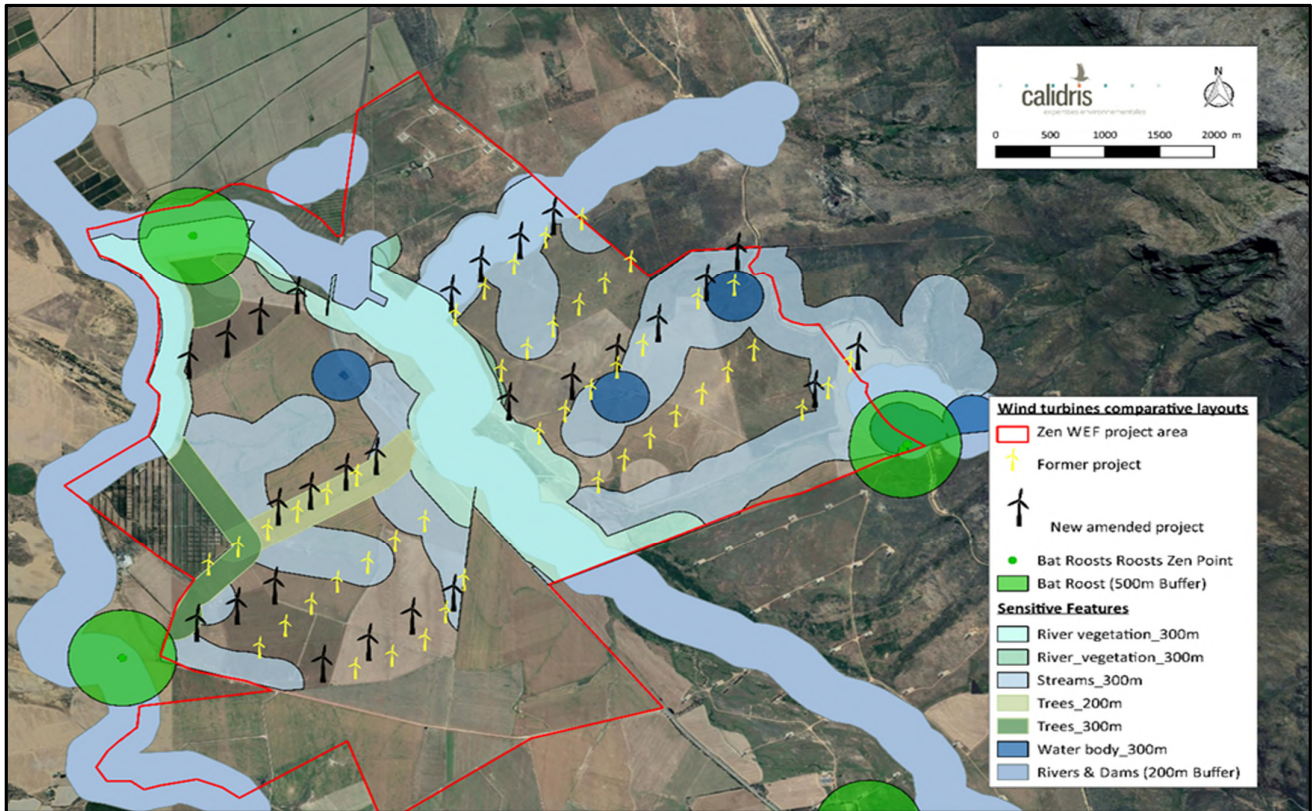


Figure 5.2: Comparative wind turbines layouts above sensitive features mapping (A3 map provided within Appendix J)

5.2.2. Conclusion

Following the results of the monitoring and comparative assessment it is determined that the proposed amendments to the turbine dimensions, number and layout proposed at Zen Wind Energy Facility would not result in significant change in impacts already determined with the EIA. No new impact stemming from the proposed amendments have been identified.

Impacts may be slightly lower for some species as the turbines would reach higher above the ground based on the maximum dimensions being applied for. This is an advantage of the proposed amendments. However, for high flying species, the higher tip height may result in a greater impact, which is a disadvantage. Longer blades will also extend higher into the air and place open air species such as free-tailed bats at greater risk; therefore, ground clearance should be maximized, and tip height should be minimized as much as possible. On the other hand, longer blades spin less quickly and can be easier to avoid. Considering that the orchards and rows of trees located west of the study area are important features for bats, the reduction of the number of turbines and the change of location will most likely reduce the risk of collision for bats.

The specialist has indicated that the Layout design must take sensitive areas for bats into consideration and adhere to the buffer distances indicated in order to reduce the impacts on bat communities as far as

possible. The implementation of mitigation measures should reduce the identified impacts and result in acceptable residual impacts. No additional mitigation measures were proposed by the specialists. The recommendation for curtailment already proposed within the EIA dependent on the results of the bat activity is however reiterated. As no new impacts were identified for the proposed amendments; hence no new mitigation measures were recommended and the proposed amendment is deemed acceptable.

5.3. Visual Impact

A visibility analysis was undertaken from each of the originally authorised wind turbine positions (46 in total) at an offset of 171m (maximum blade tip height) above ground level to indicate the potential total visual exposure of the original turbine dimensions and at an offset of 222.5m to indicate the visual exposure of the increased turbine dimensions and reduced number of turbines (27 in total). The results of the visibility analyses are displayed in Figure 5.3 (refer to the specialist report contained in Appendix C).

An increase of approximately 30.1% in turbine dimensions will have a relatively small influence on the overall visual exposure of the wind energy facility, due to the already tall turbine structures. The surface area (within the study area) of the original turbine exposure is 292km², compared to the 296km² of the amended dimensions turbine exposure. This is an increase of 5km², or alternatively, an increase of less than 1.5% in potential visual exposure.

No additional sensitive visual receptors are located within the area of increased visual exposure. The increased area of visual exposure does not include any additional exposure to major roads within the study area. The location of La Gratitude, Kleinbergrievier and La Bonne Esperance on properties earmarked for existing or potential wind energy facility developments reduces the probability of this impact occurring. The residential (built-up) nature of the town is expected to contain the visual impact to acceptable levels. Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time as it is inhabited again. It is therefore expected that the wind turbine structures, both the original dimensions and the proposed increased dimensions and taking into consideration the reduction in the number of turbines, would be equally visible and noticeable from both the roads and homesteads.

None of the proposed amendments will increase or decrease the significance of the impacts identified during the EIA phase. The amendments proposed will have negligible effect on the significance of impacts as predicted in the EIA and therefore no comparative impact tables were required to be included.

