

Gunstfontein Wind Energy Facility and associated infrastructure, Northern Cape Province

Motivation for amendment of Environmental Authorisation

DEA Ref.: 14/12/16/3/3/2/826

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PROJECT DETAILS

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PURPOSE OF THE REPORT

An Environmental Authorisation (EA) for the Gunstfontein Wind Energy Facility and associated infrastructure, in the Northern Cape Province (DEA ref: 14/12/16/3/3/2/826) was obtained by Gunstfontein Wind Farm (Pty) Ltd on 25 July 2016. The project is intended to be bid into future rounds of the Department of Energy's (DoE) Renewable Energy Independent Power Producers Procurement (REIPPP) Programme. There have been advancements to wind turbine technology since the issuing of the EA, and the turbines authorised in the EA are therefore no longer considered to be the most efficient or suitable in terms of energy production and economic considerations.

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

1. An increase to the rotor diameter for each wind turbine from the authorised diameter of up to 140m, to **up to 180m;**
2. An increase in hub height from up to 120m, to a range of **up to 150m;**
3. Update the layout as required based on the revised turbine locations and turbine specifications;
4. Amendment to site access co-ordinates:

It is requested that the site access co-ordinates (as specified on page 6 of the EA) be amended:

From:

Access to site: 32°32'12.91" S, 20°39'06.97" E

To:

Site access point 1: 32°32'32.67" S, 20°39'40.95" E

Site access point 2: 32°34'56.62" S, 20°42'59.77" E

And it is requested that the description of the technical details of the facility on page 7 of the EA be amended as follows:

From:

Site access: Site access will be via a gravel road which branches off of the R354. The access point is located approximately 2.0-2.5km from the R354 turn-off to Klein Roggeveld.

To:

Site access will be via a gravel road which branches off of the R354. Two access points are proposed approximately 2.0-2.5km and approximately 10.5-11.0km from the R354 turn-off to Klein Roggeveld.

5. It is requested that the following conditions be removed from the Environmental Authorisation, since the numbering of turbines has been updated in the amended layout (as included within Figure 9.1 and Appendix H of this amendment motivation report) and the following conditions are no longer relevant (since the turbines have been renumbered from 1-46):
 - **Condition 2:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67
 - **Condition 3:** The following turbine positions is not approved; i.e. 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68 and does not form part of the development
 - **Condition 41:** The underground MV line route linking turbine 40 to turbine 49 is not approved
 - **Condition 130:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67

- **Condition 131:** The following turbine positions are excluded from this environmental authorisation:
turbine positions 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68.

6. Amendment of Condition 42 of the EA:

from:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 is not approved"

To:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 (as shown on the layout plan submitted with the final EIR report, dated April 2016) is not approved".

7. Amendment of Condition 51 of the EA:

from:

"Condition 51: The area identified as "high sensitive escarpment" by the Environmental Sensitivity and Final Optimised Layout Map (Mitigation Strategy) received by the Department on 29 June 2016 is regarded as a "no-go" area."

To:

Areas identified as high and very high ecological sensitivity in the Environmental Sensitivity Map (**Ref Gunstfontein Updated Layout, Date 06 May 2019**) be regarded as no-go areas for turbines.

It is important to note that the high sensitivity areas are no-go for turbines only, not for associated infrastructure such as roads.

8. Amendment of Condition 27 of the EA (in order to align the Environmental Authorisation with the current EIA Regulations):

From:

Condition 27: The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. The holder must notify the Department of its intention to amend the EMPr at least 60 days prior to submitting such amendments to the EMPr to the Department for approval. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in Regulation 37 of GNR 982.

To:

The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in the relevant EIA Regulations at the time of application.

9. Amendment of Condition 123 of the EA:

From:

Pre-construction archaeological monitoring is required. The appointed archaeologist must keep a list documenting all identified farm infrastructure.

To:

Pre-construction archaeological walkthrough is required of the final layout. A report detailing the results of the walk-down must be submitted to SAHRA for comment. The holder must keep a list documenting all features of archaeological significance, identified by the archaeologist, which may be impacted by the development and which must be demarcated as no-go areas.

These amendments to the project description are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof, avoid environmental sensitivities on the site, and to align the conditions of the EA with the current requirements of the EIA Regulations. 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 EIA, 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 Gunstfontein Wind Farm (Pty) Ltd. This report aims to provide detail pertaining to the significance and impacts of the proposed change to the project description and layout in order for interested and affected parties to be informed of the proposed amendments and provide comment, and for the competent authority to be able to reach a decision in this regard. This report is supported by specialist studies in order to inform the final conclusion regarding the proposed amendments (refer to **Appendix A to F** of this report). This main report must be read together with these specialist studies in order to obtain a complete understanding of the proposed amendments and the implications thereof.

This amendment motivation report has been made available to registered interested and affected parties for a 30-day period from **Friday, 10 May 2019** and **Monday, 10 June 2019**. A subset of registered I&APs who were inadvertently excluded from the aforementioned notification were subsequently notified on Friday 31 May 2019 and provided with a full 30-day review and comment period from **Friday 31 May 2019 to Tuesday 2 July 2019**. The availability of the report was advertised in the Noordwester newspaper on 10 May (refer to **Appendix G4**).

The draft amendment motivation report was made available for download at www.savannah.com during the above-mentioned commenting periods. CD copies were also available on request. To obtain CD copies, further information, register on the project database, or submit written comment, Interested and Affected Parties were invited to contact:

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All comments received during the review periods were included within a Comments and Responses report (refer to **Appendix G5**) as submitted to the DEA with this Final Motivation Report and updated application for decision making purposes.

