

# Zonnequa Wind Farm, Northern Cape Province

Motivation for amendment of Environmental  
Authorisation

DEA Ref.: 14/12/16/3/3/1/1970

October 2019

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## PROJECT DETAILS

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<b>Title</b>	:	Zonnequa Wind Farm, Northern Cape Province: Motivation for Amendment to the Environmental Authorisation
<b>DEA Reference</b>	:	14/12/16/3/3/1/1970
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<b>Client</b>	:	Genesis Zonnequa Wind (Pty) Ltd
<b>Report Status</b>	:	Motivation Report for review and comment during a 30-day review period
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## TABLE OF CONTENTS

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	<b>PAGE</b>
<b>PROJECT DETAILS</b> .....	<b>i</b>
<b>TABLE OF CONTENTS</b> .....	<b>ii</b>
<b>APPENDICES</b> .....	<b>iii</b>
<b>PURPOSE OF THE REPORT</b> .....	<b>iv</b>
<b>1. OVERVIEW OF THE PROJECT</b> .....	<b>1</b>
1.1. Location .....	1
1.2. Potential Environmental Impacts as determined through the EIA Process .....	1
<b>2. DETAILS OF THE AMENDMENTS APPLIED FOR</b> .....	<b>10</b>
2.1. Amendment to Wind Turbine specifications and Project Description .....	10
2.2. Inclusion of the co-ordinates of the on-site substation within the EA .....	11
2.3. Summary of amendments applied for .....	11
<b>3. MOTIVATION FOR THE PROPOSED AMENDMENTS</b> .....	<b>14</b>
3.1. Amendment to Wind Turbine Specifications and Facility Layout .....	14
3.2. Inclusion of the co-ordinates of the on-site substation within the EA .....	14
<b>4. Considerations in terms of the requirements of the EIA Regulations</b> .....	<b>15</b>
<b>5. POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE BA AS A RESULT OF THE PROPOSED AMENDMENTS</b> .....	<b>16</b>
5.1. Impacts on avifauna .....	16
5.2. Impacts on bats .....	20
5.3. Ecological Impacts .....	23
5.4. Impacts on soil and agricultural potential .....	25
5.5. Impacts on heritage .....	25
5.6. Noise impact .....	26
5.7. Visual Impact .....	27
<b>6. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS</b> .....	<b>30</b>
<b>7. REQUIREMENTS FOR ADDITIONAL MITIGATION AS A RESULT OF THE PROPOSED AMENDMENTS</b> .....	<b>32</b>
<b>8. PUBLIC PARTICIPATION</b> .....	<b>33</b>
<b>9. CONCLUSION</b> .....	<b>34</b>

## APPENDICES

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- Appendix A:** Avifauna Specialist Comment and Input Letter
- Appendix B:** Bat Specialist Comparative Assessment
- Appendix C:** Ecology Specialist Comment and Input Letter
- Appendix D:** Soils and Agricultural Potential Comment and Input Letter
- Appendix E:** Heritage Specialist Comment and Input Letter
- Appendix F:** Noise specialist Comment and Input Letter
- Appendix G:** Visual Specialist Comparative Assessment
- Appendix H:** Public Participation Documentation
- Appendix H1: I&AP Database*
- Appendix H2: Consultation with I&APs*
- Appendix H3: Consultation with Organs of State*
- Appendix H4: Advertisements and Site Notices – proof of advertisement to be included in the final Motivation Report*
- Appendix H5: Comments and Responses Report – to be included in the final Motivation Report*
- Appendix H6: Comments Received – to be included in the final Motivation Report*
- Appendix I:** A3 Maps
- Appendix J:** Authority Correspondence – to be included in the final Motivation Report
- Appendix K:** CVs

## PURPOSE OF THE REPORT

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An Environmental Authorisation (EA) for the Zonnequa Wind Farm and associated infrastructure, in the Northern Cape Province (DEA ref: 14/12/16/3/3/1/1970) was obtained by Genesis Zonnequa Wind (Pty) Ltd on 18 February 2019. 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. Following developments in technology after the issuing of the EA and considering economic efficiency, the developer is proposing to install a turbine technology on the site that is best suited to the conditions of the site and which enables a reduction of the number of turbines with the capacity to still generate 140MW (contracted capacity) as originally authorised. These amendments are proposed in order to increase the efficiency of the facility and reduce the infrastructure requirements and consequently increase the economic competitiveness thereof.

In the time since the original Basic Assessment (BA) was undertaken and the EA issued, the turbines that are available on the market have increased in both size and output power. The applicant wishes to amend the EA in order to cater for the larger turbine specifications, to enable the applicant to utilise the latest, most efficient turbines available on the market, which will increase the overall efficiency of the authorised Zonnequa Wind Farm and reduce the number of turbines required.

In this regard, Genesis Zonnequa Wind (Pty) Ltd is considering an updated turbine model for the project and is proposing the following amendments to the EA:

1. Reduction of the number of turbines from **up to 56 turbines** to **up to 35 turbines**
2. Hub height from **up to 130m** to **up to 150m**
3. Tip height from **up to 205m** to **up to 240m**
4. Individual turbine capacity from **up to 4.5MW** to **up to 7MW**

In addition to the above, it is requested that the co-ordinates of the on-site substation be included in the EA for the avoidance of doubt. It is also requested that the layout be approved, as per the requirements of Condition 13 of the EA.

The proposed amendments in themselves are not listed activities, and do not trigger any new listed activity as the proposed amendments are within the original authorised development footprint assessed within the Basic Assessment (BA) process<sup>1</sup>, and do not change the scope of the EA.

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 this amendment application on behalf of Genesis Zonnequa Wind (Pty) Ltd. This report aims to provide detail pertaining to the significance and impacts of the proposed change to the project description and layout compared to that predicted in

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<sup>1</sup> A Basic Assessment (BA) process was undertaken in support of the application for EA for the Zonenqua Wind Farm due to the location of the entire project site within the Springbok Renewable energy Development Zone (REDZ 8). This is in line with GN 114, as gazetted on 16 February 2018.

the BA process 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 inputs in the form of comment and input letters and comparative assessment reports in order to inform the final conclusion regarding the proposed amendments (refer to **Appendix A to G** of this report). This main report must be read together with these specialist inputs in order to obtain a complete understanding of the proposed amendments and the implications thereof within the different fields of study.

This Motivation Report has been made available to registered interested and affected parties for a 30-day review and comment period from **Wednesday, 09 October 2019** to **Friday, 08 November 2019**. The availability of the report was advertised in the Gemsbok newspaper on **09 October 2019** (proof of advertisement will be included in **Appendix H4** of the final Motivation Report to be submitted to the competent authority for decision-making).

This Motivation Report has been made available for download at [www.savannahsa.com](http://www.savannahsa.com) during the above-mentioned commenting period. To obtain CD copies, further information, register on the project database, or submit written comment refer to the contact details below:

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All comments received during the 30-day review period will be recorded and included within a Comments and Responses report (refer to **Appendix H5**) to be submitted to the Department of Environment, Forestry and Fisheries (DEFF) (previously known as the Department of Environmental Affairs (DEA)) with the final Motivation Report for decision making purposes.

# 1. OVERVIEW OF THE PROJECT

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## 1.1. Location

The authorised Zonnequa Wind Farm is located approximately 19km south-east of Kleinsee and falls within the Nama Khoi Local Municipality and the Namakwa District Municipality, Northern Cape. The project site is located within the Springbok Renewable Energy Development Zone (REDZ 8) as determined by the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015 – CSIR/DEA), and formally gazetted on 16 February 2018 (GN 114). The Zonnequa Wind Farm is to be constructed within the project site which comprises the following four farm portions:

- » Portion 1 of the Farm Zonnekwa 328
- » Remaining Extent of the Farm Zonnekwa 326

## 1.2. Potential Environmental Impacts as determined through the EIA Process

From the specialist investigations undertaken within the BA process for the wind farm, the following environmental impacts were identified:

- » Potential impacts on birds;
- » Potential impacts on bats;
- » Potential ecological impact;
- » Potential impacts on soil and agricultural potential;
- » Potential impacts on heritage;
- » Potential noise impact;
- » Areas of visual impact;
- » Potential socio-economic impact; and
- » Potential impacts on traffic

### Key conclusions and recommendations of the BA pertinent to this application:

From the specialist investigations undertaken as part of the BA for the wind farm, it was concluded that the majority of negative impacts are of low to medium significance with the implementation of appropriate mitigation measures. Only one impact of a high significance was identified to be associated with the visual impact of the Zonnequa Wind Farm which relates to visual impact on sensitive visual receptors within a 5km radius of wind turbines. No environmental fatal flaws were identified on the site. However, areas of very high sensitivity were identified and avoided through micro siting of the wind turbines. The following sections summarise the findings of the specialist studies undertaken during the BA process, as well as provide insight to the impacts identified and assessed.

#### » **Avifauna:**

The avifauna impact assessment was undertaken by Rob Simmons and Marlei Martins of Birds and Bats Unlimited.

From the results of the avifauna assessment, it can be concluded that no impacts of high significance will occur on the avifauna communities within the area and the project site.



The Avifauna Impact Assessment is based on the findings of the avifauna pre-construction monitoring campaign that was conducted between May 2017 and February 2018. The avifauna impacts identified to be associated with the Zonnequa Wind Farm will be negative and local in extent. The duration of the impacts will be long-term, for the lifetime of the wind farm and apply to all collision-prone species. The magnitude is expected to be low, with the implementation of the recommended mitigation measures.

The avifauna impacts identified relate specifically to three collision-prone Red Data Species likely to be impacted. The species to be impacted include the Red Data Secretarybirds, Lanner Falcon, and the two eagles (Black-chested Snake and Booted), which are collectively summed under Raptors, as well as the nomadic Kori and Ludwig's Bustard. The probability of occurrence of raptors (including Secretarybirds) and bustards having interaction with the wind farm is rated as probable due to their passage rates and occurrence within the project site. The probability is linked to the fact that Secretarybirds are known to fly at the rotor swept area heights.

The avifauna impacts expected to occur include direct impact fatalities, as well as disturbance and loss of foraging habitat. The significance of the impacts on the three collision-prone Red Data species will be low following the implementation of the recommended mitigation measures of the specialists.

» **Bats:**

The Bat Impact Assessment was undertaken by Werner Marais of Animalia.

Considering the findings of the bat pre-construction monitoring campaign and the impact assessment, it is concluded by the specialist that the development of the Zonnequa Wind Farm is acceptable from a bat impact perspective, subject to the implementation of the recommended mitigation measures.

The Bat Impact Assessment identified impacts on bats during the construction and operation of the Zonnequa Wind Farm. The results of the Bat Impact Assessment are based on the bat pre-construction monitoring campaign conducted within the project site between May 2017 and June 2018.

During the construction phase, the impacts include the destruction of foraging habitat through the clearing of vegetation. This construction phase impact has been assessed as being of a low significance with the implementation of the recommended mitigation measures as identified by the specialist.

During the operation phase the impacts to bats include bat mortalities due to direct impact or barotrauma caused by the wind turbines and an increase in bat mortalities due to increased insect numbers as a result of the light attraction caused by the wind farm. Both of the impacts expected during the operation phase will be of a low significance with the implementation of the recommended mitigation measures as specified by the specialist.

» **Ecology:**

The Ecological Impact Assessment was undertaken by Simon Todd of 3Foxes Biodiversity Solutions.

Based on the nature and significance of the post-mitigation ecological impacts, the Zonnequa Wind Farm project site is considered as a broadly suitable environment for wind farm development from an ecological perspective. There are no specific long-term impacts likely to be associated with the wind farm that cannot be reduced to an acceptable level through mitigation and avoidance, including a

low post-mitigation impact on ESAs and no impact on CBAs. Consequently, there are no high residual impacts or fatal flaws associated with the development and it can be supported from a terrestrial ecology perspective. It is therefore the reasoned opinion of the specialist that the Zonnequa Wind Farm should be authorised, subject to the implementation of the recommended mitigation measures.

The Ecological Impact Assessment assessed the impact of the Zonnequa Wind Farm on the sensitive ecological features present within the project site for the life-cycle of the project. The Ecological Impact Assessment identified impacts within the construction, operation and decommissioning phases of the project.