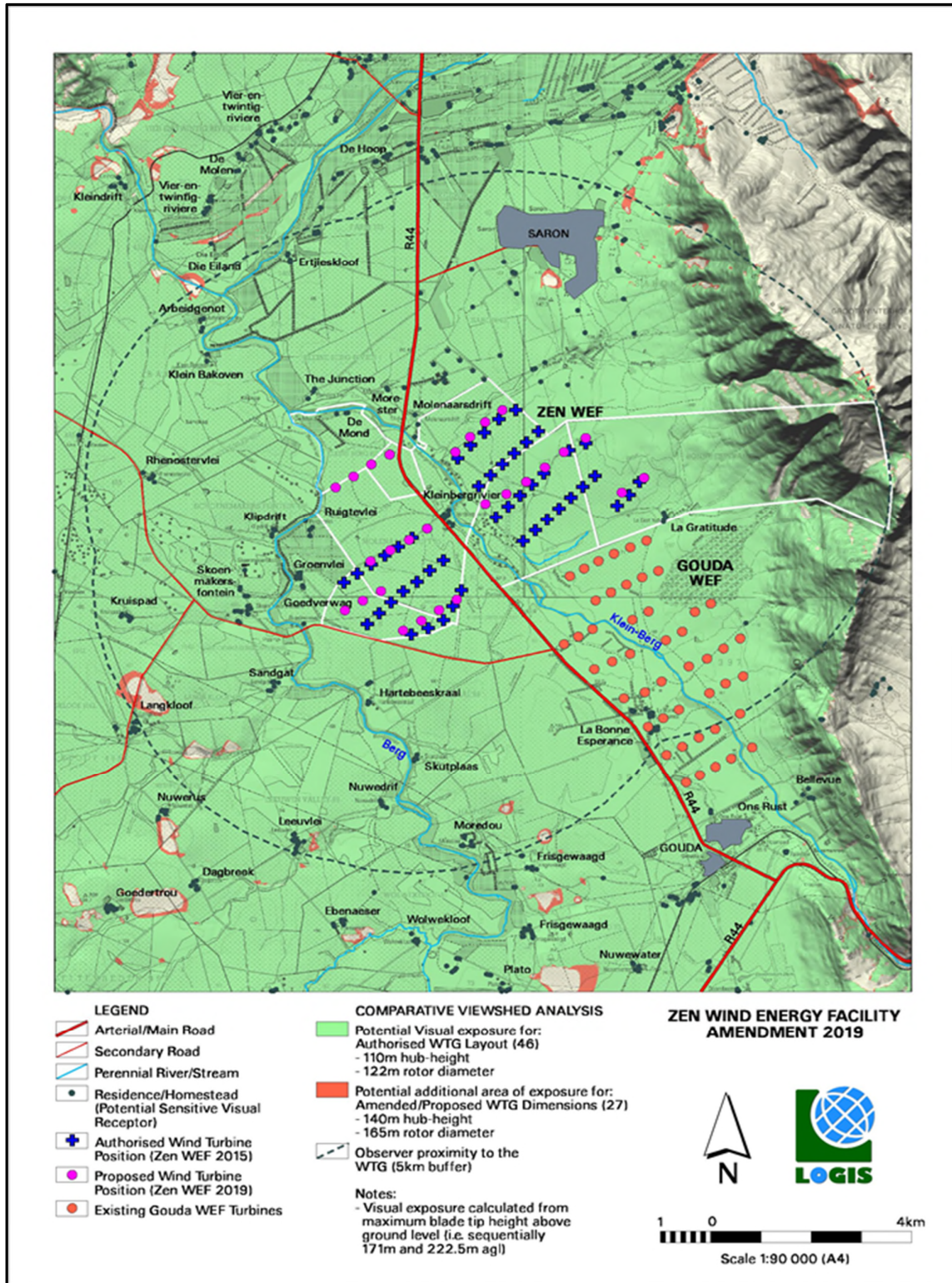


Figure 5.3: Viewshed analysis represents the potential total visual exposure of the original turbine dimensions (illustrated in blue) compared to the proposed new turbine dimensions and locations (illustrated in pink).

5.3.1. Comparative Assessment

The photo-simulations were undertaken, additional to the comparative viewshed analysis, in order to visualise the approved wind turbine layout and dimensions and the proposed amended layout and dimensions during the operational phase of the WEF. The photograph positions (viewpoints) are as follows (refer to photographs below):

Viewpoint 1 is located at the Kleinberggrivier homestead (located on one of the farm portions earmarked for the development). The proposed amended layout will place the slightly larger wind turbines in closer proximity to the homestead, but fewer turbines may be visible due to the reduction of the overall number of turbines.

Viewpoint 2 is representative of views of the wind turbine structures by observers travelling along the R44 arterial road, for respectively the approved turbine layout and the proposed amended layout. As the road traverses over the WEF development site, both the layouts will provide clear views of turbines at varying distances, on either side of the road

Viewpoint 3 provides a longer distance (approximately 3.4km at the closest) view of the wind turbine structures, from the main access road to Saron. Both the authorised and proposed amended turbine structures will be visible, notwithstanding the fact that the number of turbines and the dimensions thereof differs.

Viewpoint 4 provides views of the WEF from the southern outskirts of Saron (e.g. from the cemetery) may be partially obstructed by planted vegetation cover, the hill south of Saron and by built structures. The taller amended wind turbines may however be slightly more exposed above the skyline, depending on the exact position of the observer.



	
Viewpoint 2 – authorised wind turbine dimensions and layout.	Viewpoint 2 – proposed amended wind turbine dimensions and layout
	
Viewpoint 3 – authorised wind turbine dimensions and layout.	Viewpoint 3 – proposed amended wind turbine dimensions and layout.
	
Viewpoint 4 – authorised wind turbine dimensions and layout.	Viewpoint 4 – proposed amended wind turbine dimensions and layout.

Taking into consideration the proposed amendments, there is no (zero) change to the significance rating compared with the original EIA visual impact assessment report and therefore no comparative impact tables were required to be included. The reduction in the number of wind turbines is expected to reduce the

frequency of visual exposure to some extent, although the remaining (larger) turbines are expected to remain visible within a 5km radius of the WEF.

5.3.2. Conclusion

The proposed increase in the dimensions and reduction in the number of wind turbine structures is not expected to significantly alter the influence of the wind energy facility on areas of higher viewer incidence (observers travelling along major secondary roads within the region) or potential sensitive visual receptors (residents of homesteads in close proximity to the facility). It is expected that the wind turbine structures, both the original dimensions and the proposed increased dimensions, would be equally visible and noticeable from both the roads and homesteads, therefore signifying a negligible change to the potential visual impact.

There will be no changes to the impact ratings identified during the EIA process due to the amendment. No additional impacts, mitigation measures or alterations to the EMPr were recommended for the proposed increased turbine dimensions, as the general appearance and functional design of the wind energy facility is not expected to change. The visual impact is expected to occur regardless of the increase in turbine dimensions. From a visual perspective, the proposed changes to the turbine dimensions and turbine layout will therefore require no (zero) changes to the significance rating within the original visual impact assessment report that was used to inform the approved EIA and is therefore considered acceptable.

5.4. Noise Impacts

The original noise impact assessment (NIA) for the proposed Zen Wind Energy Facility was conducted by M² Environmental Connections cc (November 2012)². During the EIA process undertaken for the Zen Wind Energy Facility, ambient sound levels were measured at two locations over 35 hours from the afternoon of the 14th until the morning of the 16 October 2012. The sound level meters were referenced at 1,000 Hz directly before and after the measurements were taken. In all cases drift was less than 0.2 dBA. The data indicated an area where ambient sound levels were elevated, mainly due to natural sound sources relating to bird communication as well as wind induced noises. Ambient sound levels increase as wind speeds increase and sound levels ranging between 45 and 60 dBA are expected during periods when the wind energy facility may be operational.

Several potentially sensitive receptors, also known as noise-sensitive developments (NSDs), located within or close to the wind energy facility were identified during the EIA process. In 2013, the NIA was amended and considered an updated layout of the wind energy facility (Enviro-Acoustic Research, 2013)³. No additional NSDs were identified. The amended NIA made use of the sound power emission levels of the Alstom ECO 110 wind turbine. The assessment undertaken for the current amendment used the sound power emission levels of a wind turbine generating 106 dBA. Noise propagation modelling was undertaken for the amendment (refer to Figure 5.4). For the purpose of modelling the amendments to the turbine specifications, the sound power emission levels of the GE 3.6-137 wind turbine was used.

² M² Environmental Connections cc (2012) Environmental Noise Impact Assessment: Establishment of the Zen Wind Energy Facility on various farms near the town of Saron, Western Cape.

³ Enviro-Acoustic Research (2013) Review of layout 2013-10-08 for Environmental Noise Impact Assessment: Zen Wind Energy Facility.



Figure 5.4: Noise rating level contours as modelled for the Zen Wind Energy Facility.

5.4.1. Comparative Assessment

The change in layout in order to accommodate the amended turbine specifications is significant with a number of wind turbines relocated closer to previously identified NSDs in the area.



Figure 5.4.1 : Wind Turbine Locations for the Zen WEF in relation to potential noise sensitive receptors

The projected noise levels and how construction activities may impact on the surrounding receptors is low risk for a noise impact for daytime activities. Night-time construction activities were not assessed in the 2012 study (report ZT-ZWEF/ENIA/201211-Rev 0). The proposed amendments to the layout will slightly increase the noise level at surrounding NSDs, but the projected noise level was still less than 45 dBA. The significance of the proposed changes are defined in the table below. The change in the turbine specifications will not have an impact on construction noises.

None of the proposed amendments to the turbine specifications will change the significance of the impacts identified during the EIA process, or lead to any additional impacts.