1. OVERVIEW OF THE PROJECT

1.1. Location

The authorised Gunstfontein Wind Farm is located approximately 20km south of Sutherland and falls within the Karoo Hoogland Local Municipality, which falls within the jurisdiction of the Namakwa District Municipality in the Northern Cape Province. The project site is located within the Komsberg Renewable Energy Development Zone (REDZ 2) 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 Gunstfontein Wind Farm is to be constructed within the project site which comprises the following farm portion:

- » Remainder of the farm Gunstfontein 131;

1.2. Potential Environmental Impacts as determined through the EIA Process

From the specialist investigations undertaken within the EIA process for the wind energy facility, the following environmental impacts were identified:

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

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

From the specialist investigations undertaken as part of the EIA for the wind energy facility, it was concluded that the majority of impacts are of low to medium significance with the implementation of appropriate mitigation measures. 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. Note that the original EIA considered a large study area comprised of 4 farm portions, however following the scoping phase of the original EIA, the farm portions below the escarpment (i.e. south of the authorised site) were excluded from further consideration due to environmental sensitivities. Areas of sensitivity identified during the EIA process¹ include:

Avifauna:

A 12-month pre-construction bird monitoring programme was conducted along with the Avifauna Impact Assessment, the monitoring included 9 visits to the site over a 12-month period that included the four seasons.

The key findings of the original avifaunal impact assessment and pre-construction bird monitoring can be summarised as follows:

¹ The original EIA received partial environmental authorisation on 25 July 2016.

- » From a total of 136 species potentially occurring in the area, a total of 125 bird species were recorded within the study area (that is, the wind energy facility and surrounding area) across all the survey methodologies implemented from the beginning of the pre-construction monitoring, of which 26 species are considered to be potentially sensitive to impacts from wind energy facilities.
- » Out of these species, eight (8) are of special concern owing to their conservation status in South Africa, namely: Martial Eagle (*Polemaetus bellicosus*), Black Harrier (*Circus maurus*), Ludwig's Bustard (*Neotis ludwigii*) (Endangered), Black Stork (*Ciconia ciconia*), Verreaux's Eagle (*Aquila verreauxii*), Secretarybird (*Sagittarius serpentarius*) (Vulnerable), Greater Flamingo (*Oenicopterus roseus*) and Karoo Korhaan (*Eupodotis vigorsii*) (Near Threatened).
- » Eighteen (18) species identified during the monitoring surveys are considered to be endemic or near endemic to South Africa including the range-restricted species Black Harrier.
- » The bird community identified in the study area mostly comprised of passerine and small bird species (58% of the total species), and bird species associated with waterbodies (approximately 21% of the total bird species). Representing a smaller proportion, 10% of the species found in the study area were raptor species, 6% were "Ciconids" or similar, and less than 2% of the species found were bustards, falcons or crows. From the aforementioned groups the raptors, falcons, waterbirds and "Ciconids" are considered highly likely to suffer impacts caused by wind farms (Retief et al. 2012). Passerines might also be sensitive to impacts and collide with wind turbines, especially those which conduct migrations.
- » Most of the species confirmed in the area were observed within the wind energy facility site and the surrounding area (92 species). These species may not be severely impacted by the presence of the wind energy facility as they already use the larger surrounding area, therefore being able to shift their utilisation area slightly to avoid the introduced disturbance. These include 16 sensitive species, of which 6 are raptor species, considered to have a higher vulnerability to collision (AWWI 2015).
- » Twenty one (21) species were observed using only the area surrounding the farm portions of the proposed wind energy facility, including 10 sensitive species. These species are considered to be less likely to be negatively impacted by the facility as they were not observed to regularly use the development footprint area. They may, however, be affected by the disturbance caused by the temporary construction activities which will affect the broader study area.
- » From the bird community observed during the bird pre-construction phase, the species considered to be most susceptible to the impacts associated with the construction and operation of the proposed wind energy facility would be those exclusively using the proposed farm portions of the Gunstfontein Wind Energy Facility. There are 12 species which were identified only using the development footprint during the bird monitoring programme. However, none of these species are considered to be sensitive to impacts associated with the operation of wind farms. Nor are these species of conservation concern, as they are mostly passerine and small bird species resident in Southern Africa, with widespread distributions and generally common.
- » A Verreaux's Eagle nest was located within the broader study area, to the south of the wind farm property, and although breeding of this species at this site was not confirmed, pairs were regularly observed in the surrounding area, indicating the possibility of breeding in future seasons. This nest and a 2000m "no-go" buffer were excluded from the wind farm layout.
- » A higher activity of passerine species was observed in spring, with the most frequent groups being cisticolas, flycatchers, Larks, buntings and shrikes. Sensitive passerine species were identified as Large-billed Lark, Cape Clapper Lark, Common Swift, and South African Cliff Swallow.
- » Forty-two species of large birds or raptors were recorded, of which waterbirds, crows and ravens were the most abundant and active.