During the construction phase, the impacts expected to occur include impacts on vegetation due to disturbance and clearing, impacts on fauna due to disturbance, loss of habitat and transformation of the area and an increased risk for soil erosion due to construction activities and the associated disturbance. The significance of the construction phase impacts ranges from medium to low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified prior to the implementation of mitigation.

During the operation phase, the anticipated impacts include faunal impacts due to the presence of the wind farm and the associated disturbance, negative impacts on ESAs and broad-scale ecological processes due to the presence of the wind farm within the landscape and an increased soil erosion risk due to increased vulnerability of the site following the undertaking of the construction activities. The significance of the impacts for the operation phase will be low following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project.

Two impacts on ecology are expected to occur during the project decommissioning phase. These impacts include faunal impacts as a result of disturbance and soil erosion due to the impact of the decommissioning activities which increase the vulnerability of the site. The significance of the impacts during the decommissioning phase will be low following the implementation of the recommended mitigation measures by the specialist. No ecological impacts of high significance were identified for the decommissioning of the project.

» **Soil and Agricultural Potential:**

The Soil and Agricultural Potential Impact Assessment was undertaken by Garry Patterson of the Agricultural Research Council (ARC).

Following the assessment of the associated impacts, the specialist concluded that the proposed activities associated with the development of the Zonnequa Wind Farm are acceptable from a soils perspective considering the characteristics and the potential of the soils present within the project site.

The current land use of the project site is extensive grazing (specifically by sheep) and the site is dominated by natural vegetation. The site also includes a significant proportion of sand dunes.

The soils present in most of the project site are not considered susceptible to erosion by water. However, if the vegetation cover is disturbed (for example by overgrazing or construction activities) and taking into account the sandy nature of the topsoils and dry climate, there is a significant possibility of loss of significant quantities of topsoil through wind erosion.

This can be mitigated by minimising the disturbed surface area, and ensuring rehabilitation of surface vegetation is carried out as soon as possible following disturbance.

There are no soils of high agricultural potential present within the project site and the soils are of moderate agricultural potential at best, due mainly to the sandy texture which will lead to rapid water infiltration and the soils drying out. In addition, the low rainfall in the area means that there is little potential for rain-fed arable agriculture. Arable production would therefore be possible only by irrigation, and no indications of any irrigated areas, within and surrounding the project site, can be identified on Google Earth.

In general, the soils that do occur within the project site are suited mainly for extensive grazing as the grazing capacity of the area is very low (around 26-40 ha/large stock unit).

The prevailing potential of the soils for rain-fed cultivation throughout most of the area, as well as the use of irrigation activities for cultivation, is low.

Impacts have been identified for both the construction and operation phases for the Zonnequa Wind Farm. The impacts associated with land use, soil and agricultural potential include the loss of agricultural land and soil erosion. Both of these impacts can be mitigated to a low significance with the implementation of the recommended mitigation measures.

» **Heritage:**

The Heritage Impact Assessment (including archaeology and palaeontology) was undertaken by Jayson Orton of ASHA Consulting (with input from John Pether).

The heritage specialist concluded that the palaeontological and archaeological resources are the main concerns for the Zonnequa Wind Farm, although fossils are less likely to be found than archaeological sites. While fossils would be revealed by excavations during construction, and would require reporting when found, archaeological sites will be readily located during a final pre-construction survey and can be rescued through archaeological excavation before construction starts.

There are no fatal flaws and the development of the Zonnequa Wind Farm is acceptable from a heritage perspective, subject to the implementation of the recommended mitigation measures. Buffers around known archaeological sites have been respected by the development footprint and no further buffers require implementation.

The Heritage Impact Assessment identified impacts associated with the construction and operation of the Zonnequa Wind Farm. The impact on heritage resources include the archaeology, palaeontology and cultural landscape of the project site.

Impacts on palaeontological resources, archaeological resources and graves may occur during the construction phase should direct destruction or damage arise through the activities associated with excavations for foundations and trenches, or the clearing of land for roads, laydown areas and ancillary infrastructure. The significance of these impacts ranges from medium to low with the implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur.

One impact is expected to occur during the operation phase, which relates to the impacts to the cultural landscape through the introduction of wind turbines into an area where there are currently none. The significance of this impact will be medium with the implementation of the recommended mitigation measures.

» **Noise:**

The Noise Impact Assessment was undertaken by Morné de Jager of Enviro Acoustic Research (EAR).

The noise specialist concluded that the Zonnequa Wind Farm could have a noise impact on the surrounding environment, however the impacts can be mitigated to a low significance. The increase in the noise levels is not considered to be a fatal flaw and the project is considered to be acceptable from a noise perspective.

The Noise Impact Assessment identified specific activities during the construction and operation of the Zonnequa Wind Farm that will create noise impacts.

The construction phase of the wind farm will lead to an increase in the ambient sound level of more than 7dB during the daytime, or daytime rating levels higher than 52dBA. Should construction activities be conducted during the night-time, an increase of 7dB in the ambient sound levels is expected, which will create night-time rating levels higher than 42dBA.

During the operation phase, activities relating to routine servicing and maintenance will be undertaken. The noise impact from maintenance activities will be insignificant, with the main noise source being the rotating wind turbine blades and the nacelle.

The operation phase of the wind farm will lead to an increase in the ambient sound level of more than 7dB during the daytime, or daytime rating levels higher than 52dBA. With the operation of the wind farm a night-time increase of 7dB in the ambient sound levels is expected, which will result in night-time rating levels exceeding 42dBA.

Five Noise Sensitive Developments (NSD) were identified, of which one is located within the Zonnequa Wind Farm project site (NSD01). Noise measurements were taken at one point within the project site and at two points outside of the project site. Within the project site wind induced noises from a windmill and a wind turbine were documented, as well as bird communication. Outside of the project site wind-induced noises as well as bird communication, bird calls, sheep bleating and voices were documented. It is extremely unlikely that a potential noise-sensitive receptor staying further than 2 000m from a wind turbine would experience any noise impact.

The significance of the construction phase during both the daytime and night-time was rated as low, with and without the implementation of the recommended mitigation measures. The significance of the daytime and night-time operation will be low without the implementation of mitigation measures.

» **Visual:**

The Visual Impact Assessment was undertaken by Lourens du Plessis of LOGIS.

The visual specialist concluded that the anticipated visual impacts on sensitive visual receptors in close proximity to the Zonnequa Wind Farm remains high, but that the impact is not considered to be a fatal

flaw. The specialist further concluded, that subject to the recommended mitigation measures being implemented, the proposed wind farm development may be supported regardless of the impacts and the significance thereof.

The Visual Impact Assessment identified negative impacts on visual receptors during the undertaking of construction activities and during construction and operation of the Zonnequa Wind Farm. The visual impact decreases with increasing distance from the wind farm, but remains greatest within the first 5km of the wind farm.

During the construction phase the undertaking of construction activities will impact on sensitive visual receptors in close proximity to the Zonnequa Wind Farm. The construction phase will result in a noticeable increase in heavy vehicles which may cause a visual nuisance to other road users and landowners in the area. The construction phase visual impacts will have a low significance following the implementation of the recommended mitigation measures.

Visual impacts expected to occur during the operation phase includes impact on sensitive visual receptors within a 5km radius of the wind turbines, visual impact on sensitive visual receptors within the broader region, visual impact of shadow flicker, impact on observers of operational, safety and security lighting at night close to the wind farm, visual impact of the ancillary infrastructure and the visual impact of the wind farm on the sense of place. The significance of the visual impacts range from high to low with the implementation of the recommended mitigation measures. The high visual impacts relate to the visual impact on sensitive visual receptors within a 5km radius of the wind turbine structure. No mitigation is possible for this impact (i.e. the wind turbines will be visible regardless), however general management measures have been recommended by the specialist as best practice.

» **Socio-economic:**

The Socio-Economic Impact Assessment was undertaken by Elena Broughton of Urban-Econ.

The specialist concluded that the socio-economic benefits outweigh the negative socio-economic effects that the development of the Zonnequa Wind Farm could create, and that there are no objections to the development of the Zonnequa Wind Farm from a socio-economic perspective.

The Socio-Economic Impact Assessment identified positive and negative impacts that are expected to occur during the construction, operation and decommissioning phases of the Zonnequa Wind Farm.

During the construction phase the majority of the impacts will be positive, which includes an increase in production and Gross Domestic Product per Region (GDP-R), the creation of temporary employment opportunities, attainment of household income, skills development and enhancement and an increase in government revenue. The significance of the positive construction phase impacts ranges from medium to high with the implementation of the recommended enhancement measures. The negative impacts associated with the construction phase of the wind farm includes an influx of migrant labour and job seekers, a change in the sense of place and potential stock theft and security issues. The significance of the negative impacts ranges from medium to low with the implementation of the recommended mitigation measures. The only impacts of high significance expected during the construction phase will be the positive impacts. No negative impacts of a high significance are expected.

During the operation phase of the Zonnequa Wind Farm, only positive impacts are expected to occur. No negative impacts were identified. The positive operation phase impacts include stimulation of the economy, the creation of long-term employment, increase in household income, skills development and an increase in government revenue. The significance of the positive operational impacts ranges from medium to high with the implementation of the recommended enhancement measures.

Positive impacts are also expected to occur during the decommissioning phase of the Zonnequa Wind Farm. The positive impacts include the creation of temporary employment opportunities, as well as stimulation of the demand for services from transport and construction companies. In addition, the decommissioning will result in the extraction of metallic and non-metallic materials from the site that could be re-used in other projects. The significance of the decommissioning phase impacts will be medium with the implementation of the recommended enhancement measures.

» **Traffic:**

The Traffic Impact Assessment was undertaken by Iris Wink of JG Afrika.

The specialist concluded that the development of the Zonnequa Wind Farm is supported from a traffic engineering perspective, subject to the implementation of the stipulated recommendations.

The Traffic Impact Assessment identified impacts expected to occur during the construction, operation and decommissioning phases.

During the construction phase approximately 616 trips will be required for the transportation of the project components and the required equipment. Therefore an increase in traffic on the surrounding road network is likely. The significance of the traffic impacts during the construction phase will be medium with the implementation of the recommended mitigation measures.

The operation phase of the Zonnequa Wind Farm will generate limited vehicle trips. The significance of the operation phase impacts is rated as low with the implementation of the recommended mitigation measures, and it is expected that the operation phase will have a negligible impact on the road network.

The decommissioning phase will result in the same impacts identified and assessed for the construction phase as similar vehicles and number of trips are expected. The significance

Environmental Sensitivity Mapping

From the specialist investigations undertaken for the Zonnequa Wind Farm, the following sensitive areas/environmental features were identified and demarcated within the project site and avoided by the development footprint (refer to **Figure 1.1**):