Projected significance of daytime construction activities

Nature of Impact: Increased noise levels due to daytime construction activities.				
	Authorized		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)	Temporary (1)	Temporary (1)
Magnitude	High (8)	High (8)	High (8)	High (8)
Probability	Possible (2)	Possible (2)	Possible (2)	Possible (2)
Significance	Low (22)	Low (22)	Low (22)	Low (22)

Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceability	Not relevant	Not relevant	Not relevant	Not relevant
Mitigated available	Yes, not required	Yes, not required	Yes, not required	Yes, not required
Mitigation: No mitigation is required for daytime construction activities. No night-time construction activities are recommended closer to 500 m from residential dwellings.				
Cumulative Impacts: Construction noises will cumulatively increase existing ambient sound levels. Cumulative effects however are less than 3 dB and of low significance.				
Residual Risks: The impacts will disappear after the construction and operational phases.				

Only the night-time operational scenario was assessed (as per previous reports), as this is the most critical time period when a quiet environment is desired. The projected noise rating levels were determined to be less than 45 dBA at all NSDs, with the updated layout resulting a slight reduction in the noise rating levels at NSDs 1, 2 and 3. The noise rating levels will increase at NSDs 18, 19 and 20 but the total noise levels will be well less than 45 dBA. Therefore, the proposed change in layout and wind turbine specifications will not alter the findings of the 2013 Noise Impact Assessment as defined below:

Projected significance of night-time operational activities

Nature of Impact: Increased noise levels due to night-time operational activities.				
	Authorized		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Long (4)	Temporary (1)	Temporary (1)	Temporary (1)
Magnitude	High (8)	High (8)	High (8)	High (8)
Probability	Possible (2)	Possible (2)	Possible (2)	Possible (2)
Significance	Low (28)	Low (28)	Low (28)	Low (28)
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceability	Not relevant	Not relevant	Not relevant	Not relevant
Mitigated available	Yes, not required	Yes, not required	Yes, not required	Yes, not required
Mitigation: No mitigation is required.				
Cumulative Impacts: Operational noises from the Zen WEF will cumulatively add to the noises from the Gouda WEF. This is only relevant for NSD25, where the calculated maximum noise level is 40.7 dBA (Gouda WEF turbines only), where noises from the Zen WEF will cumulatively raise the total noise level to 42.1 dBA. Cumulative effects however are less than 3 dB and of low significance.				
Residual Risks: The impacts will disappear after the construction and operational phases.				

5.4.2. Conclusion

The modelled construction and operational noise levels using the GE 3.6-137 wind turbine, indicated that the proposed changes to the layout and wind turbines specifications will not lead to any other noise impacts,

neither will it change the significance of the noise impact as defined in the EIA process or the impacts associated with the updated assessment undertaken in 2013. The findings and recommendations provided in the original 2012 and 2013 amendment would remain. Considering the projected noise rating levels at NSD02 (please refer to Table 7-1 of the Noise Impact Assessment report within Appendix D), the findings of Noise Impact comparative assessment report will remain valid, provided that the developer use a wind turbine with a maximum sound power emission level of less than 107 dBA. No additional mitigation measures have been proposed for the amendment under consideration (refer to Appendix D for a detailed specialist report). Considering the low significance of the noise impacts the specialist is of the opinion that there no reason that the proposed amendment of the Zen WEF should not be authorised.

5.5. Heritage Impacts

The area proposed for the Zen WEF was subject to a thorough and comprehensive Heritage Impact Assessment conducted by ACO Associates in 2012. This HIA assessed impacts to the built environment; historic settlements; scenic routes; the cultural landscape; and archaeology. Orton's HIA (2012) identified a number of archaeological heritage resources, none of which were determined to be conservation worthy. The impacts to archaeological resources was not deemed be of high significance. Orton's HIA (2012) identified a number of built environment heritage resources within the assessment that would not be directly affected by the development, however, indirect (visual) impacts would be felt by farmhouses and outbuildings in the vicinity. The built environment heritage of Saron and its surrounds has been investigated by Cape Town Properties Histories. Five of these historic properties fall within 5km of the proposed development area. Two of the five historic structures were assessed by Orton (2012). In terms of the proposed amended layout, the house at Die Mond will be 1.5 km from the nearest turbine, while the Kleinbergvriervier farmhouse will be approximately 500m from its nearest turbine. A further three historical farmsteads located within 5km of the proposed ZEN WEF were identified by Cape Town Properties Histories.

HWC responded to the submission of the HIA in a letter dated 23 January 2013 which stated that the Impact Assessment Committee of HWC did not consider the HIA, and required that:

- » The VIA deal explicitly with visual impacts on and from the historic core of Saron, and on and from any historical farmstead within 5km of the turbines;
- » The VIA be conducted by an appropriately qualified and experienced professional with respect to visual impacts on the cultural landscape;
- » Comment in respect of heritage parties in Saron be obtained

Savannah Environmental responded to HWC's comments in a letter dated 13 August 2013 (Refer to Appendix 6 (HWC Correspondence) of the Heritage Screening Assessment in Appendix D of this amendment report); however HWC did not accept this letter as sufficient. Orton also responded to HWC's comments in a letter dated 14 November 2013 (Appendix 5 of the Heritage Screening Assessment), following which the EA was granted for the proposed development in November 2016. As such, HWC's requirements articulated above had not been responded to in terms of this project.

The screening for the purpose of the amendment application is not intended to be a Heritage Impact Assessment in terms of Section 38(3). The purpose of screening assessment is therefore to assess the change in impact on heritage resources associated with the implementation of the proposed amendments and to ensure that the proposed amendments to the Zen WEF development do not negatively impact on heritage resources based on the field assessments and Heritage Impact Assessment already conducted in 2012. As

the screening assessment aims to address these aspects through the inclusion of additional information and photo simulations that indicate likely visual impact on the historic core of Saron, and on the historical farmsteads within 5km of the turbines. It is important to note that the cultural landscape has changed drastically since 2013 through the development of the Gouda WEF on the neighbouring property. The turbines of the Gouda WEF are 100m high, and thus are 40m shorter than the proposed Zen WEF turbines. The existing Gouda WEF, and the included photo simulations, do demonstrate the likely impact of the proposed Zen WEF on the cultural landscape.

As the proposed Zen WEF falls within the area of interest indicated by the Drakenstein Heritage Foundation, and borders on the area of interest indicated by the Tulbagh Valley Heritage Foundation. These bodies have been provided with 30 days in which to comment the Heritage Screening Assessment and will be given 30 days to comment on this motivation report.

5.5.1. Comparative Assessment

The HIA undertaken in 2012 identified a number of archaeological heritage resources in the assessment, none of which were determined to be conservation worthy. According to Orton (2012), impacts to archaeological resources would occur but these would not be of high significance. Furthermore, mitigation measures can be easily implemented and accomplished where they may be required. No Late Stone Age (LSA) sites were found in the immediate WEF area; however should any be located at a later stage they would require some degree of formal excavation.

The previous HIA undertaken for the EIA indicated that should any changes to the layout be made pre-construction then a follow-up inspection of the new layout would need to be undertaken, particularly for archaeological resources which are point-specific on the landscape. However, as the archaeological resources identified by HIA in 2012 were determined to be not conservation-worthy, it is unlikely that conservation-worthy archaeology will be impacted by the proposed amended layout. In addition, the proposed amended layout largely aligns with the previously approved layout which was inspected by Orton (2012) other than the location of seven of the proposed 27 turbines, all of which are located on previously cultivated fields. Based on the available information, it has been concluded that the proposed amendments to the EA and site layout will **NOT increase** the significance of impacts to significant archaeological heritage resources originally identified in the HIA and EIA report or lead to any additional impacts.