- » Sensitive raptors recorded were: African Harrier Hawk, African Fish Eagle, Black Harrier, Black-chested Snake Eagle, Jackal Buzzard, Booted Eagle, Martial Eagle, Pale-chanting Goshawk, Secretarybird, Verreaux's Eagle, Greater Kestrel and Rock Kestrel.
- » Both Martial Eagle and Verreaux's Eagle were recorded flying at rotor swept area (RSA) for relatively high proportions of time, as were Booted Eagle, Rock Kestrel, Southern Pale Chanting Goshawk and Jackal Buzzard.
- » Raptor activity was highest in the escarpment area to the south of the wind farm property (i.e. above the steeper slopes and ridges), and it was stated that this area appears to be an important uplift feature for soaring birds and as a hunting ground for some "Falcon" species.
- » During Vantage Point (VP) monitoring, the average number of "contacts per hour" for Martial Eagle was one in each of summer, winter and spring.
- » During VP monitoring, the average number of "contacts per hour" for Verreaux's Eagle was two in summer, 1.4 in winter and 1.0 in spring.
- » Flight activity of Greater Flamingo was relatively high with VP monitoring recording an average of 2.5 contacts/hour in summer, 34 contacts/hour in autumn, 25 contacts/hour in winter and 9.1 contacts/hour in spring, although 81 % of all contact for this species were below RSA.
- » The general area of the site was classified as having medium avifaunal sensitivity, with some focal areas of high sensitivity.
- » A risk analysis was conducted which identified a set of high risk areas which were classified as no-go areas and mapped. These included natural renosterveld areas, main waterbodies, valleys, buffers of nest sites of key species and the escarpment areas.

Bats:

A 12-month pre-construction bat monitoring programme was conducted along with the Bat Impact Assessment, the monitoring included passive detection which was conducted continually during the 12-month period and active detection surveys which were conducted two times per season.

The key findings of the original bat impact assessment and pre-construction bat monitoring can be summarised as follows:

- » Approximately 67 bat species may occur within South Africa (Monadjem et al. 2010). However, bat distribution areas are strongly influenced by geographic and climatic variables, with only a few species occurring throughout the entire South African territory. Therefore, not all of these 67 bat species are likely to occur within Gunstfontein Wind Energy Facility study area. From the pre-construction monitoring it was concluded that 5 species have confirmed occurrence in the area and 4 more may occur, and therefore 9 species have been considered within this study. Of these species, only six species have been considered to be sensitive to the project development.
- » At a macro level, there are no known features considered to have relevant importance for bats in the broader area of the proposed Gunstfontein Wind Energy Facility development area. The closest known roost with confirmed occupation by bats is located approximately 150km from the site. Considering that bat migration in South Africa is not a very-well studied process, it is not possible to conclude that bat roosts located at such large distances from the study area have any potential to shelter bats using the study area.
- » At the wind farm site level, activity in the area is considered to be low but with areas of high activity mainly concentrated around specific microhabitats known to attract bats. In terms of sensitivity to bats, the site presents two major areas with distinct sensitivity:

- The area of the escarpment and the area immediately below the escarpment (south of the wind farm site), which may be considered as having a higher sensitivity to bat community since it holds over 60% of the overall activity detected on site (over 25% for each area); and
- The area above the escarpment (where the wind farm is proposed), which in general may be regarded as having a lower sensitivity. In this area there are, however, some features that attract bat activity, mainly permanent and temporary waterbodies. Bat activity levels around these areas are much higher in relation to the general surroundings supporting over 8% of the overall activity, and are therefore considered to be bat sensitive areas or habitats.

Ecology:

The greater project development site for the Gunstfontein wind farm project comprises three distinctive and ecologically different areas: the high-lying plateau, the low-lying plains and the intervening rugged or steep escarpment. The facility itself is restricted to the plateau and the margin of the escarpment, with no wind turbine closer than 500m from the edge of the escarpment. The majority of the site is considered of moderate sensitivity with some areas of high sensitivity located along the edge of the plateau along the escarpment deemed to be high sensitivity on account of the high confirmed abundance of species of concern within the area. The lowlands and associated wetlands and drainage systems are considered very high sensitivity on account of their ecological function as well as high abundance of species of conservation concern. There is also a high elevation hill along the western margin of the site, which is above 1600m in elevation and is considered very high sensitivity as a result of the very limited extent of habitat at this elevation.

The drainage systems and associated seasonally wet lowlands are identified as sensitive features of the site that should be avoided to the extent possible, both due to their ecological role as well as the presence of numerous geophytes of concern associated with these habitats. Under the originally assessed layout there were 9 turbines within these more sensitive lowland areas. It was recommended that these are relocated to less sensitive areas, as it is not likely that the impacts associated with development in these areas can be effectively mitigated. It should however be noted that it would not be possible to totally eliminate impact to the very high sensitivity areas as it would be necessary for access roads and power lines to traverse these areas. Provided that crossings and habitat loss to these areas can be minimised, then it is considered acceptable for some transformation to occur in these areas. There are also existing roads and areas of impact in these areas and these lower sensitivity areas should be used for access where possible, or existing roads should be discontinued and allowed to re-habilitate, with farm traffic rather moved to the wind farm roads. Please note: 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 EIA in order to reduce impacts to an acceptable level.

The front edge of the escarpment which is broadly defined, includes both the edge of the plateau itself and the upper escarpment slopes, is also considered a sensitive area for several reasons. Firstly, large parts of this area are on sandstone and the vegetation of these areas is different from the areas of Roggeveld Shale Renosterveld on shale. Ultimately, the areas of sandstone probably deserve to be recognised as a separate vegetation type from typical Roggeveld Shale Renosterveld as the substrate clearly does not align with the intended notion of this vegetation type. In the Sutherland area, it is restricted to the higher-lying areas of the plateau along the escarpment and the larger mountain tops and hills on the plateau. Secondly, this area is wetter than the other areas away from the edge of the escarpment and the large areas of exposed rockfields also contain numerous species of concern. Due to its' relatively more limited extent the renosterveld on sandstone is also considered more vulnerable to cumulative impact.