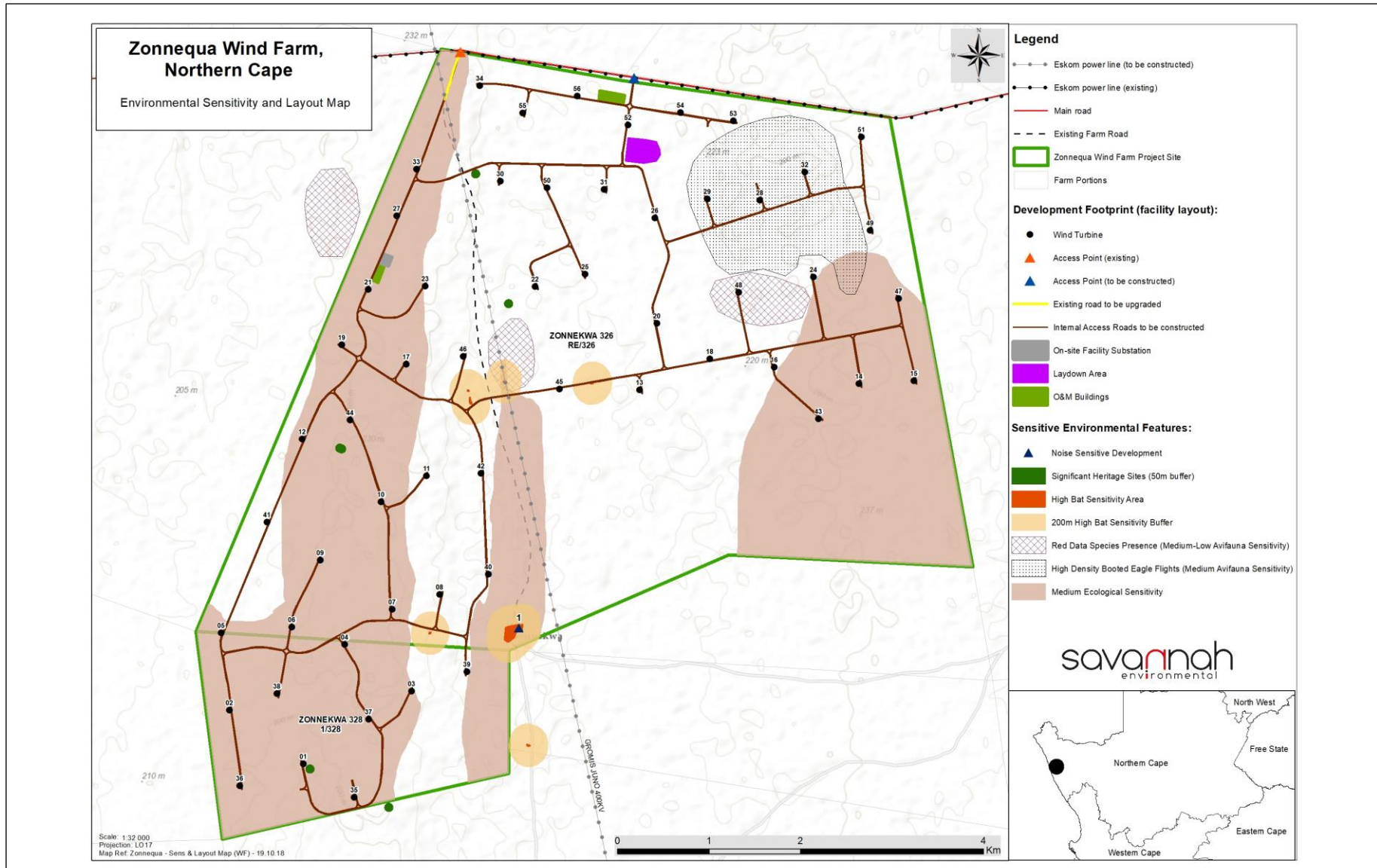
- » **Ecology** - The entire Zonnequa Wind Farm project site consists of Namaqualand Strandveld considered to be of low or moderate ecological sensitivity. Development in these areas would generate low ecological impacts as these habitats are widely available in the area. The areas classified as Namaqualand Salt Pans are clearly not salt pans and while the vegetation survey confirmed that they are well-differentiated from the adjacent strandveld, they are not currently acting as hydrological features and hence they are not considered to be as sensitive as pans would be. Development within these areas is considered acceptable, but should be limited to some degree as this is not a very extensive habitat type with the result that it is considered more vulnerable to cumulative impacts. There are no

sections of the project site that have been identified as being of high or very high sensitivity and that should specifically be avoided by the development.

- » **Bird Habitat and Sensitive Areas** – Three medium-risk areas, encompassing the flights of one Red Data species and at least one other priority species, were identified within the project site. Development can proceed in these medium risk areas with the implementation of appropriate mitigation measures with the construction of the turbines. In the medium-low risk area, in the east of the project site (where high rates of Booted Eagle activity occurred), development can be undertaken, but mitigations must be enacted if more than one mortality of a collision-prone species occurs per month at the turbines involved.
- » **Bat Habitat and Sensitive Areas** – Areas considered to be sensitive with regard to bats have been identified within the project site. These sensitive areas support specific features that are relevant to the bat populations present on site. The high bat sensitivity areas are considered to be critical for resident bat populations, capable of elevated levels of bat activity while supporting greater bat diversity/activity than the rest of the project site. These areas were deemed no-go areas and turbines (including turbine blades) may not be placed in these areas or their associated buffers. Features considered to be of a high bat sensitivity have been allocated a 200m buffer. The features associated with the highly sensitive areas are a dam associated with a wind pump, livestock water tanks and a drinking trough, a kraal, a seasonal water depression, a farm dam, housing residence and a kraal with a cement farm dam. All areas of high bat sensitivity, including the associated buffers, have been incorporated into the design layout by the developer.
- » **Heritage Sites:** Archaeological sites were identified by the specialist during the field survey of the project site and a 50m buffer has been applied. The archaeological cultural landscape consists of a multitude of individual archaeological sites classifiable as a Type 3 precolonial cultural landscape. The project site houses many small archaeological sites. The vast majority of sites are in the large dune cordon along the western side and eastern edge of the project site. There are less significant sites present towards the north and this likely relates to the fact that the dune cordon becomes somewhat flatter and has less sandy deflations. Another site, along the eastern margin of the dune cordon and in the northern part of the project site, contained a mixture of Late Stone Age (LSA) sites and recent items. The site was on a hill top with a view across the plains to the east. Pottery, stone artefacts, and ostrich eggshell fragments are all LSA in age, while a leather shoe sole and fragments of two bottles are relatively recent.
- » **Noise Sensitive Developments (NSDs):** Noise sensitive developments, including residences located within the project site, occur in and around the project site and may be impacted by the Zonnequa Wind Farm. It is unlikely that a potential noise-sensitive receptor staying further than 2 000m from a wind turbine would experience any noise impact.

The final preferred layout map submitted as part of the final BA Report and on which the EA is based is overlain on the above environmental sensitivities included in **Figure 1.1**.

As part of the planning mitigation strategy, the applicant considered all the above-mentioned findings and sensitivities and duly made the necessary amendments to the layout considered in the BA in order to reduce impacts to an acceptable level and design the amended layout in consideration to the sensitive environmental features. No environmental fatal flaws were identified to be associated with the proposed Zonnequa Wind Farm. A number of issues requiring mitigation were however highlighted.



**Figure 1.1:** Environmental sensitivity map overlain with the preferred development footprint as assessed during the BA process (A3 Map included in Appendix I).



## 2. DETAILS OF THE AMENDMENTS APPLIED FOR

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The amendments being applied for relate to the authorised wind turbine specifications as detailed in the EA dated 18 February 2019, as amended. This requested amendment will result in a change in the layout for the optimisation of the development footprint assessed within the BA. This proposed amended layout is presented in **Figure 2.1**. It must be noted that this amended layout is submitted to DEFF for review and approval in accordance with Condition 13 of the EA.

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

### 2.1. Amendment to Wind Turbine specifications and Project Description

The number of wind turbines, hub height and tip height are requested to be amended as follows:

**From:**

Up to 56 wind turbines

**To:**

**Up to 35** wind turbines

**From:**

hub height of up to 130m

**To:**

hub height of **up to 150m**

**From:**

tip height of up to 205m

**To:**

tip height of **up to 240m**

Further to the amendments listed above, the applicant requests the amendment and inclusion of the individual turbine capacity to the EA. The final BA Report submitted to DEFF in December 2018 lists the individual turbine capacity as up to 4.5MW, this information was however not included in the EA. This must be amended and included in the EA to state up to 7MW.

The contracted capacity of the Zonnequa Wind Farm will remain at up to 140MW as authorised in the Environmental Authorisation.

## 2.2. Inclusion of the co-ordinates of the on-site substation within the EA

The centre point co-ordinates of the on-site substation were not specified in the EA and has now been included for the avoidance of doubt, which is also in-line with the amended layout proposed as part of this Motivation Report. The relevant co-ordinates that must be included are:

**29°47'6.07"S ; 17°14'6.12"E**

## 2.3. Summary of amendments applied for

The table below provides a detailed comparison of the project description included in the EA as authorised on 18 February 2019 with the proposed project components that are requested to be amended (shown in **bold** text). **Please note:** no individual turbine capacity was specified in the EA, however this has now been increased considering the larger turbines proposed and included in the Application for the Amendment of the Environmental Authorisation for the avoidance of doubt. In addition, the centre point co-ordinates of the on-site substation were not specified in the EA and have now been included for the avoidance of doubt, which is also in-line with the amended layout as proposed.

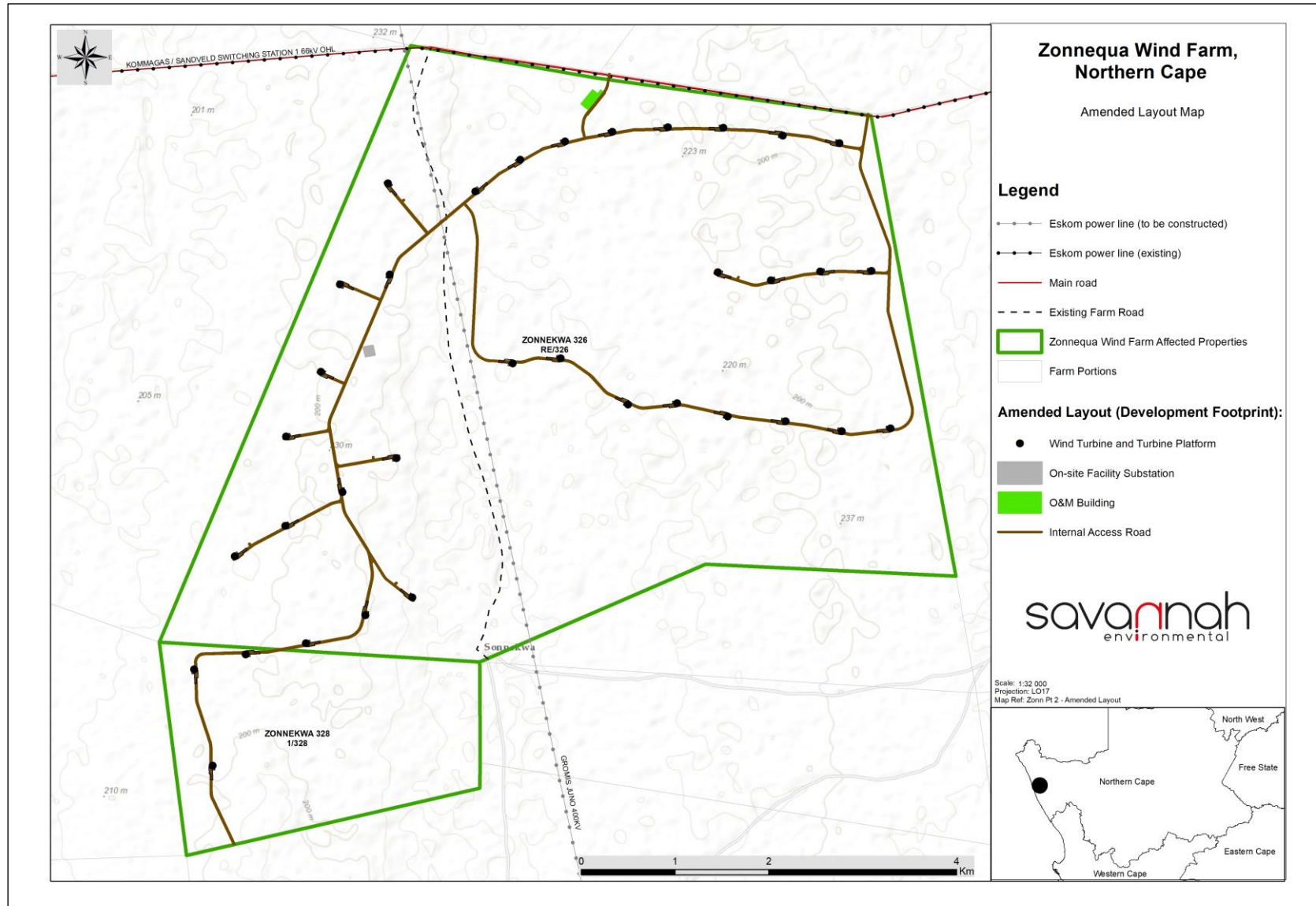
Component	Authorised specification in the EA	Amended specifications
Number of turbines	Up to 56	<b>Up to 35<sup>2</sup></b>
Hub height	Up to 130m	<b>Up to 150m</b>
Tip height	Up to 205m	<b>Up to 240m</b>
Turbine Capacity	None specified (the final BA Report submitted included a capacity of 4.5MW).	<b>Up to 7MW</b>
On-site Facility Substation Location	None specified	<b>29°47'6.07"S ; 17°14'6.12"E</b>

With the reduction of the number of turbines, the preferred development footprint (i.e. layout) submitted as part of the final BA Report has been amended. These changes to the layout have been undertaken within the assessed project site and avoids the identified sensitive environmental features.