The specialist identified a number of built environment heritage resources in his assessment undertaken in 2012. According to the specialist; "No built environment elements will be directly impacted." However, indirect (visual) impacts will be felt by farmhouses and outbuildings in the vicinity. The houses at the Kleinberggrivier and Die Mond werfs are most significant but still do not attract high gradings. For this reason, visual impacts to them and their contexts are not seen as very significant. The house at Die Mond will be 2.9 km from the nearest turbine on the authorised layout, while the Kleinberggrivier farmhouse will be 930 m from its nearest turbine. Neither house is of suitable merit to prevent construction or to suggest that larger buffers should be incorporated – these buffers are deemed adequate. No further mitigation measures are suggested. In terms of the proposed amended layout, the house at Die Mond will be 1.5 km from the nearest turbine, while the Kleinberggrivier farmhouse will be approximately 500m from its nearest turbine. A further three historical farmsteads located within 5km of the proposed Zen WEF were identified by Cape Town Properties Histories. As part of the comparative assessment, photo simulations of the likely impact of the proposed WEF on some of these identified structures of significance were developed (refer to Section 7 of the Heritage Screening Assessment).

The impacts to the sense of place of the Kleinberggrivier farmhouse will be negatively impacted by the amended layout. However, the proposed amended layout does comply with the recommendations made by the HIA undertaken for the EIA in that the buffers around historical houses should be a minimum of 500 m. Please refer to the photo simulations Figure 7.1a and 7.b within the Heritage Screening Assessment (Appendix E)

Based on the available information, the proposed amendments to the EA and site layout will increase the significance of impacts to the context of significant built environment heritage resources originally identified in the HIA and EIA report.

As per the previous HIA, Saron is a historical settlement whose context and character retain heritage significance. Furthermore, there are several individual structures of significance within the core part of the village. The key aspect of the impacts to this settlement is visibility of the turbines. Much of the settlement is visually protected at the very local scale due to the many trees that form part of its structure and character. It is only on the very southern limits of the village, close to the historic mission station and graveyard, that one will be able to see the uppermost part of the turbines.

As part of the photo simulations of the likely impact of the proposed WEF on the historic core of Saron were developed. It was noted that the nearest turbine to Saron is located approximately 2.5km from the southern edge of the town. From the historic core of Saron, the turbines are shielded from view from the trees around the cemetery, as well as a small koppie located to the south of Saron.



Photograph Simulation: From Point 5 - Road towards Saron - status quo



Photograph Simulation: From Point 5 - Road towards Saron - as per EA (110m hub height)



Photograph Simulation : From Point 5 - Road towards Saron - proposed amendment (140m hub height)

In terms of the Heritage Guidelines emanating from the Provincial Spatial Development Framework by Winter and Oberholzer (2013), the following guidelines apply to large-scale developments located within the contexts of historic settlements such as Saron:

- » Avoid large scale infrastructural developments such as windfarms, transmission lines and solar energy facilities where these disrupt the relationship between historical settlements and their landscape setting
- » Retain view-lines and vistas focused on prominent landscape features

In response to these guidelines, importantly, the proposed WEF does not impact on the dramatic mountain backdrop to the Saron Mission, and the proposed WEF does not disrupt view-lines and vistas between the Saron Mission and the mountains to the east.

It was deemed that the proposed amendments to the EA and site layout will decrease the significance of visual impacts to historic settlements and to the Cultural Landscape originally identified in the HIA and EIA

report and will not lead to any additional impacts. This is due to the reduction in the number of turbines proposed from 46 to 27.

In terms of the Heritage Guidelines emanating from the Provincial Spatial Development Framework and the applicability to large-scale developments located within the contexts of scenic routes such as the R44, the proposed ZEN WEF is likely to obstruct views of the Tulbagh Mountains from the R44 scenic route, as well as view of the Saron Mission from the R44. However, the proposed amended layout does comply with the recommended visual buffer zones as the nearest turbine to the R44 is located approximately 200m away.

5.5.2. Conclusion

Based on the findings of the Heritage Screening Assessment it is anticipated that the proposed amendments indicated above will not have an adverse impact to heritage resources in general, and in respect of visual impacts will even decrease significance due to the reduction in the number of turbines proposed. In terms of impacts to significant built structures, the proposed amendments to the EA and site layout will increase the significance of impacts to significant built environment heritage resources originally identified in the HIA and EIA report.

The impacts to the sense of place of the Kleinberggrivier farmhouse will be negatively impacted by the amended layout in that the turbines will be closer to this structure. However, the proposed amended layout does comply with the recommendations made in 2012 in that the buffers around historical houses should be a minimum of 500 m.

The specialist recommended that the following measures be adhered to and included within the conditions of the EMPr and EA were applicable:

- » A no development area of 500m around significant structures or 100m of the R44 scenic route be maintained;
- » If any archaeological resources, palaeontological resources or burials are encountered during any stage of the development then work in the immediate vicinity should be stopped, the resources and/or remains protected and the finds reported to HWC. Exhumation and/or excavation would be required at the expense of the developer.

Based on the findings of the heritage screening assessment and that the proposed amendments will not have an adverse impact to heritage resources in general the proposed amendment is considered to be acceptable.

5.6. Palaeontological Impacts

A desktop palaeontological assessment and recommended exemption from further palaeontological studies was included in the EIA undertaken for the project (April 2013). The construction of the proposed Zen Wind Energy Facility is not considered to pose a serious threat to local fossil heritage because the Malmesbury Group bedrocks and overlying mantle of Late Caenozoic superficial sediments (terrace gravels, alluvium, soils etc) are of very low palaeontological sensitivity.

For purposes of the proposed amendment the specialist was consulted on the proposed changes to the turbine specifications and palaeontological impacts.

5.6.1. Comparative Assessment

The desktop assessment concluded that construction of the proposed Zen Wind Energy Facility was not considered to pose a serious threat to local fossil heritage because the Malmesbury Group bedrocks and overlying mantle of Late Caenozoic superficial sediments (terrace gravels, alluvium, soils etc) are of very low palaeontological sensitivity. It was then recommended that, pending the discovery of significant fossil remains, exemption from further specialist palaeontological studies and mitigation be granted for this alternative energy development.

For the purpose of the amendment the specialist has indicated given the overall low to very low palaeontological sensitivity of the project area, the proposed Part 2 amendments to the authorised Zen Wind Farm will not cause a marked change in the impact significance of the proposed development in terms of palaeontological heritage.

5.6.2. Conclusion

The conclusions reached in the original palaeontological assessment report for this project remain unchanged and there are no objections on palaeontological heritage grounds to authorisation of the proposed Part 2 Amendment of the Zen Wind Farm. It is recommended that, pending the discovery of significant fossil remains, exemption from further specialist palaeontological studies and mitigation be granted for this alternative energy development.

Should any substantial fossil remain (e.g. stromatolites, trace fossils, shells, vertebrate bones and teeth) be encountered during excavation, however, these should be reported to Heritage Western Cape for possible mitigation by a professional palaeontologist.

5.7. Soils and Agricultural Potential Impacts

The Agricultural Potential Survey: Proposed Ventusa Wind Energy Facility, Gouda, Western Cape Province was compiled and published by J.H. van der Waals of Terra Soil Science on 8th January 2012. On 10 October 2013, his professional comment on the initial report was also published in response to the comment and non-agreement of the National Department of Agricultural, Forestry and Fisheries to the proposed project as presented within the EIA. The specialist highlighted the agricultural potential of the site was determined by climatic parameters, and that soil erosion was the highest risk impact expected to be associated with the project infrastructure on the receiving soil environment and that signs of soil erosion within the development area were already present during times of the survey. It was emphasized that the development of a wind energy facility at the site will have a smaller surface area footprint than coal energy production impacts in high agricultural potential areas of the country. Areas with high sensitivity to the proposed development were demarcated using a combination of criteria that includes slope, drainage features and the presence of irrigation infrastructure.

The specialist concluded that the development of a wind energy facility on the site would not have a detrimental effect on farming enterprises or agricultural production if appropriately managed and considering that wind turbine positions were planned to use existing roads and boundary areas between fields in order to minimise impacts on farming practices. The project was subsequently approved by DAFF following conditions as specified within the EA and EMPr.

5.7.1. Comparative Assessment

A comparative assessment was undertaken for the purposes of the amendment application in order to compare impacts of the new layout to that of the authorised Zen WEF layout. The newly released National Land Capability Evaluation Raster Data Layer was obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) to determine the land capability classes of Zen WEF development area and surrounding area according to this system. The new data was developed by DAFF to address the shortcomings of the 2002 national land capability data set. The new data was developed using a spatial evaluation modelling approach (DAFF, 2017).