Heritage:

Archaeology

Eight (8) heritage features were recorded within the proposed site. The heritage features that were recorded consisted of Anglo Boer War (South African War) fortifications, rock art, stone cairns and farm labourer ruins. A rock art site, stone cairn, a ruin and four fortifications are all located well away from any development footprint and will not be impacted on by the proposed wind farm development. As such no mitigation were needed for these features but it was recommended that these features are marked on development plans and preserved in situ. In the originally assessed layout, a third fortification will be indirectly impacted on by wind turbine 14 which is located 48 m to the north, and the proposed access road that is located 20 m to the north west.

Palaeontology

The development area is located in an area that is underlain by potentially fossiliferous sedimentary rocks of Late Palaeozoic and younger, Late Tertiary or Quaternary age. The construction phase of the wind farm development will entail substantial ground clearance as well as excavations into the superficial sediment cover and locally into the underlying bedrock. These include, for example, excavations for the wind turbine foundations, crane pad / laydown areas, internal access roads, underground cables, power line tower footings, on-site substation, various buildings and construction compound. All these developments may adversely affect potential fossil heritage within the study area by destroying, disturbing or permanently sealing-in fossils at or beneath the surface of the ground that are then no longer available for scientific research or other public good. The operational and decommissioning phases of the wind energy facility are unlikely to involve further adverse impacts on local palaeontological heritage.

In general, the destruction, damage or disturbance out of context of fossils preserved at the ground surface or below ground that may occur during construction represents a negative impact that is limited to the development footprint (local). Such impacts can usually be mitigated but cannot be fully rectified or reversed (i.e. permanent, irreversible).

Most of the sedimentary formations represented within the study area contain fossils of some sort, so impact on fossil heritage are probable. However, because of (a) the generally sparse occurrence of well-preserved fossils within the bedrocks concerned here, as well as within the overlying superficial sediments (soil, alluvium, colluvium etc), (b) the widespread occurrence of the fossils concerned (primarily petrified wood and other plant remains) outside the study area, and (c) the mantling of the bedrocks with largely unfossiliferous superficial sediments in many areas, the magnitude of these impacts is conservatively rated as low. This assessment applies both to the core infrastructure of the wind energy facility itself (wind turbines, access roads, underground cables, on-site substation etc) that will be located on the Roggeveld Plateau as well as the associated power line that will run down the Roggeveld Escarpment to the south (even though it is noted that this will be assessed separately).

No areas or sites of exceptional fossil heritage sensitivity or geoscientific significance have been identified within the study area, with the exception of:

- » A site on the western margins of Gunstfontein 131 where concentrations of fossil plants (moulds of woody material) are associated with ferruginous koffiekliip; and

- » The five uranium anomalies on Gunstfontein 131 that are documented on the 1: 250 000 metallogenic map for the Sutherland area.

The fossil remains identified in this study are mostly of widespread occurrence within the study area itself as well as within the outcrop area of the formations concerned (i.e. not unique to the study area). Irreplaceable loss of fossil heritage is therefore unlikely.

Should fossil remains be impacted by the proposed development, these impacts can be partially mitigated by a chance-find procedure.

Visual:

During the original EIA process, the area of greatest impact from the Gunstfontein WEF was likely to be the Upper Plateau above the Komsberg. In areas where the project is visible it is likely to be seen in its entirety. Within the Buffels and the Tankwa Valleys at the base of the Komsberg, views of the project will be possible, however, with the setback of the turbines from the edge of the ridge, the numerous ridgelines that are located between the Komsberg and the main viewpoints, and the distances involved will all help to reduce the visibility of the project. The project is unlikely to be obvious from the Tankwa Karoo National Park, however under certain atmospheric and lighting conditions reflections from spinning rotor blades could potentially be noticeable.

The project is unlikely to be visible from Sutherland but it will be visible in its entirety from the SALT. The distance between the SALT and the project is approximately 25km which will help to mitigate the impact. The project will also be highly visible from a particular area/portion of the Komsberg Wilderness Private Nature Reserve. However, it will not be visible to the majority of this facility which is located at a lower level below the main Komsberg ridgeline. There is a small risk that one property could be impacted by shadow flicker.

The Visual Absorption Capacity (VAC) of the landscape is really only afforded by the landform. On the upper plateau the depression in which Sutherland is located will result in the town being screened however, the flat landscape and low vegetation of higher areas will result in the development being visible in its entirety. In the lower valleys, the secondary spurs of the Komsberg and the primary ridgeline and secondary spurs of the Roggeveldberg will provide significant screening of the proposed development from main access roads.

The original visual impact assessment identified key viewpoints (VPs) for the Gunstfontein WEF. The viewpoints include:

1. VP1 is located on the R354 as it crosses the Roggeveldberg ridge into the Tankwa Valley. This is a long-distance view towards the site, the Gunstfontein project which will be viewed at a distance of just over 30 km.
2. VP2 is located on the R354 as it exits the proposed Kareebosch Wind Farm project. The closest Gunstfontein turbine is approximately 18.8km from the viewpoint. The assessment indicates that approximately half of the turbines associated with the Gunstfontein project are likely to be visible.
3. VP3 is located on the R354 on the approach to Sutherland. It is positioned at the top of the rise from the town to the upper plateau and is therefore the first exposure that a traveller from the town is likely to experience. The viewpoint is approximately 8.0km from the closest Gunstfontein turbine.
4. VP4 is located on the western edge of the town of Sutherland. The analysis indicates that views of the project are unlikely to be visible from this position.