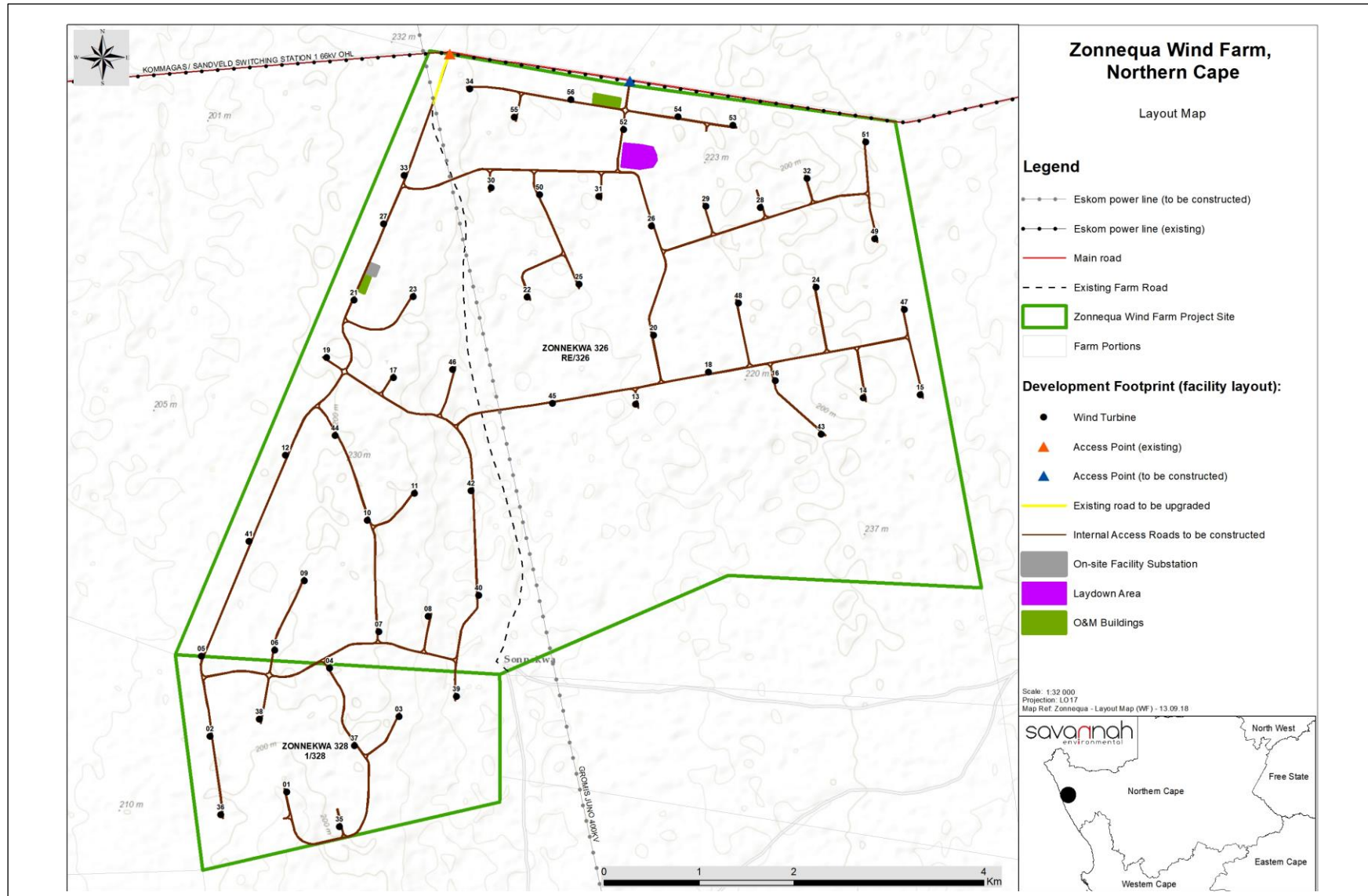
The proposed amended layout is presented in **Figure 2.1**. The layout was provided to the specialists for assessment and input in terms of the suitability of the layout for implementation and the identification of additional mitigation measures (if required). **Figure 2.2** includes the layout as was assessed during the BA process and included in the final BA Report submitted to DEFF for decision-making on the application for EA.

It must be noted that this amended layout is submitted to DEFF for review and approval in accordance with Condition 13 of the EA.

<sup>2</sup> This represents a reduction of ~38%.



**Figure 2.1:** Proposed amended Zonnequa Wind Farm layout map (A3 Map included in **Appendix I**).



**Figure 2.2:** Zonnequa Wind Farm layout map as assessed in the BA process and submitted as part of the final BA Report (A3 Map included in **Appendix I**)

### **3. MOTIVATION FOR THE PROPOSED AMENDMENTS**

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The motivation for the proposed amendments is detailed below. The proposed amendments are not in themselves a listed activity and will not trigger any new listed activities as the proposed amendments will fall within the originally authorised footprint of the facility as assessed in the BA, and will not change the scope of the EA. The contracted capacity of the wind farm will still be capped at 140MW as was authorised in February 2019.

#### **3.1. Amendment to Wind Turbine Specifications and Facility Layout**

Following the issuing of the EA and considering economic efficiency, the developer is proposing to install a turbine technology on the site that is best suited to the conditions of the site and which enables a reduction of the number of turbines with the capacity to still generate 140MW (contracted capacity) as originally authorised. These amendments are proposed in order to increase the efficiency of the facility and reduce the infrastructure requirements and consequently increase the economic competitiveness of the wind farm.

In the time since the original BA was undertaken and the EA issued, the turbines that are available on the market have increased in both size and output power. The turbines authorised in the EA are therefore no longer considered to be the most suitable in terms of production and economic considerations. In this regard, Genesis Zonnequa Wind (Pty) Ltd is considering an updated turbine model 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 increase in the hub height and overall tip height will result in the optimisation of the facility layout that was assessed within the BA for the project. With the implementation of the larger and more efficient turbines, a reduced number of turbines is required in order for the wind farm to generate up to 140MW contracted capacity. This reduction of turbines has led to a change in the positions of the turbines and associated internal roads and other associated infrastructure within the assessed project site, requiring an amendment to the layout. The applicant wishes to amend the EA in order to cater for the larger turbine specifications, to enable the applicant to utilise the latest, most efficient turbines available on the market. This in turn will increase the overall competitiveness of the Project in the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme, and will decrease the cost of energy produced by the Project, which would be for the benefit of all electricity consumers in South Africa.

The amendment to the wind turbine specifications and the reduction of the number of turbines is not a listed activity and will not trigger any new listed activities as the proposed amendment will fall within the originally authorised footprint of the facility.

Due to the reduction of the number of turbines, the facility layout will be amended. This amended layout is submitted for approval as part of the Application for the Amendment of the Environmental Authorisation.

#### **3.2. Inclusion of the co-ordinates of the on-site substation within the EA**

The centre point co-ordinates of the on-site substation were not specified in the EA and have now been included for the avoidance of doubt. These co-ordinates are in-line with the amended layout.

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

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In terms of Regulation 31 of the EIA Regulations 2014, as amended, an environmental authorisation may be amended by following the process and requirements of this Regulation (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 optimised layout were not considered in the initial authorisation. The 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 BA AS A RESULT OF THE PROPOSED AMENDMENTS

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In terms of Regulation 32(1)(a)(i), the following section provides an assessment of the impacts related to the proposed amendments. Understanding the nature of the proposed amendments and the impacts associated with the project (as assessed within the BA), the following has been considered:

- » Potential impacts on birds;
- » Potential impacts on bats;
- » Potential ecological impact;
- » Potential impacts on soil and agricultural potential;
- » Potential impacts on heritage;
- » Potential noise impact; and
- » Areas of visual impact.

The changes in turbine hub height, overall tip height, the reduction in the number of turbines<sup>3</sup> (and subsequent change to the layout assessed in the BA process) and the other miscellaneous amendments that are requested to align the EA with the optimised layout, are expected to have **no effect** on the findings of the Socio-economic Impact Assessment and Traffic Impact Assessment undertaken as part of the BA process. Therefore, no socio-economic or traffic specialist input has been included as part of the amendment application.

The potential for change in the significance and/or nature of impacts based on the proposed amendments as described within this Motivation Report is discussed below, and detailed in the specialist comment and input letters and reports (as applicable) contained in **Appendices A-G**<sup>4</sup>.

Additional mitigation measures recommended as a result of the proposed amendments have been underlined for ease of reference, where applicable. This section of the main report must be read together with the specialist comment and input letters and reports (where applicable) contained in **Appendices A-G** in order for the reader to obtain a complete understanding of the proposed amendments and the implications thereof.

### 5.1. Impacts on avifauna

The avifauna specialist has considered the likely impacts of the amendments on the avian community in the form of a comment and input letter (**Appendix A**). The specialist who undertook the Avifauna Impact Assessment during the BA process is the same specialist providing inputs for the amendment. The purpose of the specialist input was to determine whether or not the proposed amendments will result in an increased level of change in the nature of the avifauna impacts where such change was not assessed in the BA process and to confirm whether the mitigation measures outlined in the Avifauna Impact Assessment remain the same or whether changes and additional measures are required to cater for the proposed amendments.

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<sup>3</sup> Compared to what was assessed in the original BA (56 turbines)

<sup>4</sup> It must be noted that the original specialists who undertook the EIA studies have been used for these assessments as far as possible. A different bat specialist was appointed to provide input to this Motivation Report as the original specialist who undertook the BA studies no longer works in the industry.

The specialist has summarised the main effect of decreasing the turbine numbers and increasing the turbine dimensions and has identified three overarching ways in which these changes can influence birds. These include:

- » Displacement and disturbance – birds avoid the area through disturbance caused by the operation of wind turbines;
- » Habitat loss and fragmentation – the construction of infrastructure and the presence of infrastructure directly destroys or divides the habitat; and
- » Direct mortality – birds are struck by the turbines.

The specialist indicated that the ~39% reduction in the number of turbines suggest that displacement and disturbance will be reduced given that the 3-dimensional footprint will be reduced. This is also relevant for habitat loss and fragmentation as the footprint is expected to be reduced and because some of the internal access roads have been altered to reduce disturbance throughout the site. Direct mortality of birds is considered to be the main influence on birds associated with the proposed amendments.

From a literature review undertaken by the specialist it was derived that taller structures generally kill more birds and an increase in hub height from up to 130m to up to 150m is predicted to have some influence on the background mortality rates of birds, including priority birds in the Zonnequa Wind Farm. The specialist applied two methods to predict the bird fatalities associated with an increase in hub height.

The first method includes the modelling of real fatality data with different hub heights to determine whether a relationship occurs between fatalities and hub height. The specialist found that an increase of 76% in fatalities is expected, however the number of turbines will decrease from up to 56 turbines to up to 35 turbines, which is a decrease of ~38%. This decrease in turbines will partially offset the expected increase in fatalities<sup>5</sup>.

The second method is determining the effect of taller turbines on the risk to raptors flying over the Zonnequa Wind Farm. The flight heights of birds through the Zonnequa Wind Farm (as documented during the 12-month monitoring campaign) was considered to gauge any increased risk. The number of flights (as documented in the BA process) in the blade swept area for the amended turbine specifications was considered to obtain an indication of the number of priority species likely to be killed with the implementation of the amendments. The project site for the Zonnequa Wind Farm had only three Red Data priority species present (*Secretarybird Sagittarius serpentarius*, Ludwig's Bustard *Neotis ludwigii* and Kori Bustard *Ardeotis kori*) over a full year's monitoring. Two of these species were recorded flying in the original blade swept area (as assessed in the BA). The Vulnerable Secretarybird was recorded flying within the zone of the original blade swept area (as assessed in the BA) for 42% of the 27 flights and was, therefore, most at risk. However, two reasons suggest that this is likely to be a low risk, (i) all new turbine positions avoid all areas where these birds were previously recorded soaring or displaying, and (ii) Secretarybirds were never recorded flying above 205m, so the proposed taller turbines should not pose a greater risk to this species.