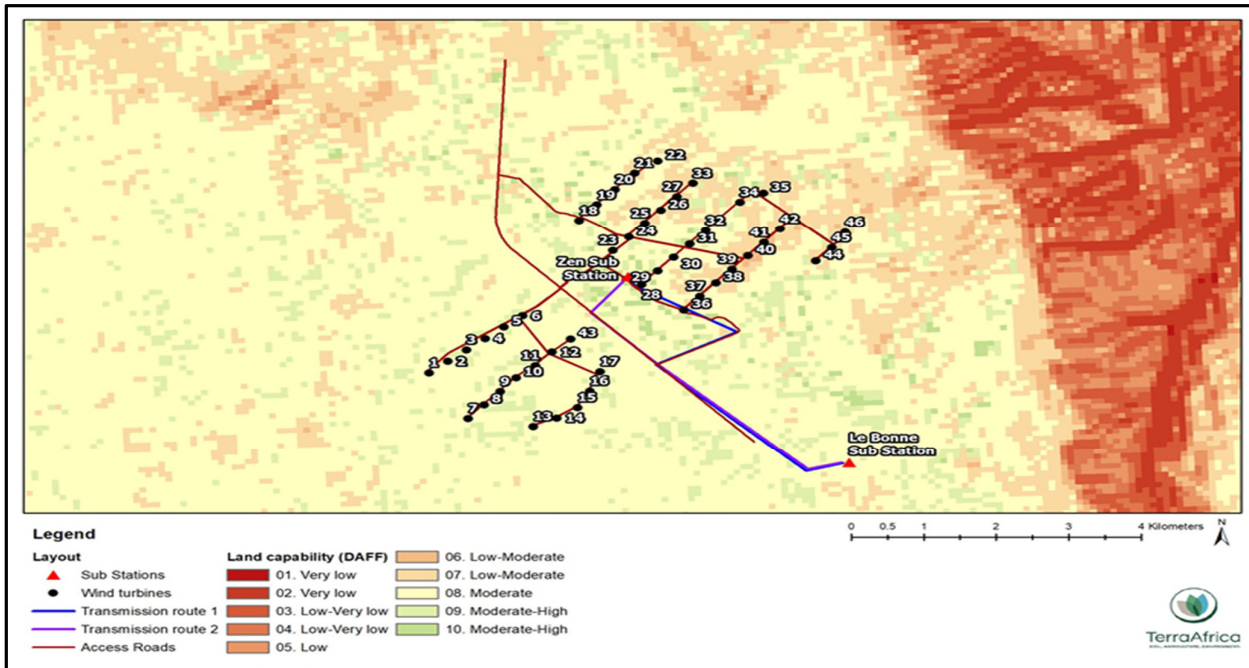


Figure 5.7: Zen WEF project infrastructure layout (initial, as per EA) superimposed on DAFF land capability raster data (data source: DAFF, 2017)

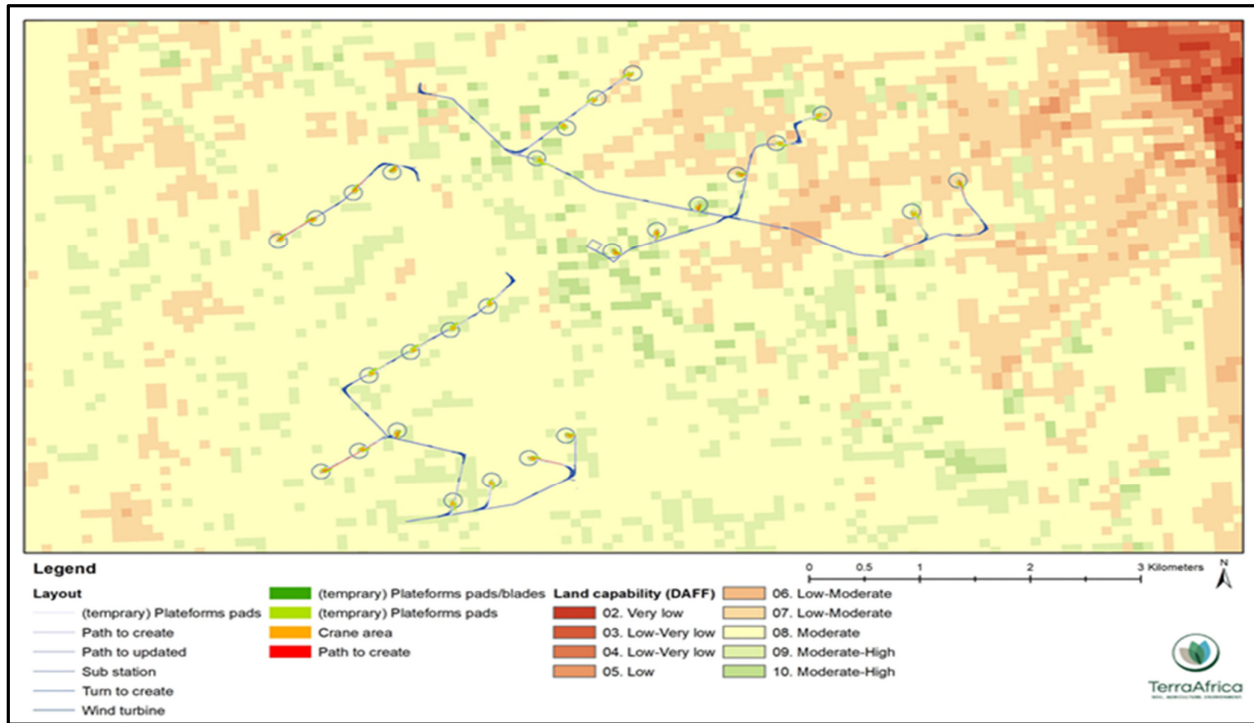


Figure 5.7.1: Zen WEF project infrastructure (new proposed layout) superimposed on DAFF land capability raster data (data source: DAFF 2017)(A3 Map available within Appendix J)

Figure 5.7 and Figure 5.7.1 indicate both project layouts fall on land with a varying degree of land capabilities ranging from Low-Very Low (Class 4) to Moderate-High (Class 10). Higher land capability classes are associated with the middle and south-western parts of the proposed project areas. Following the land capability analysis, it was concluded that the two project layouts are located on land with a similar range of land capabilities. The slightly wider range of land capabilities associated with the initial project layout is due to the fact that it was spread over a larger area.

As per the comparative assessment, the main impact of the proposed Zen WEF is associated with the physical disturbance and occupation of the soil surface where the infrastructure will be erected. In addition to the turbines, the road access to the turbines for the purpose of construction and maintenance further contributes to the impacts on soil and the related agricultural production potential. The revised project infrastructure layout has resulted in a decrease of the areas to be impacted upon. A summary of the changes in areas of high and medium land capability is presented below:

- » The crane and foundation areas have been reduced from 7,40ha to 6,00ha
- » New access road areas have been reduced from 6,80ha to 1,56ha
- » Areas where road upgrades are required have been reduced from 5,64ha to 4,27 ha

In addition, the crane and foundation areas that are planned in areas of high sensitivity have been reduced from 5,47ha to 3,13ha. Apart from the reduction in areas impacted upon, the new project layout aimed to position the turbines along existing roads in order to avoid crop fields as far as possible. This is an important design measure to ensure that crop field tillage can continue uninterrupted as far as possible.

The revised project layout has reduced impacts on soil and agriculture when compared to the initial design that was authorised.

5.7.2. Conclusion

It was concluded by the specialist that the revised layout of the Zen WEF project will result in smaller impacts on the receiving soil environment and its associated agricultural potential. The reduced number of turbines, shorter areas of access roads required as well as the new placement of the turbines will result in higher likelihood of the agricultural production in the area continuing with very limited disturbance.