5. VP5 is located at the South African Large Telescope (SALT). This viewpoint is located approximately 25 km from the closest Gunstfontein turbine.
6. VP6 is located at the top of the Komsberg Pass at a distance of approximately 7.3 km from the closest Gunstfontein. This is the view that a person travelling through the Pass will see as he / she reaches the top of the Pass. It is also likely to be typical of views from within the higher areas of the Komsberg Wilderness Nature Reserve. It should be noted that at lower elevations within the Reserve there is very limited exposure to views of the Gunstfontein project.
7. VP7 is located at the bottom of the Komsberg Pass close to the southern edge of the Komsberg Wilderness Nature Reserve. No views of the Gunstfontein project will be possible from this viewpoint. However, a large number of turbines associated with the Mainstream Sutherland Project will be visible on the ridgeline to the right of the view. Five turbines also associated with the Mainstream Sutherland Project will be visible beneath the ridgeline just out of view to the right of the picture. The closest turbine will be approximately 1km from the viewpoint.

Noise:

The area near the project site has a rural character in terms of appearance and development, with a high potential to be quiet at times. Ambient sound levels however are sometimes elevated, mainly due to wind-induced noises (natural), birds and insects (natural) and chickens (considered anthropogenic). Most farmers will consider this to be naturally quiet.

Considering the results of the ambient sound measurements, the main source of daytime sound was from the wind, with other sounds from various sources raising the sound levels. The night-time periods were generally impacted by wind, chickens and insects. While the sound levels were elevated at times the area can be considered as naturally quiet. The area has a high potential to be very quiet, especially when the wind is not blowing.

Conceptual scenarios were developed for a construction and operational phase with the output of the modelling exercise indicated that there is a low risk of a noise impact for both the construction and operational phases and even less for decommissioning phase. There is a very low risk for a noise impact during the construction phase. The maximum projected noise rating level could be as high as 37dBA during the operational phase, slightly higher than the night time rural rating level, this was considered to be insignificant. The change in ambient sound levels were expected to be significantly less than 3dBA.

Summary of EIA Findings

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 EIA in order to reduce impacts to an acceptable level. No environmental fatal flaws were identified to be associated with the proposed Gunstfontein Wind Energy Facility. A number of issues requiring mitigation were however highlighted. Environmental specifications for the management of potential impacts are detailed within the final Environmental Management Programme (EMPr).

1.3. Background of the Environmental Authorisation

Gunstfontein Wind Farm (Pty) Ltd applied for Environmental Authorisation (EA) for 68 wind turbines with an installed capacity of up to 200MW. Partial EA was issued on 25 July 2016 for 46 wind turbines with an installed capacity of up to 200MW.

Two appeals were submitted to the Department of Environmental Affairs, these included:

- » An appeal as submitted by an appellant to the Department; this appeal was however dismissed on 17 January 2017.
- » A second appeal was submitted by the applicant to the Department, which appeal was partially upheld. An appeal decision issued on 17 January 2017 and a subsequent revised appeal decision issued on 9 December 2017 detail amendments granted to the EA. This includes amendment to condition 38, 39, 40 and 43.

The amended conditions are stipulated as:

38. A minimum 200m buffer applies to all identified avifaunal no-go areas, except in instances where a buffer in excess of 200m has been recommended by the specialist. In instances where a buffer in excess of 200m has been prescribed, no additional buffer is required.

39. All turbines, the substation and construction camp/laydown area position must be relocated outside the 200m uniform avifaunal buffer, except in instances where a buffer in excess of 200m has already been prescribed. In instances where a buffer in excess of 200 has been prescribed, no additional buffer is required.

40. A 200m buffer must be applied for all potential and confirmed bat roosting sites, except in instances where a buffer in excess of 200m has already been prescribed. In instances where a buffer in excess of 200m has been prescribed, no additional buffer is required.

43. All powerlines linking wind turbines to each other and to internal substation and which is within the 200m buffer, except in instances where a buffer in excess of 200m has already been prescribed and/or where it is not ecologically desirable to do so, must be buried.

Following the removal of turbines 14-18, 23,24, 30-37, 44-47, 55, 56 and 68, the layout was amended. The layout amendment is presented below. It must be noted that this layout was not approved in the EA and therefore a final layout is still required to be submitted to the DEA for approval in accordance with Condition 13 of the EA dated July 2016.



2. DETAILS OF THE AMENDMENTS APPLIED FOR

The amendments being applied relate to the authorised wind turbine specifications as detailed in the EA dated 25 July 2016, as amended. This requested amendment will result in an optimisation of the layout assessed within the EIA. This proposed amended updated layout is presented in **Figure 2.1**. It must be noted that this layout will be finalised and submitted to the DEA for review and approval (in accordance with Condition 13 of the EA) once a turbine supplier has been selected for the project.