Of the nine priority collision-prone species, only Booted Eagles were recorded flying above the height of the authorised turbine tip heights (as assessed in the BA). However, only 6% of the flights were above 205m and therefore this species is unlikely to be more at risk from the taller turbines proposed as part of the amendment. Considering the above, there would be a very low risk for any of the priority species impacting either the proposed amended or previously authorised turbines.

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<sup>5</sup> This is relevant for all birds and not just priority collision-prone birds.



**Table 5.1** provides an indication of the flight heights for the nine priority collision-prone species.

**Table 5.1:** Flying heights of the nine priority collision-prone species recorded every 15 seconds in and around the proposed Zonnequa Wind Farm site. Three Red Data birds were recorded from data collected throughout the year – June, September, December 2017 and March 2018 from focal birds. Only one species (Booted Eagle) was recorded above the previously authorised tip heights.

Species	Flight heights	Number of observations	Proportion of observations in blade-swept area
Ludwig's Bustard N = 38	1-55 m	32	84%
	55-205 m [blade-swept zone]	6	16%
	205+ m	0	0%
Kori Bustard N = 14	1 -55 m	14	100%
	55-205 m [blade-swept zone]	0	0%
	205+ m	0	0%
Secretarybird N = 64	1 -55 m	37	58%
	55-205 m [blade-swept zone]	27	42%
	205+ m	0	0%
Booted Eagle N = 368	1 -55 m	106	29%
	55-205 m [blade-swept zone]	240	65%
	205+ m	22	6%
Jackal Buzzard N = 20	1 -55 m	3	15%
	55-205 m [blade-swept zone]	17	85%
	205+ m	0	0%
Pale chanting Goshawk N = 52	1 -55 m	40	77%
	55-205 m [blade-swept zone]	12	23%
	205+ m	0	0%
Greater Kestrel N = 47	1 -55 m	42	89%
	55-205 m [blade-swept zone]	5	11%
	205+ m	0	0%
Black-chested Snake Eagle N = 76	1 -55 m	31	41%
	55-205 m [blade-swept zone]	45	59%
	205+ m	0	0%
Southern Black Korhaan N = 7	1 -55 m	7	100%
	55-205 m [blade-swept zone]	0	0%
	205+ m	0	0%

Following the consideration of the proposed amendments and the Avifauna Impact Assessment undertaken as part of the BA process, the specialist has provided a reasoned opinion on the proposed changes stating that the species involved (and their behaviour and use of space) are unlikely to change and therefore the likelihood of a change in the impacts is considered to be negligible.

The statistical model of the specialist suggested that 76% more birds may be impacted, however these are not likely to include priority bird species due to the terrestrial nature of the three Red Data species identified. This is based on the fact that the three Red Data species were never recorded flying in the blade swept area of the original assessed and authorised turbines or the blade swept area of the proposed amended turbines.

Based on the above, the specialist has indicated that the nature or magnitude of the impact as per the Avifauna Impact Assessment will not change negatively (i.e. the significance of the negative impacts will not increase). The decrease in the number of turbines and the precautionary buffers placed around the most frequently used flight areas of the Secretarybirds could result in a nett decrease in impacts to the priority (Red Data) avian community. Refer to **Table 5.2** below.

**Table 5.2:** Quantification of the avifauna impacts in terms of the expected nett decrease in impacts

<b>Nature:</b> Negative due to direct impact fatalities, disturbance and loss of foraging habitat around the Zonnequa Wind Farm for the Red-listed bird groups identified as at risk. This may increase for taller turbines with longer blades (Loss et al. 2013) but this is likely to be offset by the reduction in the number of turbines, as proposed as part of the amendment.				
The Red Data Secretarybirds, Lanner Falcon, and the two eagles (Black-chested Snake and Booted) are collectively summed under Raptors (RA) and are likely to be impacted as well as the nomadic Kori and Ludwig's Bustard (BS).				
	Authorised		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
<b>Extent</b>	Local (1)	Local (1)	Local (1)	Local (1)
<b>Duration</b>	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
<b>Magnitude</b>	Moderate (5) – RA Low (4) - BS	Low (4) – RA Low (3) - BS	Low (4) – RA Low (3) - BS	Low (3) – RA Low (3) – BS
<b>Probability</b>	Highly Probable (4) – RA Highly Probable (4) – BS	Probable (3) – RA Probable (3) – BS	Highly Probable (4) – RA Probable (3) – BS	Probable (3) – RA Probable (3) – BS
<b>Significance</b>	<b>Medium (40) – RA</b> <b>Medium (36) - BS</b>	<b>Low (27) – RA</b> <b>Low (24) - BS</b>	<b>Medium (36) – RA</b> <b>Low (24) - BS</b>	<b>Low (24) – RA</b> <b>Low (24) - BS</b>
<b>Status (positive or negative)</b>	Negative	Negative	Negative	Negative
<b>Reversibility</b>	Yes reversible, if turbines avoid areas identified as sensitive and mitigation implemented in medium risk areas	Yes reversible, if turbines avoid areas identified as high-risk	Yes reversible, if turbines avoid areas identified as high-risk	Yes reversible, if turbines avoid areas identified as high-risk
<b>Irreplaceable loss of resources?</b>	No, Secretarybirds populations are relatively low here (not core habitat). Ludwig's Bustards are nomadic visitors to this area.			
<b>Can impacts be mitigated?</b>	Yes. If the areas identified as high-risk are avoided and mitigation measures implemented in the areas of medium-risk	Yes. If all areas identified as sensitive are avoided for development	Yes. If all areas identified as sensitive are avoided for development	Yes. If all areas identified as sensitive are avoided for development
<b>Mitigation:</b>				
<ul style="list-style-type: none"> <li>» Position the turbines away from risk areas of high aerial traffic or nests of collision-prone species;</li> <li>» If birds impact the turbines then paint a single blade black for those select turbines known to kill most birds to reduce impacts for eagles and other raptors (Stokke et al. 2017);</li> <li>» Selective feathering or stopping of turbines can be implemented during high-use seasons or times in the day for turbines that continue to kill unsustainable numbers of raptors;</li> <li>» As a precautionary measure move the Secretarybird nest-structure to the last known breeding area to the east;</li> <li>» If raptors continue to be attracted into the site then habitat can be manipulated to reduce the attractiveness (from a prey point of view) for the raptors. Reducing the food resources will reduce raptor use of the area. This can be achieved by increasing the stocking density of sheep or goats on the farm.</li> </ul>				

One of the mitigations above (black-blade mitigations) is dependent upon knowing which turbines are responsible for most deaths. Therefore, it is recommended that Genesis Zonnequa Wind (Pty) Ltd implement 12-24 months post-construction monitoring to assess the mortality of birds in the wind farm, through direct observation and carcass searches. This will assist in determining where individual turbine-specific mitigation measures are required to be implemented.

**Residual Impacts:**

After mitigation, direct mortality through collision, or area avoidance, by the species identified above may still occur and further research and mitigation measures should be suggested. This can only be undertaken in conjunction with a systematic monitoring programme.

The mitigation measures recommended as part of the Avifauna Impact Assessment are all still applicable for the reduction and management of impacts to the Red Data species present. This includes the measure related to the installation of black blades on the turbines. No additional mitigation measures are recommended as a result of the amendments.

In conclusion, no adverse negative effects associated with the proposed amendments were identified. Only positive effects are applicable in that the priority birds may be less negatively impacted and face a reduced risk as a result.

## 5.2. Impacts on bats

The bat specialist has considered the likely impacts of the amendments on bats in the form of a comparative assessment (**Appendix B**). The specialist who undertook the Bat Impact Assessment during the BA process (i.e. Animalia) no longer works in the field of study and as such another suitably qualified specialist was appointed (i.e. Arcus). The purpose of the comparative assessment is to provide an assessment of all impacts related to the proposed amendments, advantages and disadvantages, a comparative assessment of impacts before and after the changes and provide measures to ensure avoidance, management and mitigation of impacts associated with the proposed amendments.

Existing project documentation was reviewed and considered by the specialist to provide context for the assessment. The documents included the Final Basic Assessment Report of the Zonnequa Wind Farm (2018), the Environmental Management Programme of the Zonnequa Wind Farm (2018) and the Bat Impact Assessment Report and Final Report of the 12-month Long-Term Pre-construction Bat Monitoring Study for the Zonnequa Wind Farm.

Considering the bat impacts identified as part of the BA process, only mortality of species due to collision with turbine blades or due to barotrauma, and cumulative impacts, are relevant to the proposed amendment. The significance of all other impacts associated with the wind farm will remain the same.

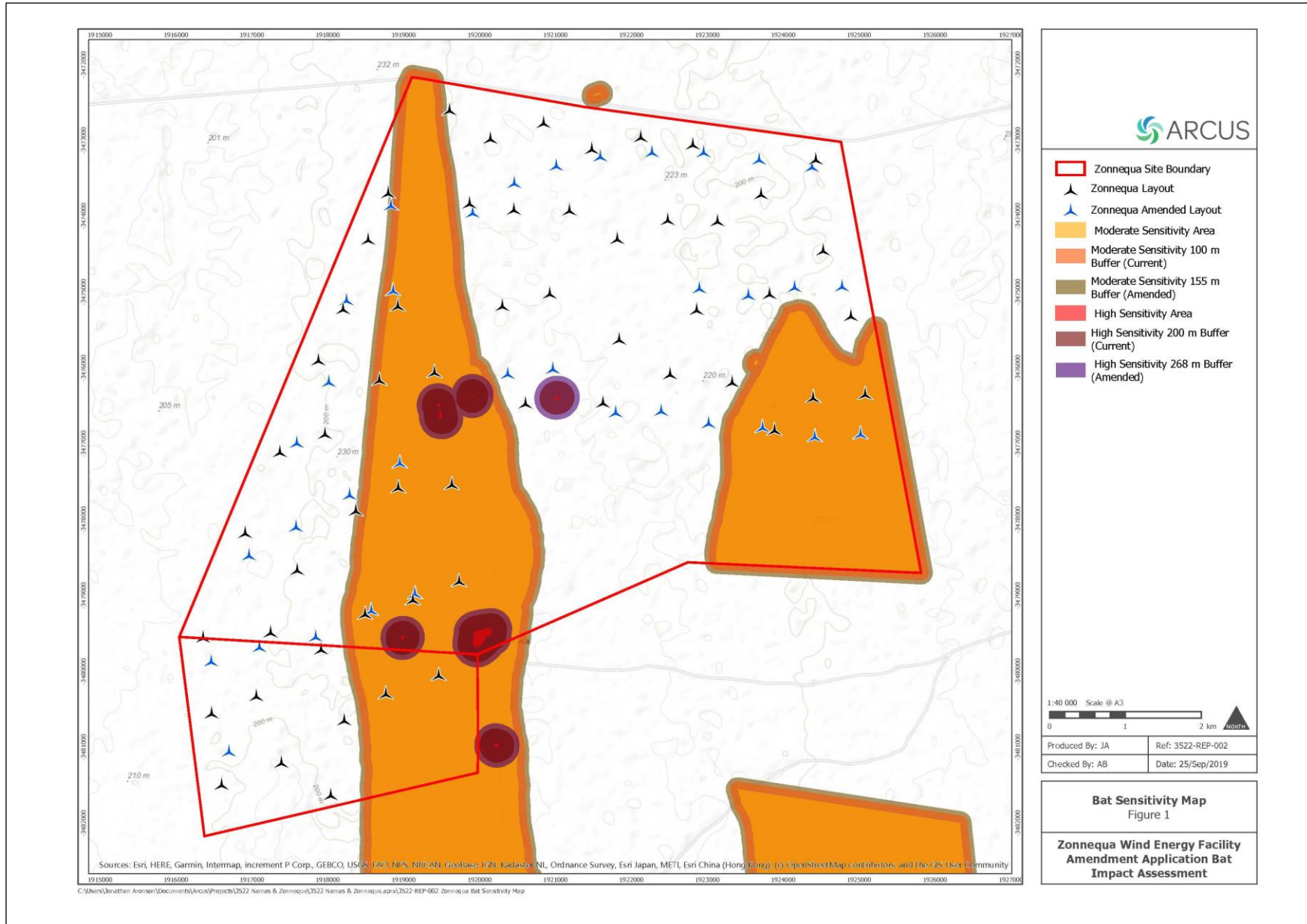
The potential collision impact to bats is currently rated as medium before, and low after mitigation with avoiding sensitive areas for bats being the major mitigation measure proposed, along with blade feathering. The significance of the impact with the implementation of the proposed amendment would be dependent on the size of the turbines ultimately installed and operated. The specialist considered a scenario where turbines of the maximum proposed dimensions are applied. This would result in turbines having a ground clearance to minimum blade tip of 60m and maximum blade tip (i.e. tip height) of 240m. This would increase the risk to high flying species such as free-tailed bats because the turbine blades would extend higher into the air. Risks to lower flying species may be reduced because the turbine blades would sweep down five

meters higher above the ground. However, the overall project risk to bats would remain medium before mitigation, and low after mitigation because very low activity was recorded at 97m, which is the only proxy for data at height. This assumes that activity does not increase above 97m. As such, the impact assessment tables presented by Animalia 2018 have not been updated as they capture the risk to bats sufficiently considering the proposed amendments. All recommended mitigation measures made in the impact assessment must be adhered to.