The specialist also emphasized the causes of soil erosion as the development area is prone to soil erosion as a result of the combination of steep slopes as well as the presence of duplex soil forms. The specialist further recommended that the following be included within the EMPr upon finalisation:

- » Construction of the turbines must take into consideration that soil removal must be conducted carefully, separating the slightly structured to apedal topsoil from the structured subsoil. Once soil is returned, it should be returned in the same sequence as it was excavated from the in situ profiles. In addition, the use of geo-textiles on site will be beneficial to prevent the erosion from the soil stockpiles during construction;
- » Erosion management practices must be included within the EMPr.

As per the findings of the comparative assessment the specialist has indicated that the revised project layout and subsequent amendments are deemed acceptable and should be authorised.

5.8. Ecological Impacts

A site visit and desktop assessment was undertaken to assess the presence and distribution of ecologically sensitive species and habitats for the purposes of the EIA in 2013. The study indicated that the site consisted of highly contrasting ecological sensitivity, with the transformed areas being of low sensitivity and the intact remnants of Swartland Alluvium Fynbos and Swartland Shale Renosterveld being of very high sensitivity. As these vegetation types were deemed Critically Endangered and observed within the site, the specialist indicated that intact remnants should be considered highly sensitive and not suitable for developments. The vast majority of the site was highly transformed and retained very little biodiversity. The pre-construction and construction impacts identified were mitigated to low significance through avoidance and mitigation measures.

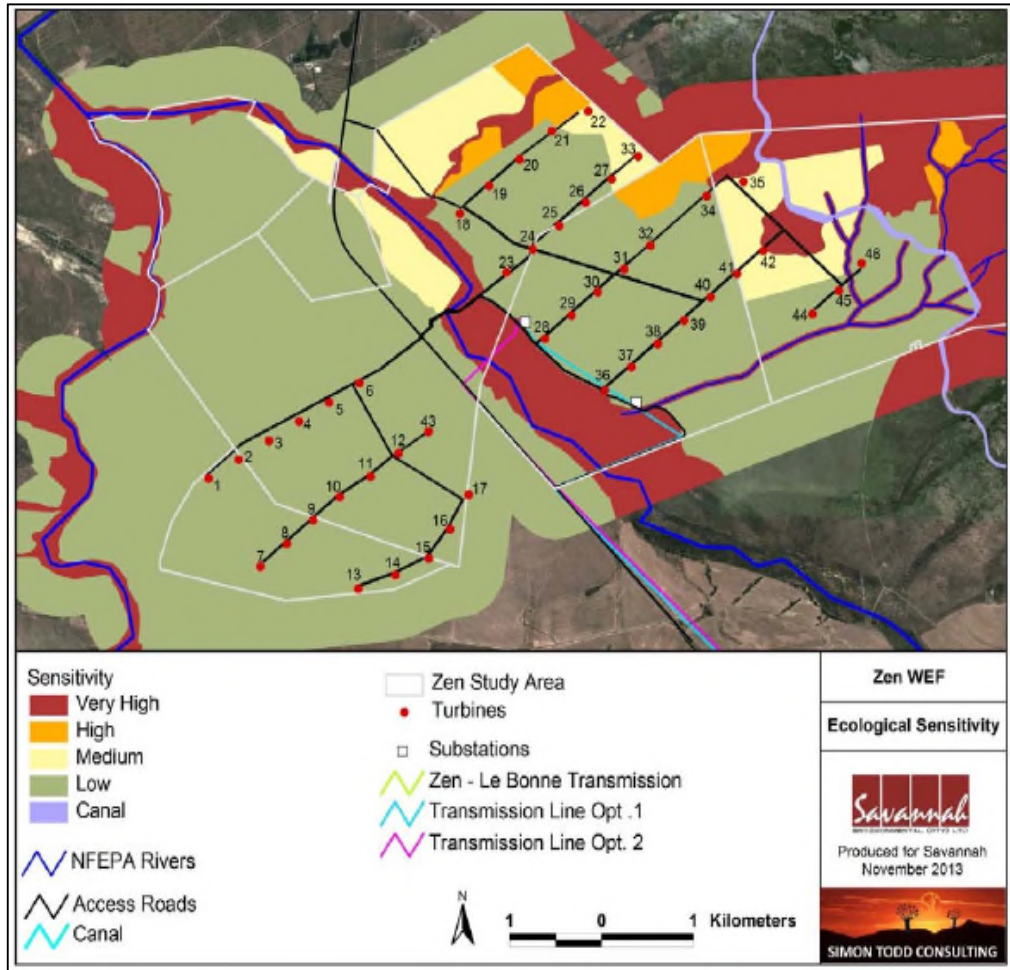


Figure 5.8: Ecological sensitivity map for the authorised Zen WEF layout (November 2013)

A comparative assessment was undertaken for the purpose of the amendment application to review the proposed amended layout in comparison with the original authorised layout together with the ecological sensitivity of the site.

5.8.1. Comparative Assessment

The amended layout remains within the low sensitivity parts of the site and as a result, there are no impacts that have increased as a result of the amendment. Consequently, there are no impacts associated with the proposed changes to the layout that would increase terrestrial ecological impacts as compared to those originally assessed.

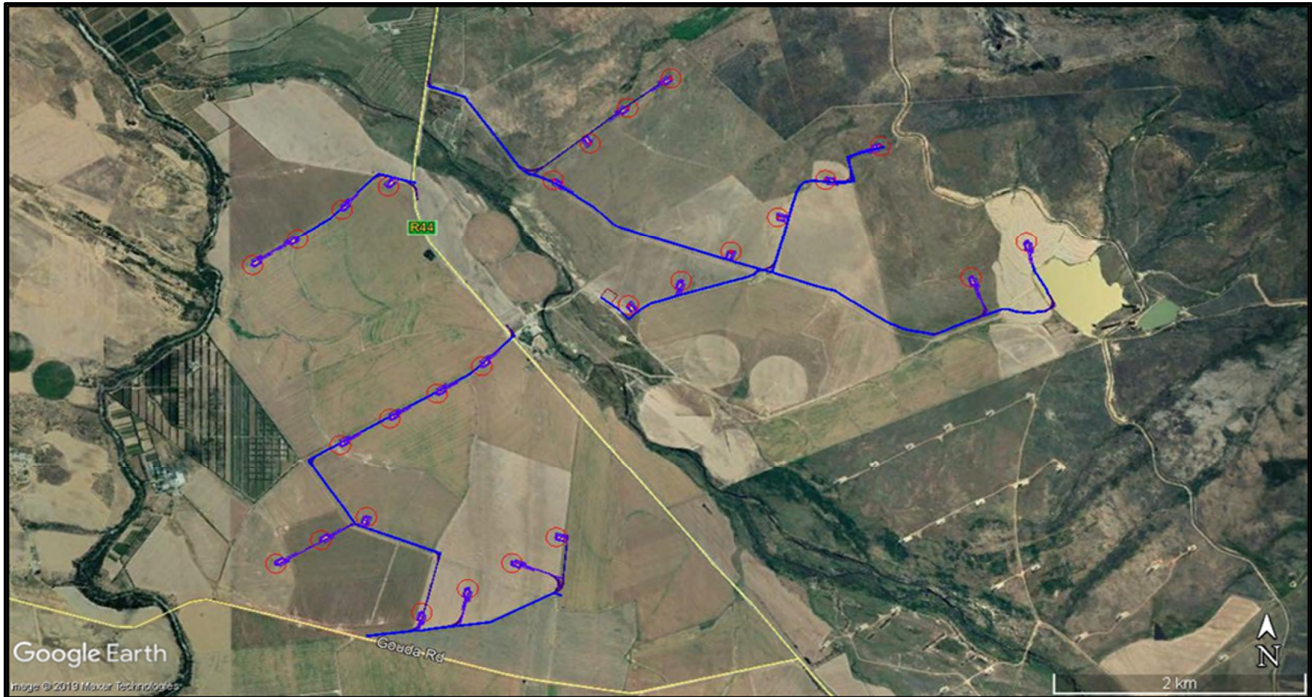


Figure 5.8.1: . The amended layout for the Zen Wind Energy Facility, showing the new 27 turbine layout of the facility.