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

2.1. Amendment to Wind Turbine specifications

The wind turbine rotor diameter, hub height and turbine capacity as specified in the EA dated July 2016 (as amended) are requested to be amended as follows:

From:

140m rotor diameter

To:

Up to 180m rotor diameter

From:

hub height of 120m

To:

hub height of up to 150m

2.2. Amendment to site access co-ordinates:

It is requested that the site access co-ordinates (as specified on page 6 of the EA) is to be amended:

From:

Access to site: 32°32'12.91" S, 20°39'06.97" E

To:

Site access point 1: 32°32'32.67" S, 20°39'40.95" E

Site access point 2: 32°34'56.62" S, 20°42'59.77" E

And it is requested that the description of the technical details of the facility on page 7 of the EA be amended

From:

Site access: Site access will be via a gravel road which branches off of the R354. The access point is located approximately 2.0-2.5km from the R354 turn-off to Klein Roggeveld.

To:

Site access will be via a gravel road which branches off of the R354. Two access points are proposed approximately 2.0-2.5km and approximately 10.5-11.0km from the R354 turn-off to Klein Roggeveld.

2.3. It is requested that the following conditions be removed from the Environmental Authorisation:

- **Condition 2:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67
- **Condition 3:** The following turbine positions is not approved; i.e. 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68 and does not form part of the development
- **Condition 41:** The underground MV line route linking turbine 40 to turbine 49 is not approved
- **Condition 130:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67
- **Condition 131:** The following turbine positions are excluded from this environmental authorisation: turbine positions 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68.

2.4. Amendment of Condition 42 of the EA:

from:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 is not approved"

To:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 (as shown on the layout plan submitted with the final EIR report, dated April 2016) is not approved".

This condition is no longer applicable since the turbine numbers have changed in the updated layout and turbines number 8 and 11 are now situated in different places. In addition, this proposed MV line (to which Condition 42 refers) has been removed from the layout.

2.5. Amendment of Condition 51 of the EA:

from:

"Condition 51: The area identified as "high sensitive escarpment" by the Environmental Sensitivity and Final Optimised Layout Map (Mitigation Strategy) received by the Department on 29 June 2016 is regarded as a "no-go" area."

To:

Areas identified as high and very high ecological sensitivity in the Environmental Sensitivity Map (**Ref Gunstfontein Updated Layout, Date 06 May 2019**) be regarded as no-go areas for turbines.

It is important to note that the high sensitivity areas are no-go for turbines only, not for associated infrastructure such as roads or powerlines.

2.6. Amendment of Condition 27 of the EA (in order to align the Environmental Authorisation with the current EIA Regulations):

From:

Condition 27: The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. The holder must notify the Department of its intention to amend the EMPr at least 60 days prior to submitting such amendments to the EMPr to the Department for approval. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in Regulation 37 of GNR 982.

To:

The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in the relevant EIA Regulations at the time of application

This amendment is requested in order to align the Environmental Authorisation with the current EIA Regulations.

2.7. Amendment of Condition 123 of the EA:

From:

Pre-construction archaeological monitoring is required. The appointed archaeologist must keep a list documenting all identified farm infrastructure.

To:

Pre-construction archaeological walkthrough is required of the final layout. A report detailing the results of the walk-down must be submitted to SAHRA for comment. The holder must keep a list documenting all features of archaeological significance, identified by the archaeologist, which may be impacted by the development and which must be demarcated as no-go areas

2.8. Summary of amendments applied for

The table below provides a detailed comparison of the project description included in the amended EA as authorised on 25 July 2016 with the proposed project components which are requested to be amended (shown in **bold** text). **Please note:** no MW rating was specified for the approved turbines in the original EA, however this has now been included for the avoidance of doubt.

Component	Authorised specification	Amended specifications
Rotor diameter	140m	Range up to 180m
Hub height	120m	Range up to 150m
Site Access	Access to site: 32°32'12.91" S, 20°39'06.97" E	Site access point 1: 32°32'32.67" S, 20°39'40.95" E Site access point 2: 32°34'56.62" S, 20°42'59.77" E
Turbine Capacity	none	Up to 6.5MW

The proposed amended layout is presented in Figure 2.1. It must be noted that this layout will be finalised and submitted to the DEA for review and approval (in accordance with Condition 13 of the EA) once a turbine supplier has been selected for the project.