Considering the proposed amended turbine specifications, the mitigation measures related to buffers need to be updated to reflect the changes in turbine size. Within the range of the proposed amended turbine dimensions, the impacts to bats and associated buffer zones needed to limit impacts (as an initial mitigation) will vary depending on the size of the turbines used. Turbines with a lower ground clearance will need to be placed further away from buffers than turbines with a higher ground clearance. The exact turbine dimensions that will ultimately be installed are not known and therefore a possible worst-case scenario was applied to update the bat buffer areas. These buffers are the primary mitigation measure proposed by Animalia to avoid impacts. A turbine with a low hub height (110m) and with the maximum blade length being applied for (90m) was used. Such a turbine would have a ground clearance of 20m. Based on this, each turbine base must be 155m from the moderate sensitivity areas and 268m from the high sensitivity bat areas (**Figure 5.1**). The final buffers will need to be confirmed once the final turbine specifications selected are available. No turbines are located with the no-go high sensitivity areas but seven turbines of the turbines within the amended layout are within moderate sensitivity areas, compared to nine turbines of the currently authorised layout. All buffers proposed for the no-go high sensitivity areas are to blade tip, i.e. no part of the blade tip must extend into the proposed buffer areas. The moderate sensitivity buffer is not strictly a no-go for turbine placement.

Considering the Bat Impact Assessment and the proposed amendments to the turbine dimensions, it is not expected that the amendments will result in an increase in the overall bat impacts. Cumulative mortality impacts would also not increase beyond what was previously identified, assessed and rated. However, there may be additional impacts to high flying species because the blade tips will extend higher into the air. Risks to lower flying species may be reduced as the blades will be higher above the ground.

The key mitigation measure that should be implemented at the Zonnequa Wind Farm would be adherence to the updated sensitivity map (**Figure 5.1**). The sizes of the bat buffers have been increased to reflect the changes in the turbine size. An additional mitigation measure recommended by Animalia (2018) is that curtailment via blade feathering (90-degree feathering below the manufacturer's cut in speed) must be applied to all turbines from sunset until sunrise every night during March, April, May, August and September. The requirements of curtailment and blade feathering and the application thereof, as contained in the EMPr and contained in the Bat Impact Assessment by Animalia 2018, still apply and no changes to this have been made based on this assessment. Operational monitoring must also be carried out as per best practise (i.e. for a minimum of two years) and based on these results, adjustments to the curtailment may be needed or the use of acoustic deterrents investigated. If these mitigation measures are adhered to, the specialist accepts the proposed amendments.



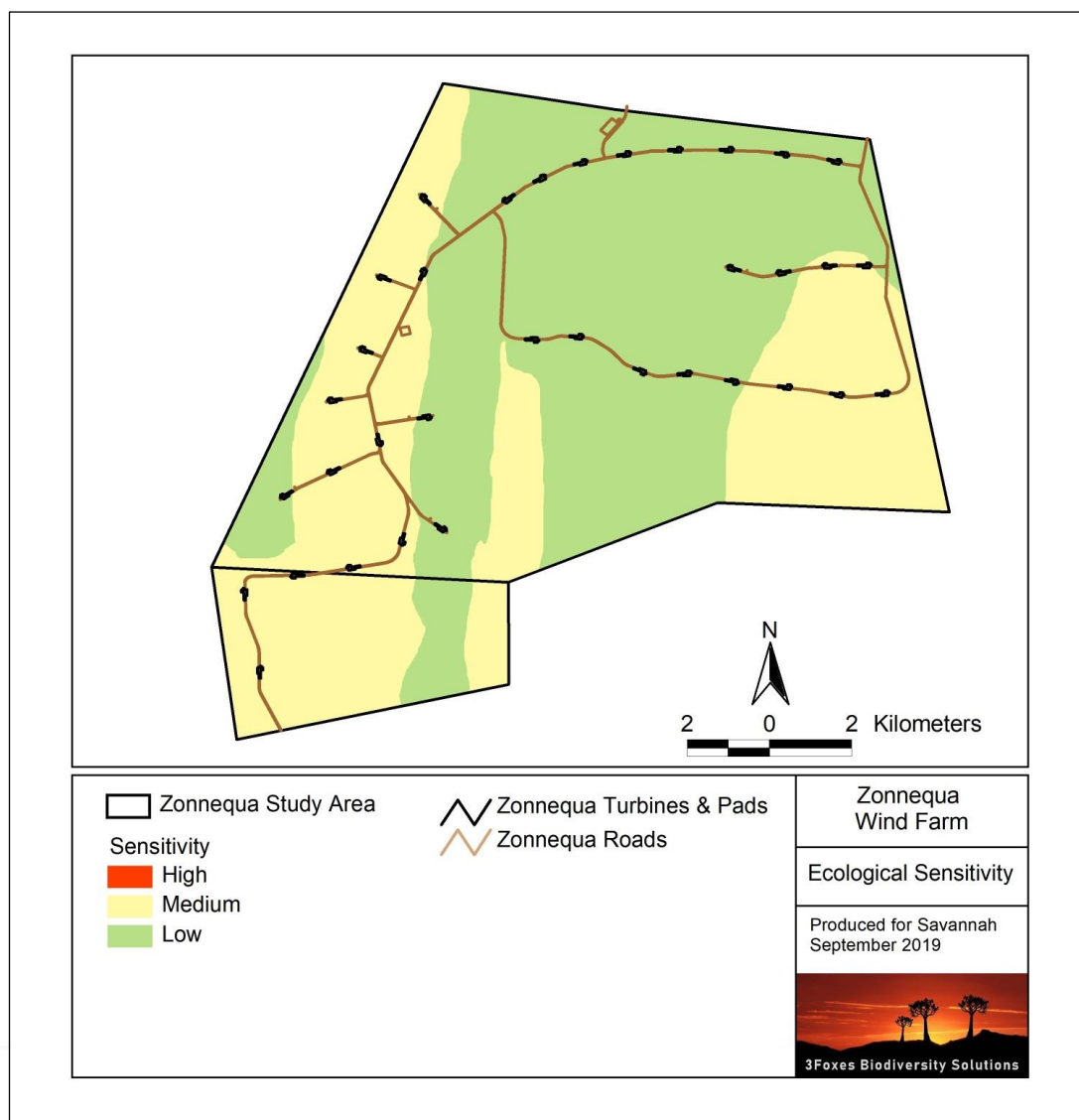
**Figure 5.1:** Updated bat sensitivity map that must be adhered to for the development of the Zonnequa Wind Farm amended layout

### 5.3. Ecological Impacts

The ecology specialist has considered the likely impacts of the amendments on the fauna and flora in the form of a comment and input letter (**Appendix C**). The specialist who undertook the Ecological Impact Assessment during the BA process is the same specialist providing inputs for the amendment.

The specialist provided feedback on the proposed amendments regarding the change in impact or any new impacts, additional mitigation measures and any advantages and disadvantages that may result due to the implementation of the proposed amendments.

The specialist has considered the proposed amended layout and the ecological sensitivity of the project site. The ecological impact of the amended 35 turbine layout is likely to be somewhat lower to the original 43 turbine layout as a result of the reduced number of turbines and access road footprint associated with the amended layout (**Figure 5.2**). No new impacts are expected to occur with the implementation of the amended layout.



**Figure 5.2:** Zonnequa Wind Farm amended layout overlain with the ecological sensitivity of the project site

The total footprint of the wind farm would be reduced but this is not considered sufficient to change the overall ecological impact of the amended layout as compared to the original layout assessed in the BA process. The larger turbine size is not considered to be of consequence with regards to terrestrial impacts as, while the turbine hard stand may be larger for each turbine, the reduction in the number of turbines would compensate for any increase in footprint associated with each turbine.

In terms of flora, the construction phase impact resulting from the transformation of intact habitat associated with the development was assessed as being of medium significance after mitigation. Although the footprint of the development would be reduced under the amendment, this is not considered sufficient to reduce the overall post-mitigation impact on flora from a Medium significance to a Low significance. As such, the amendment is considered to have a positive impact on flora as compared to the original layout of the BA process, but this benefit is not considered to be of sufficient magnitude to warrant a reduction in the assessed impact from medium to low and as such remains unchanged.

In terms of fauna, the reduced number of turbines would mean that the average distance between turbines is larger with the result that faunal disturbance from the turbines or maintenance activities on the wind farm during operation would potentially be slightly lower. However, taking a conservative approach in this regard, this is not deemed sufficient to warrant adjustment of the assessed impacts on fauna downward as these were already assessed as being of low significance and consequently, there would be no overall change in the assessed impact on fauna.

The cumulative impacts associated with the development of the amended layout are assessed as being relatively low and are considered acceptable.

Considering the proposed amendments and the potential effect thereof on the ecology of the site, no additional mitigation measures or changes to the EMPr would be required as no significant changes to impacts or new impacts will occur with the implementation of the amendments. The mitigation measures and avoidance measures included in the Ecological Impact Assessment are still relevant and applicable to the amended layout and must be implemented. No additional mitigation measures are required as a result of the amendments.

The major change to the development that could potentially have significant ecological impacts is the increase in turbine size. Although the turbines in the proposed amendment are larger than those originally assessed, the total output of the facility is capped with the result that the use of the larger turbines would result in fewer turbines being constructed. As the footprint of the amended layout would be somewhat lower than the original assessment, there would not be an increase in impact as a result of the changes to the turbine specifications and facility layout. As a result, the significance of impacts as assessed in the original study is considered still valid and applicable for the current assessment.

No upward or downward adjustment of impacts is justified based on the changes to the layout and turbine specifications. As such, the amendment is supported from an ecological perspective as it would not increase or change any impacts or lead to new impacts associated with the development and implementation of the amended layout. The impact of the amended layout on fauna and flora would be similar to the authorised layout and there are no fatal flaws or critical issues associated with the proposed changes.

Considering the above it is concluded that the amendment is supported from an ecological perspective as the amendments will result in similar assessed impacts on fauna and flora at the site. The amended layout is also supported in terms of terrestrial ecology impacts. Overall, the proposed amended layout and turbine specifications would not result in a change in the assessed impacts and an adjustment to the original assessed impacts is not required.

The specialist reiterated the need to undertake a pre-construction walk-through of the final development footprint to locate and identify species of conservation concern that are within the development footprint. Some search and rescue of plant species of conservation concern may be required. These measures are not additional measures and were included in the EMPr of the final BA Report submitted to the competent authority for decision-making.

#### **5.4. Impacts on soil and agricultural potential**

The soil and agricultural potential specialist has considered the likely impacts of the amendments on the soils and agricultural potential of the Zonnequa Wind Farm project site in the form of a comment and input letter (**Appendix D**). The specialist who undertook the Soil and Agricultural Potential Impact Assessment during the BA process is the same specialist providing inputs for the amendment.

The specialist has confirmed that the findings of the impact assessment undertaken as part of the BA process and the project site assessed therein are still relevant when considering the proposed amended layout and amendment of the turbine specifications. Therefore, the findings and recommendations of the impact assessment on soils and agricultural potential will remain unchanged and is still considered to be valid for the development of the Zonnequa Wind Farm. This relates specifically to:

- » The impacts that were identified
- » Any advantages and or disadvantages regarding the proposed wind farm
- » Any impact management and/or mitigation measures
- » Any recommendations to the EMPr

No additional mitigation measures are required as a result of the amendments.