A comparative assessment of the original assessed ecological impacts and the impacts of the amended layout is provided below:

Impact	Original Assessment		Amendment
	Pre-Mitigation	Post Mitigation	Post Mitigation
Loss of Vegetation and Listed Species	Medium	Low	Low
Faunal Impacts	Medium	Low	Low
Alien Plant Invasion Risk	Medium	Low	Low
Increased Erosion Risk	Medium	Low	Low
Reduced Landscape Connectivity	Medium	Low	Low

According to the comparative assessment based on the amendment to layout, no new impacts were identified to occur and as a result no new mitigation measures were recommended to be included by the specialist.

5.8.2. Conclusion

As the major changes to the Zen WEF in terms of the amendment are the changes to turbine specifications and therefore the reduction in the number turbines resulting in a decreased footprint, the changes can be seen as neutral as there are no disadvantages of the amended layout as compared to original layout. No high sensitivity areas were impacted by the amended layout and as a result no new impacts were identified.

From an ecological perspective the amendment layout is supported as the impacts on fauna and flora would be similar to that of the authorised layout and there are no fatal flaws or critical issues associated with the proposed changes.

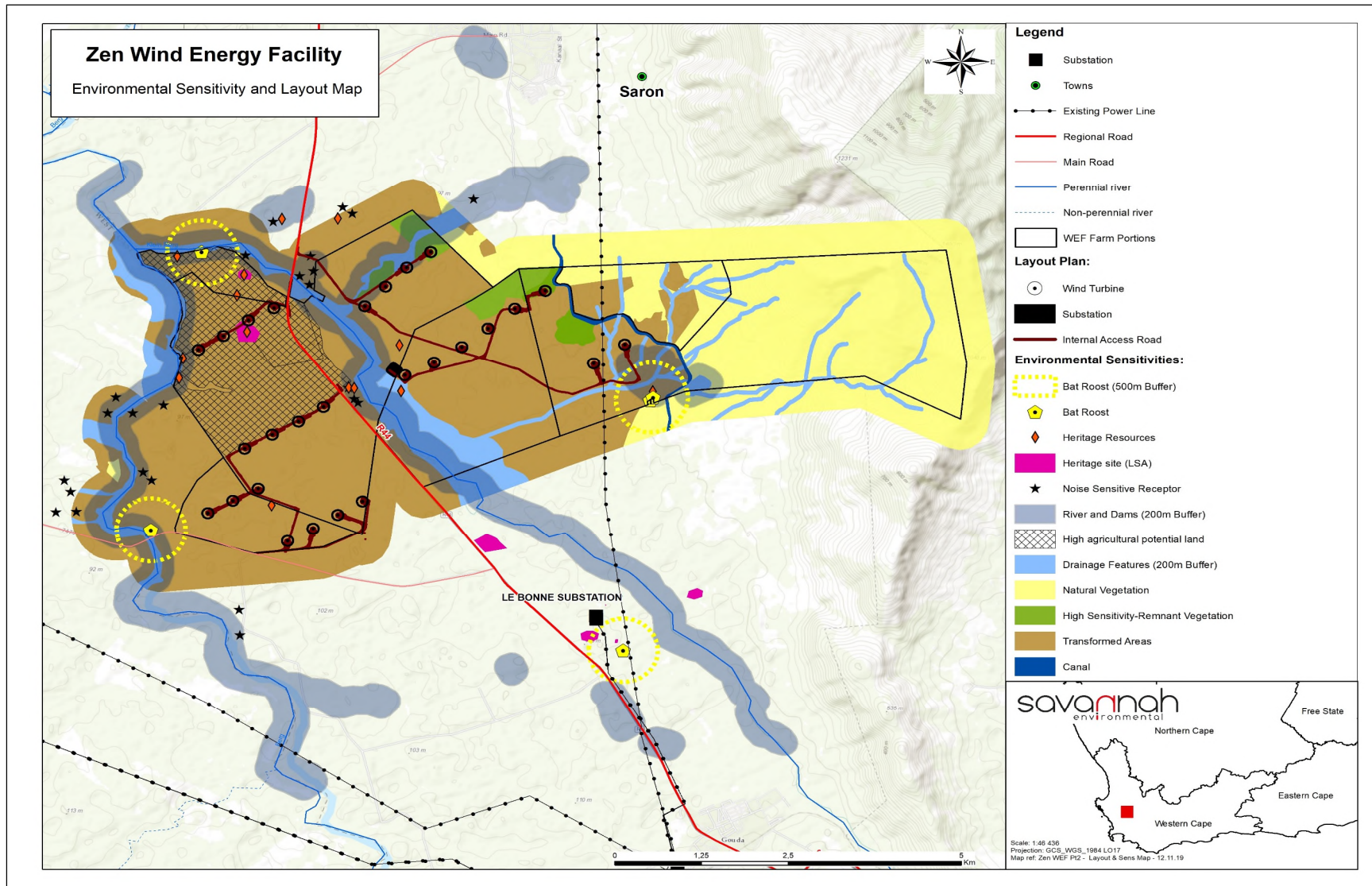


Figure 5.8.2: Overall sensitivity map as per the proposed amendment (2019) (A3 Map included in Appendix J).

6. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(a)(ii), this section provides details of the advantages and disadvantages of the proposed amendment.

Advantages of the amendment	Disadvantages of the amendment
General	
<p>The increase in rotor diameter will increase the efficiency of the facility and consequently the economic viability thereof. Increased efficiency of a facility is considered to be beneficial to the environment as this will reduce the need for additional facilities to generate additional electricity.</p> <p>It is also beneficial from a macro-economic perspective as it results in the lower cost per unit of energy (i.e. lower tariff), ultimately benefiting the South African public.</p>	None
Avifauna	
	The proposed amended turbine results in a rotor surface of 21 400 m ² (with a total of 577 000 m ² for the full WEF). Even with a reduced number of turbines the space used "in the air" with turning blades is increased by almost 40 000 m ² which potentially increases the risk of collision for birds and bats. Larger blades also means that the blades will spin less quickly which will permit birds to avoid it easily.
The overall area used for the authorised project and the amended layout are more or less the same, with the difference being the density of turbines and the location of each of these turbines. Habitats that are mainly occupied by the amended layout are by crops like wheat, resulting in a Low sensitivity rating resulting in a lower impact predicted for avifauna.	None
The amended project layout requires 25 m x 25 m of concrete foundation because of the bigger turbines proposed. Each platform will be 625 m ² in extent, with a total of 16 875 m ² being required for the full facility. In comparison, the overall transformed surface for the turbines is reduced. In addition, the number of roads created or upgraded will also be reduced.	None.
Bats	
As the distance between the ground and the blade tips will increase, some bat species foraging at ground level will be less at risk with the proposed amendments.	As the hub height and rotor diameter will increase, this would result in a greater rotor swept area and a potentially greater likelihood of bat collision with turbine blades or barotrauma. However, larger blades mean that the blades will spin less quickly which will permit bats to avoid these more easily.

Advantages of the amendment	Disadvantages of the amendment
Visual	
The proposed amendment does not introduce any new impacts or increase the significance of impact already identified.	None
Noise	
None.	The proposed amendments to the layout will slightly increase the noise level at surrounding NSDs, but the projected noise level is still less than 45 dBA
Heritage	
Overall, it is anticipated that the proposed amendments indicated will not have an adverse impact to heritage resources in general, and in respect of visual impacts will even decrease significance due to the reduction in the number of turbines proposed.	In terms of impacts to significant built structures, the proposed amendments to the EA and site layout will increase the significance of impacts to significant built environment heritage resources originally identified in the HIA and EIA report as a result of closer proximity to these sites. The turbines will however not encroach on the recommended buffer areas recommended by the HIA or the Heritage Guidelines emanating from the Provincial Spatial Development Framework.
Palaeontological	
The proposed amendment does not introduce any new impacts or increase the significance of impact already identified.	None
Soil & Agricultural Potential	
The revised layout of the Zen WEF project will result in smaller impacts on the receiving soil environment and its associated agricultural potential.	None
The reduced number of turbines, shorter areas of access roads required as well as the new placement of the turbines will result in higher likelihood of the agricultural production in the area continuing with very limited disturbance.	None
Ecological	
The proposed amendment does not introduce any new impacts or increase the significance of impact already identified.	None

Based on the above, it can be concluded that the advantages of the proposed amendments outweigh the disadvantages from an environmental and technical perspective.