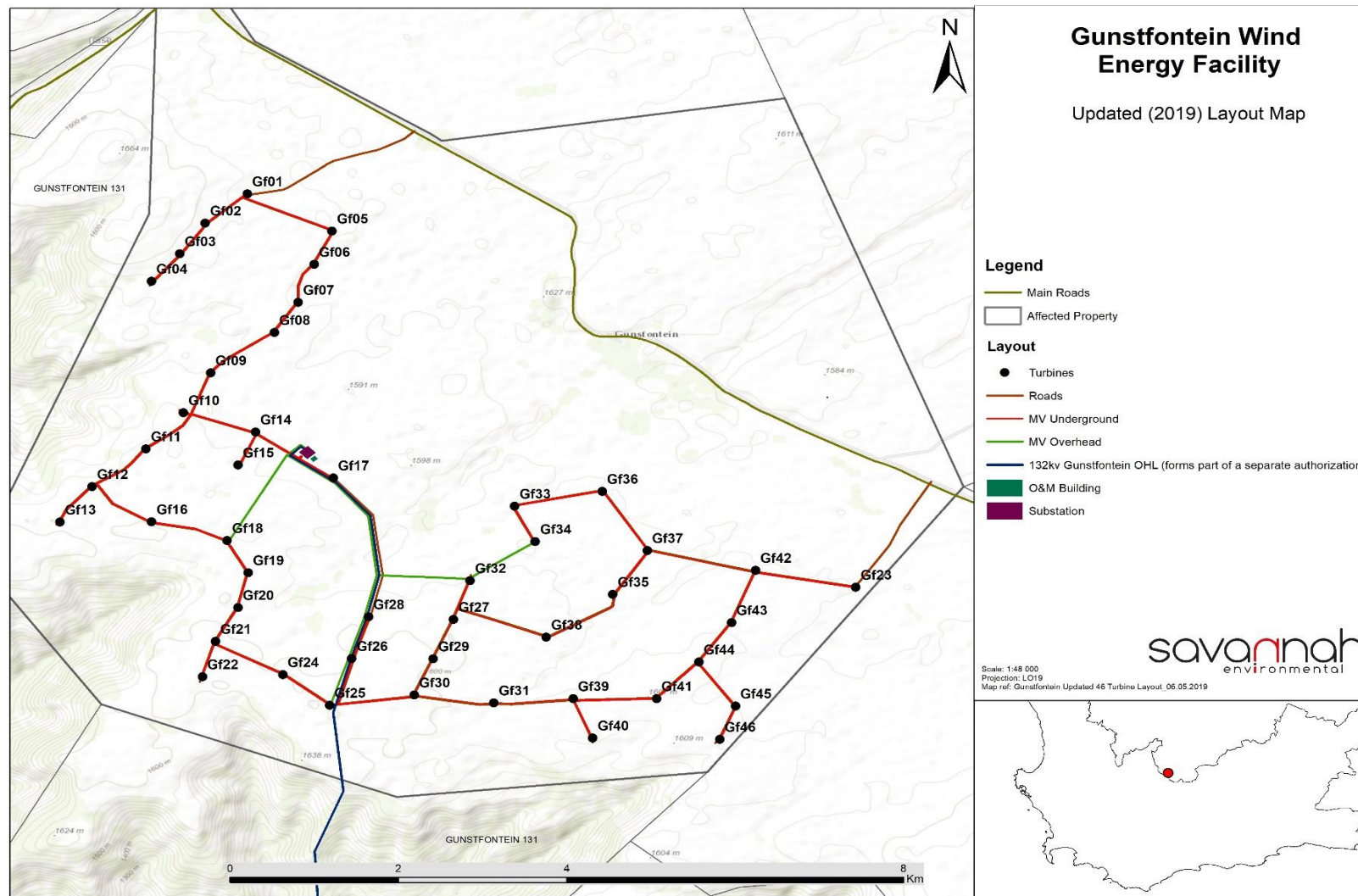


Figure 2.1: Updated wind farm layout - A3 Map included in **Appendix H**.

3. MOTIVATION FOR THE PROPOSED AMENDMENTS

The motivation for each of 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 EIA, and will not change the scope of the EA.

3.1. Amendment to Wind Turbine Specifications & Site Layout

Following the issuing of the EA for the project, there have been advancements to wind turbine technology with newer turbines becoming larger and more powerful. 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, Gunstfontein Wind Farm (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 rotor diameter, and hub height will result in the optimisation of the facility layout which was assessed within the EIA for the project. The larger turbines require more space between turbines to reduce internal wake effects between the turbines, requiring an amendment to the layout. The amendment of the turbine specifications and layout are proposed in order to increase the efficiency of the facility and consequently the economic competitiveness thereof, as well as to avoid environmental sensitivities on the site. It is also noted that the proposed amendments will improve the efficiency of the wind farm which may reduce the electricity tariff charged by the project, which would be to the benefit of all electricity consumers in South Africa.

In the process of optimising the site layout to cater for the larger turbines, it has been identified that a second access point is required in order to improve access to the turbines located in the eastern portion of the site. This will allow for construction- and operational-phase efficiencies and will reduce the distance over which components must be hauled across the site during construction and maintenance.

3.2 Amendment to Remove Specific Conditions from the EA

It is requested that Conditions 2, 3, 130 and 131 be removed from the EA. These conditions specify which turbines (as shown in the final layout assessed in the original EIA, dated 2016) were excluded from the authorisation, due to the turbines being located in areas of high ecological sensitivity. The final layout assessed in the original EIA contained 68 turbines, however the EA authorised only 46 turbines and Conditions 2, 3, 130 and 131 specify which turbines were excluded from the EA.

The Applicant has now optimised the layout of the approved 46 turbines, and has renumbered the turbines sequentially from 1-46 to aid the implementation of the layout plan and to avoid future confusion. In optimising the layout, all exclusion areas and no-go areas identified by the specialists and stipulated in the EA have been adhered to, and no turbines are proposed in areas of high or very high ecological sensitivity². The renumbering of turbines is requested to allow for ease of implementation by the developer since turbines numbered in sequence would allow for less confusion during project implementation. The updated layout submitted as part of this amendment application (2019) adheres to the turbine exclusions outlined in the EA

² The ecological sensitivity map delineated by Todd (2016) during the EIA process has been subsequently refined and the high sensitivity areas mapped at a finer-scale following further site visits by MacDonald (2017) and Todd (2019). The turbine layout has been amended and optimized to comply with the most recent sensitivity map. Refer to ecological specialist report in Appendix C.

dated 25-07-2016, as well as all no-go areas identified by the specialists and thus remains compliant with the exclusions identified within the EA (employing the previous numbering).

Conditions 2, 3, 130 and 131 refer to turbine numbers that either no longer exist in the amended layout or which are located in different positions to that within the EIA layout due to the re-optimisation and renumbering of the turbine layout. Conditions 2, 3, 130 and 131 are therefore no longer relevant or appropriate for the revised layout.