#### **5.5. Impacts on heritage**

The heritage specialist has considered the likely impacts of the amendments on heritage resources of the Zonnequa Wind Farm project site in the form of a comment and input letter (**Appendix E**). The specialist who undertook the Heritage Impact Assessment during the BA process is the same specialist providing inputs for the amendment.

The specialist has considered and reviewed the amendments (including the proposed amended layout), as well as the known heritage resources in the area and has indicated that there is no difference in the potential impacts as identified and assessed for the project site in the Heritage Impact Assessment. This relates to archaeological sites that may be impacted, palaeontological material that may be impacted and visual impacts to the cultural landscape.

The specialist has confirmed that the amended layout avoids all known sites. However, although the site survey carried out during the BA process by the specialist aimed to locate as many sites as possible, it is still



likely that some sites (a small number) will be intersected. The impact assessment recommended a pre-construction walk-through of the development footprint, which is also relevant to the implementation of the amended layout.

Considering palaeontological material, none were discovered during the site survey undertaken during the BA process, however such materials are likely to occur beneath the surface and may be revealed during the excavation of turbine foundations and/or related infrastructure. A chance find procedure was recommended as part of the impact assessment for the rescuing of discovered fossils by chance during the construction phase. This measure is also relevant to the implementation of the amended layout.

From a cultural landscape perspective, the specialist indicated that although the turbines will be higher this increase will not result in significant changes to the visibility. The impact relates mainly to the presence of turbines in the landscape, and the implementation of taller turbines is considered to make a negligible difference. This is supported by the input provided by the visual specialist as included in section 5.7.

In conclusion, all heritage impacts and the significance thereof remain the same as to that identified in the impact assessment. The specialist indicated that there are no particular advantages or disadvantages associated with the implementation of the amended layout. The recommendations and mitigation measures as indicated in the Heritage Impact Assessment undertaken during the BA process will remain the same and are relevant to the implementation of the proposed amendments. No additional mitigation measures are required as a result of the proposed amendments.

## **5.6. Noise impact**

The noise specialist has considered the likely impacts of the amendments on noise in the form of a comment and input letter (**Appendix F**). The specialist who undertook the Noise Impact Assessment during the BA process is the same specialist providing inputs for the amendment.

From a noise perspective the change in wind turbine specifications such as hub height and rotor diameter does not relate to sound power emission levels, which depends on the model and make of a wind turbine. For the same model and make, a change in specifications such as hub height and rotor diameter have an insignificant impact on sound power emission levels. Therefore, there is no advantage or disadvantage in terms of acoustics by changing the wind turbine specifications. By changing the wind turbine model and make to a wind turbine with a lower sound power emission level will however have a significant advantage on acoustics (reduced noise emissions).

The noise specialist has considered the change in turbine specifications and the amended layout proposed for the authorised Zonnequa Wind Farm. As the specifications of the final turbine selection are not yet defined, the specialist evaluated a scenario with a wind turbine with a sound power emission level of 105 dBA (which is similar to the wind turbine proposed as part of the amendment).

The reduction in the number of wind turbines resulted in a change in the layout, although no wind turbines were moved closer to any Noise Sensitive Development (NSD), with a number of wind turbines close to NSD01 removed. The layout was remodelled considering the sound power emission level of the preferred wind turbine (105dBA) with the updated model calculating a noise level of 37.1 dBA at NSD01, which is a reduction in the noise level of 4dB.

Considering the above and based on the location of the wind turbines in the amended layout, the specialist has indicated that the change in the noise level will not increase the significance of the noise impact. This change is considered as acceptable from a noise perspective.

The specialist also advised that the findings, mitigation measures and recommendations included in the Noise Impact Assessment undertaken as part of the BA process are still valid for the proposed amendments. No additional mitigation measures are required as a result of the proposed amendments.

## 5.7. Visual Impact

The visual specialist has considered the likely visual impacts of the amendments through a comparative viewshed analysis and visual assessment (**Appendix G**). The specialist who undertook the Visual Impact Assessment during the BA process is the same specialist providing inputs for the amendment.

This visual assessment includes a comparative viewshed analysis in order to determine the visual exposure (visibility) of the original (authorised) turbine dimensions compared to the potential (additional) exposure of the increased (proposed) turbine dimensions and amended layout. The viewshed analysis focuses on a radius of 5km from the proposed amended layout and potential visual receptors located within this zone. The Visual Impact Assessment undertaken as part of the BA process determined that receptors, where visible, within this zone may experience a high visual impact of the proposed infrastructure.

Through the consideration of the proposed amendments the specialist has indicated that the primary relevance of the proposed increase in dimensions, from a visual impact perspective, is that the total maximum vertical dimension (height) of the wind turbine increases from approximately 205m to up to 240m above ground level. This translates to a total of 35m maximum increase in tip height per turbine, potentially increasing the visual exposure and subsequently the potential visual impact.

A viewshed analysis was undertaken from each of the authorised wind turbine positions (56 in total) at an offset of 205m (maximum tip height) above ground level. The result of this analysis represents the potential total visual exposure of the original and authorised turbine dimensions (indicated in green in **Figure 5.3**). The viewshed analysis was repeated at an offset of 240m to indicate the visual exposure (shown in orange in **Figure 5.3**) of the increased turbine dimensions and reduced number of turbines (35 in total) proposed as part of the amendment.

From the analysis it is clear that the approximately 14.5% increase in turbine dimensions, would have a relatively small influence on the overall visual exposure of the wind farm, due to the already tall turbine structures previously authorised and the predominantly flat topography of the surrounding landscape. The surface area of the original turbine exposure is 509.4km<sup>2</sup>, compared to the 518.7km<sup>2</sup> of the increased dimensions (amendments) of the wind turbine exposure. This is an increase of 9.3km<sup>2</sup>, or alternatively, an increase of only 1.8% in the potential visual exposure.

There are no sensitive visual receptors located within the area of increased visual exposure that will be affected by the amended turbine dimensions and layout.

Potential sensitive visual receptors within an approximately 5km radius (identified during the BA process) include<sup>6</sup>:

- » Hoë Heuwel
- » Sonnekwa A
- » Lewies se Duin
- » Rooivlei (south)
- » Sonnekwa
- » Graafwater
- » Observers travelling along the Komaggas-Kleinsee secondary road (the magnitude spans from very high to moderate)

The increased area of visual exposure does not include a significant portion of additional exposure to the secondary roads within the area. In spite of the reduction in the number of turbines 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 identified above. This signifies a negligible change to the potential visual impact with the implementation of the increased turbine dimensions and amended layout.

The Zonnequa Wind Farm is located within the Springbok Renewable Energy Development Zone No. 8 (REDZ8) as determined by the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015 – CSIR/DEA). The consolidation and concentration of the wind energy facilities within this zone is preferred and the cumulative visual impact is deemed to be of an acceptable level.

Through the consideration of the proposed amendments, the specialist has indicated that there will be no change to the visual impacts and the significance ratings of the impacts. The reduction in the number of turbines is expected to reduce the frequency of visual exposure to some extent, although the remaining 35 (larger) turbines are expected to remain visible within a 5km radius of the Zonnequa Wind Farm.

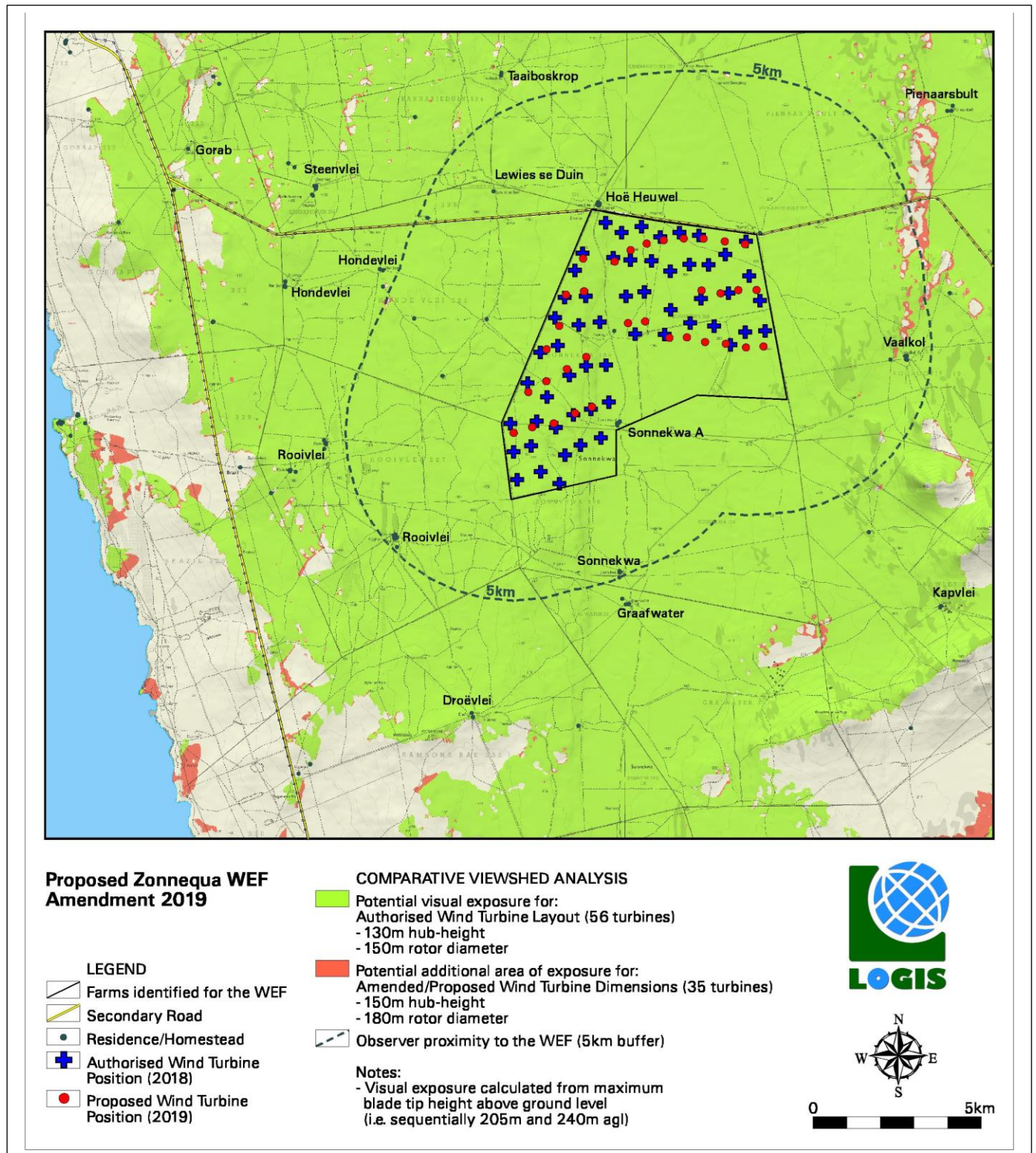
It is concluded that the increase in the dimensions of the wind turbine structures is not expected to significantly alter the influence of the Zonnequa Wind Farm on areas of higher viewer incidence (observers travelling along the secondary roads within the region) or potential sensitive visual receptors (residents of homesteads in close proximity to the wind farm).

From a visual perspective, the proposed changes to the turbine dimensions and facility layout will result in no changes to the significance ratings of the impacts identified within the original Visual Impact Assessment report that was used to inform the authorised wind farm. In addition to this, no new mitigation measures are required.

The amendments are supported from a visual perspective subject to the implementation of the conditions and recommendations as stipulated in the EA and according to the Environmental Management Programme and suggested mitigation measures as provided in the Visual Impact Assessment undertaken as part of the BA process.

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<sup>6</sup> Note: The location of Sonnekwa, Graafwater, Rooivlei (south) and Sonnekwa A on properties earmarked for the Zonnequa, Namas or Kap Vley Wind Farms reduces the probability of this impact occurring due to their assumed support and endorsement of wind farm developments on these farms and within the region. Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time that they are inhabited again.