7. REQUIREMENTS FOR ADDITIONAL MITIGATION AS A RESULT OF THE PROPOSED AMENDMENTS

As required in terms of Regulation 32(1)(a)(iii), consideration was given to the requirement for additional measures to ensure avoidance, management and mitigation of impacts associated with the proposed change. From the specialist inputs provided into this amendment motivation, it is concluded that the mitigation measures proposed within the EIA would be sufficient to manage potential impacts within

acceptable levels. Updated recommendations are however provided by the Heritage, Soil & Agricultural Potential specialists and Avifaunal specialists:

Avifauna:

- » Should artificial water points need to be destroyed, other can be created elsewhere with a stream connecting the waterbodies;
- » The mitigation will be to assist the developer and guide them to follow the roads and cross rivers at the good spots to minimise the impact of the work associated with burial of powerlines;
- » Implementing curtailment at dawn and dusk for limiting the risk for night-flyers water birds and roosting Blue Crane and Secretarybird during breeding season for approximately 4 months only if fatality rates are deemed unacceptable;
- » Painting turbine towers dark and one blade a different colour from the other two. Nocturnal illumination of rotor blades using green or blue light if CAA regulations will allow this.

Heritage:

- » A no development area of 500m around significant structures or 100m of the R44 scenic route be maintained;
- » If any archaeological resources, palaeontological resources or burials are encountered during any stage of the development then work in the immediate vicinity should be stopped, the resources and/or remains protected and the finds reported to HWC. Exhumation and/or excavation would be required at the expense of the developer.

Soil and Agricultural Potential:

- » Construction of the turbines must into consideration that soil removal must be conducted carefully, separating the slightly structured to apedal topsoil from the structured subsoil. Once soil is returned, it should be returned in the same sequence as it was excavated from the in situ profiles. In addition, the use of geo-textiles on site will be beneficial to prevent the erosion from the soil stockpiles during construction;
- » Erosion management practices must be included within the EMPr.

No other novel mitigation measures are introduced from the other specialists. These additional mitigation measures are not directly related to the proposed amendments, but rather due to additional information now available (since the initial EA issuance) as a result of new guidelines that have been published and experience gained on operational facilities. These updated mitigation measures should be included within the project EMPr when the updated layout is finalised and submitted for final approval to the DEA as required in terms of Conditions 15 of the Environmental Authorisation.

8. PUBLIC PARTICIPATION

A public participation process is being conducted in support of a Part 2 amendment application for amendment of the Environmental Authorisation for the Zen Energy Facility in the Western Cape Province.

This public participation includes:

- This motivation report is available for a 30-day public review period between **13 November 2019 and 13 December 2019** at www.savannahsa.com. CD copies have been distributed to Organs of State who have jurisdiction over the project as well as to key stakeholders. CDs can be provided to stakeholders on request.
- Written notification of registered I&APs regarding the availability of the amendment motivation report.
- Placement of an advert in the Witzenburg Herald on the 08 November 2019 (Appendix I4).
- Placement of site notices at the site on 02 October 2019.(Appendix I4)

Comments received during the public review period will be included in the final submission to the DEA for consideration in the decision-making process. Comments will be responded to and included in the Comments and Responses Report (refer to **Appendix I5**). Proof of requests made to obtain comments will be included in **Appendix I**.

9. CONCLUSION

Based on the specialist findings, it is concluded that the proposed amendments to the turbine specifications and associated changes to the layout and turbine positions are not expected to result in an increase to the significance ratings for the identified potential impacts within the EIA. No other new impacts have been identified under the current amendment and all other impact ratings remain the same.

In terms of Avifaunal Impacts, the significance of impact remains unchanged under the current assessment. It was recommended that all the mitigation measures previously included within the mentioned into the EIA and EMPr remain applicable and are to be implemented.

The Bats specialist concluded that it is unlikely that the amendments to the turbine dimensions proposed for the Zen WEF would change the current rated impacts to bats. Due to the proposed changes in turbine specifications and subsequent change to the layout, impacts were deemed to be slightly lower for some species as the turbines would reach higher above the ground based on the maximum dimensions being applied for. However, for high flying species, the higher tip height could result in a greater impact. Longer blades were also deemed to extend higher into the air and place open air species such as free-tailed bats at greater risk. Therefore, ground clearance should be maximized, and tip height should be minimized as much as possible. On the other hand, longer blades spin less quickly and can be easier to avoid. The specialist also recommended that the layout design should take sensitive areas for bats into consideration and respect buffer distances indicated in order to reduce at most the impacts on bat communities. The specialist also reiterated that curtailment be implemented depending on the results of bat activity and collision rates as recommended by Bio3 in 2013.

The heritage assessment concluded that overall, the proposed amendments proposed will not have an adverse impact to heritage resources in general, and in respect of visual impacts will even decrease significance due to the reduction in the number of turbines proposed. In terms of impacts to significant built structures, the proposed amendments to the EA and site layout will increase the significance of impacts to significant built environment heritage resources originally identified in the HIA and EIA report as a result of the closer proximity of turbines to these structures. The turbines will however not encroach on the recommended buffer areas recommended by the HIA or the Heritage Guidelines emanating from the Provincial Spatial Development Framework. The specialist recommended that the no development area of 500m around significant structures or 100m of the R44 scenic route be maintained and that the Drakenstein Heritage Foundation and the Tulbagh Valley Heritage Foundation be provided with 30 days in which to comment on this comparative assessment.

The results of the soil and agricultural potential assessment indicated that the revised layout of the Zen WEF project would result in smaller impacts on the receiving soil environment and its associated agricultural potential. The revised project layout reduced impacts on soil and agriculture when compared to the initial design that was authorised. The reduced number of turbines, shorter areas of access roads required as well as the new placement of the turbines will result in higher likelihood of the agricultural production in the area continuing with very limited disturbance. The specialist also emphasized that the proposed development area is prone to soil erosion as a result of the combination of steep slopes as well as the presence of duplex soil forms and thereby recommended additional soil erosion measure be implemented and included within the EMPr.

In terms of aspects relating to visual, noise and palaeontology, it was concluded that the proposed changes to the EA will not increase the significance of impacts originally identified in the EIA report or lead to any additional impacts.

Based on the above conclusions, there are no new impacts identified as a result of the proposed amendments. The amendment in itself does not constitute a listed activity. The mitigation measures described in the original EIA document are adequate to manage the expected impacts for the project. Additional mitigation measures have been recommended by the soil and agricultural potential specialist and heritage specialist and must be included within the project EMPr when the updated layout and EMPr is finalised and submitted to DEA for final approval in terms of the requirements of Conditions 15 of the Environmental Authorisation. It must be noted that the layout and EMPr for the project will be finalised and submitted to the DEA for review and approval (in accordance with Condition 17 and 18 of the EA) once a turbine supplier has been selected for the project.

Given the conclusions of the studies undertaken for this Part 2 amendment application, Zen Wind Farm (Pty) Ltd requests the following:

- » Reduction in the number of turbines from 46 **to 27**;
- » Increase rated power of turbines from 3 MW to **up to 6 MW per WTG**
- » Increase rotor diameter from 122 m to **up to 165 m**;
- » Increase hub height from 110 m to **up to 140 m**;
- » Increase in the overall capacity of the wind energy facility from 140 MW to **up to 147 MW**;
- » Potential increase to dimensions of the crane pad and laydown area (storage area per turbine) from **2400 m² to 5500 m²**;
- » Increase in the concrete foundation from 20m x 20m x 4m to **25m x 25m x 6m**;
- » Update of the **layout**; and
- » Change the **holder of the EA**.

In addition to the above, Zen Wind Farm (Pty) Ltd, requests an update to the property description to reflect the consolidation of properties as per the conveyance certificate.

Taking into consideration the conclusions of the studies undertaken for the proposed amendments associated, with the revised turbine specifications and changes to the layout (as detailed in Appendix A – H), it is concluded that these amendments are considered acceptable from an environmental perspective, provided that the original and additional mitigation measures stipulated herein are implemented.