**Figure 5.3:** Comparative viewshed analysis for the layout assessed as part of the BA process and amended layout of the Zonnequa Wind Farm

## 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
<b>General</b>	
<p>The increase in hub height and tip height 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
<p>The reduction of the number of turbines reduces the infrastructure requirements of the wind farm, and therefore on-ground disturbance, which will still be able to generate a 140MW contracted capacity.</p>	
<b>Avifauna</b>	
<p>Nett decrease in impacts to the priority (Red Data) avian community due to the decrease in the number of turbines</p> <p>All new turbine positions avoid all areas where priority bird species were previously recorded soaring or displaying</p> <p>Low risk of the Red Data species being impacted by the amended turbines.</p>	None
<b>Bats</b>	
<p>No turbines from the amended layout are located in the no-go high sensitivity areas or buffers.</p> <p>Risks to lower flying species may be reduced because the turbine blades would sweep down five meters higher above the ground.</p> <p>Cumulative mortality impacts would not increase beyond what was previously identified, assessed and rated.</p>	None
<b>Ecology</b>	
<p>The ecological impact of the amended 35 turbine layout is likely to be somewhat lower to the original 43 turbine layout as a result of the reduced number of turbines and access road footprint associated with the amended layout.</p> <p>The reduced number of turbines would mean that the average distance between turbines is increased with the result that faunal disturbance from the turbines or maintenance activities on the wind farm during operation would potentially be slightly lower.</p>	None

Advantages of the amendment	Disadvantages of the amendment
The cumulative impacts associated with the development of the amended layout are assessed as being relatively low and are considered acceptable.	
<b>Soils and Agricultural Potential</b>	
None	None
<b>Heritage (including archaeology, palaeontology and cultural landscape)</b>	
None	None
<b>Noise</b>	
A number of wind turbines close to NSD01 has been removed.	None
A reduction in the noise level of 4dB at NSD01	
<b>Visual</b>	
The reduction in the number of turbines is expected to reduce the frequency of visual exposure to some extent	None
The increase in the dimensions of the wind turbine structures is not expected to significantly alter the influence of the Zonnequa Wind Farm on areas of higher viewer incidence (observers travelling along the secondary roads within the region) or potential sensitive visual receptors (residents of homesteads in close proximity to the wind farm)	

Based on the above, it can be concluded that the advantages of the proposed amendments outweigh the disadvantages from an environmental and technical perspective with very limited disadvantages associated with the implementation of the amended turbine specifications and layout.

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

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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 for this Motivation Report, it is concluded that the mitigation measures proposed within the BA would be sufficient to manage potential impacts within acceptable levels. Updated mitigation measures are however provided by the Bat specialist as follows:

- » The key mitigation measure that should be implemented at the Zonnequa Wind Farm would be adherence to the updated sensitivity map (Figure 5.1 of section 5).<sup>7</sup>

No other novel mitigation measures are introduced from the other specialists.

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<sup>7</sup> It must be noted that the amended layout proposed by the developer adheres to this requirement as no amended turbine positions are located within the no-go high bat sensitivity areas and associated buffers (including the larger updated buffers identified for the increased turbine specifications).

## 8. PUBLIC PARTICIPATION

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A public participation process was conducted in support of this Part 2 application for amendment of the Environmental Authorisation for the Zonnequa Wind Farm and associated infrastructure, Northern Cape Province. This public participation included:

- » Site notices were placed at the site on **02 October 2019** (refer to **Appendix H4**).
- » The Motivation Report was made available for a 30-day review period on [www.savannahsa.com](http://www.savannahsa.com) from **Wednesday, 09 October 2019** to **Friday, 08 November 2019**.
- » Written notification to registered I&APs regarding the availability of the Motivation Report was distributed on **Wednesday, 09 October 2019** (refer to **Appendix H2**).
- » An advertisement was placed in the Gemsbok newspaper on **09 October 2019** (refer to **Appendix H4**).

Comments submitted from I&APs and authorities during the 30-day review period will be included in the final submission to the DEFF for consideration in the decision-making process (**Appendix H6**). Comments will be included and responded to in a Comments and Responses Report (**Appendix H5**) to be submitted as part of the final Motivation Report. Proof of attempts made to obtain comments will be included in **Appendix H2** and **Appendix H3**, accordingly. The final Motivation Report will be updated where necessary in order to address comments raised by I&APs during the 30-day review period.



## 9. CONCLUSION

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Based on the specialist findings, it is concluded that the proposed amendments to the turbine specifications and wind farm layout are not expected to result in an increase or significant reduction to the significance ratings for the identified potential impacts. In some instances, limited reductions to the significance ratings are expected, however these changes are negligible and do not result in a reduced significance category.

The benefits associated with the implementation of the amendments provide a motivation for the need of the amendment in terms of the benefits from an operation and economic perspective, as well as benefits associated with a reduced number of turbines. It must also be considered that the advantages of the proposed amendment far outweigh the disadvantages.

No impacts are expected to change in terms of bats, ecology, soils and agricultural potential, heritage, noise and visual. A reduction of the avifauna impact significance is expected which includes a reduction of the significance rating and a reduction in the significance category. Limited changes to certain on-site characteristics associated with the Zonnequa Wind Farm project site are expected with the implementation of the amendments. These changes include the need for increased bat sensitivity buffers due to the increased turbine specifications and the removal of turbines located near NSD01. These changes are however insignificant and the implementation of the amended layout ensures no significant infringement and provides opportunity for reduced impact.

From a cumulative perspective, the amendments will not result in any unacceptable cumulative impacts.

The amendments applied for in themselves do not constitute a listed activity. The mitigation measures described in the original BA document are considered adequate to manage the expected impacts for the project. Only one additional mitigation measure has been identified by the bat specialist. This measure is the required adherence to the updated bat sensitivity map which has been updated to increase the buffers around moderate and high bat sensitivity areas to cater for the increased turbine specifications. This measure will need to be added to the project EMPr once the final turbine specifications are confirmed.

Considering the findings of the specialist inputs, it can be concluded that the authorisation of the proposed amendments is considered to be acceptable and will not result in any significant changes to the impacts identified and assessed as part of the BA process under which the project was authorised. The implementation of the amended layout will also not infringe on any sensitive environmental features (**Figure 9.1**). It is therefore the recommendation and reasoned opinion of the EAP that the requested amendments be approved due to their acceptability detailed in this report, subject to the mitigation measures of the BA process and the additional measure provided by the Bat specialist identified within this Motivation Report.

Given the above, Genesis Zonnequa Wind (Pty) Ltd requests the following amendments to its EA (page numbers included for ease of reference):

The information must be amended from:

- » Page 5: Up to 56 wind turbines with a maximum hub height of up to 130m
- » Page 5: The tip height of the turbines will be up to 205m
- » Page 5 (table including technical details of the WEF): Number of turbines: Up to 56
- » Page 5 (table including technical details of the WEF): Hub height from the ground level: Up to 130m

- » Page 5 (table including technical details of the WEF): Rotor diameter : Up to 205m
- » Page 13: Up to 56 wind turbines are approved

To:

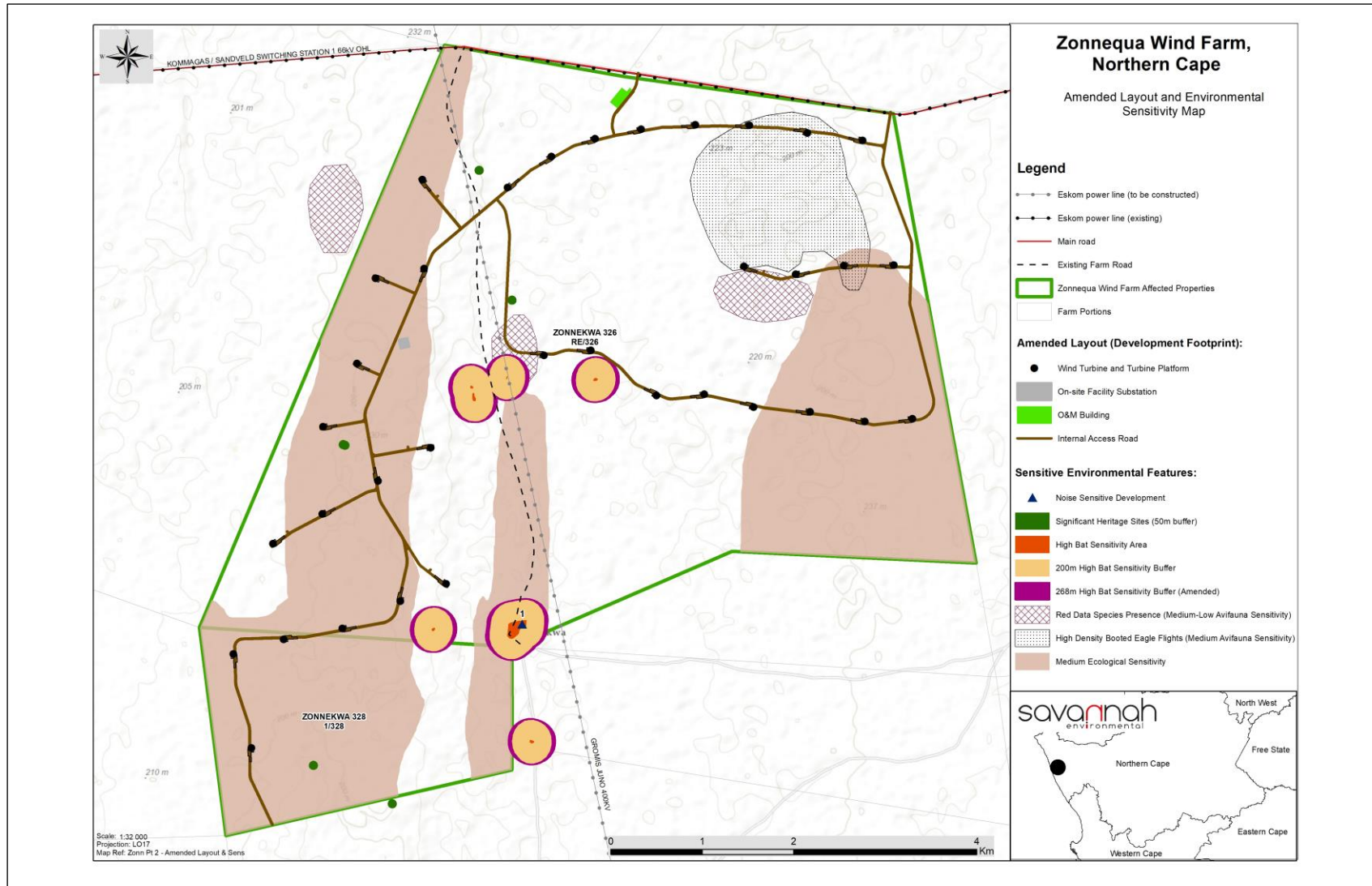
- » Page 5: **Up to 35** wind turbines with a maximum hub height of **up to 150m**
- » Page 5: The tip height of the turbines will be **up to 240m**
- » Page 5 (table including technical details of the WEF): Number of turbines: **Up to 35**
- » Page 5 (table including technical details of the WEF): Hub height from the ground level: **Up to 150m**
- » Page 5 (table including technical details of the WEF): **Tip height: Up to 240m**
- » Page 13: **Up to 35** wind turbines are approved

Further to the amendments listed above, the applicant requests the amendment and inclusion of the individual turbine capacity to the table including the technical details of the project on Page 5 of the EA. The final BA Report submitted in December 2018 lists the individual turbine capacity as **up to 4.5MW**, this information was however not included in the Environmental Authorisation. This must be amended to state **up to 7MW** and must be included in the table including the technical details of the project on Page 5. This is requested to be included for the avoidance of doubt.

The applicant further requests the inclusion of the centre point co-ordinates of the **on-site facility substation** to the EA. The on-site facility substation will be located within the project site assessed by all specialists and will be situated outside of any environmental sensitivities. The centre point co-ordinate to be listed in the EA is included below. This is requested to be included for the avoidance of doubt, and is in-line with the amended layout proposed.

- » **29°47'6.07"S ; 17°14'6.12"E**

The requested amendments of the turbine specifications and number, as well as the layout will result in an optimisation of the layout assessed within the BA and the avoidance of sensitive areas. It must be noted that this amended layout is submitted to DEFF for review and approval in accordance with Condition 13 of the EA.



**Figure 9.1:** Amended Zonnequa Wind Farm layout overlain with environmental sensitivities, including updated bat sensitivity buffers (A3 Map included in Appendix I)