Similarly, it is requested that Condition 41 be removed from the EA as the turbines in question (and the MV line linking them) are no longer part of the amended layout. It is also requested that Condition 42 be amended to clarify that this condition refers to the turbine numbering as per the original layout submitted with the EIA Report, to avoid any future confusion.

3.3 Amendment to Condition 51, relating to Ecological Sensitivity

The areas of high ecological sensitivity that were delineated during the original EIA (Todd, 2016) were those areas that the specialist identified as having the potential to contain pockets of high sensitive vegetation, interspersed with areas of lower sensitivity. The sensitive areas have subsequently been revisited and mapped at a finer scale following site visits by MacDonald (2017) and Todd (2019), in order to more clearly identify and delineate the pockets of true high sensitivity. It is therefore requested that Condition 51 be amended to refer to the latest sensitivity map, which is a more accurate (finer-scale) depiction of the sensitive areas on site.

3.4 Amendment to Condition 27 to Align with the EIA Regulations

It is requested that Condition 27 of the EA be amended to remove the requirement to provide 60 days' notice prior to applying to amend the EMPr. Regulation 37 of the EIA Regulations previously stipulated that the holder of the EA must notify the Department of its intention to amend the EMPr at least 60 days prior to submitting such amendments to the EMPr to the Department for approval. However, the requirement to provide 60 days' notice has been removed in the latest version of the EIA Regulations (GNR326), and it is therefore requested that Condition 27 be similarly amended in order to align with the EIA Regulations.

It is also noted that in practise, it may be necessary to amend the EMPr to respond to changing circumstances on site, and it is not always desirable or practical to provide 60 days' notice before giving effect to the necessary amendments to the EMPr.

3.5 Amendment to Condition 123, relating to Archaeological Monitoring Requirements

It is requested that Condition 123 be amended to remove the requirement for "pre-construction archaeological monitoring" and instead to specify that the final layout of the development must be physically inspected by a qualified archaeologist via a site walk-through and a report must be submitted to SAHRA for comment. This would bring the condition in line with recommendations from SAHRA received on 31 May 2019. These recommendations were issued by SAHRA in response to the Draft Motivation report for the amendment.

A detailed pre-construction archaeological assessment was undertaken during the EIA, and the specialist and SAHRA did not identify the need for any further “pre-construction monitoring”. It is noted that the identified archaeological resources on site are static and there would be no merit or benefit in conducting any further pre-construction monitoring of these features. Undertaking a physical inspection (walk through) by a qualified archaeologist to assess the final layout prior to construction, would be a more practical exercise and would better ensure that identified heritage resources are sufficiently avoided and protected *in situ*.

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

In terms of Regulation 31 of the EIA Regulations 2014, as amended, an environmental authorisation may be amended by following the process in this Part (i.e. a Part 2 amendment) if it is expected that the amendment may result in an increased level or change in the nature of impact where such level or change in nature of impact was not:

- a) Assessed and included in the initial application for environmental authorisation; or
- b) Taken into consideration in the initial authorisation.

In this instance, the amended turbine specifications and 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 EIA AS A RESULT OF THE PROPOSED AMENDMENTS

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 EIA), the following has been considered:

- » Impacts on birds;
- » Impacts on bats;
- » Ecological Impacts;
- » Heritage Impacts;
- » Visual impacts; and
- » Noise impacts.

The change in rotor diameter and turbine hub height, the reduction in the number of turbines³ (and subsequent change to the layout assessed in the EIA 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 Assessment undertaken as part of the EIA process. Therefore, no Socio-economic Specialist Report has been included as part of the current 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 specialists' assessment addendum letters and reports (as applicable) contained in **Appendix A-F⁴**.

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 reports contained in **Appendix A-F** in order for the reader to obtain a complete understanding of the proposed amendments and the implications thereof.

5.1. Impacts on avifauna

The avifaunal amendment study (**Appendix A**) undertaken by Arcus to assess the proposed amendments included a review of the original scoping assessment (2013), the 12 months of pre-construction monitoring data and resultant report (2016), updated SABAP data and a current literature review. The latest best practise guidelines were also considered. One hundred and forty-one bird species were identified as possibly being present on the site, which was described as a "relatively low diversity of species". The 2013 scoping assessment (which included a short site visit) identified the following micro-habits: Karoo veld; pans and dams; drainage lines; escarpment; arable lands; and ridges.

The most important "target species" were identified as Ludwig's Bustard, Greater Flamingo, Martial Eagle, Verreaux's Eagle, Black Harrier, Jackal Buzzard and Grey-winged Francolin. Other relevant red data species

³ Compared to what was assessed in the original EIA (68 turbines)

⁴ It must be noted that the original specialists who undertook the EIA studies have been used for these assessments as far as possible. However, where the original specialists were not available for whatever reason, suitably qualified and experienced specialists have been used to provide an assessment of the proposed amendments.

or raptors indicated as being potentially present were Black Stork, Booted Eagle, African Fish Eagle, Spotted Eagle-owl, Rock Kestrel, Black-shouldered Kite, and Southern Pale Chanting Goshawk.

5.1.1. Comparative Assessment

The avifaunal amendment report (**Appendix A**) compiled to assess the proposed amendments includes a list of the most significant impacts on birds of the proposed wind energy facility (WEF) development.

The original avifaunal impact assessment, BioInsight (2016), based on the findings of their pre-construction monitoring, identified and rated the following impacts on avifauna:

- » Construction Phase: i) Destruction of natural vegetation; and ii) Disturbance and/or displacement effects.
- » Operation Phase: i) Fatalities due to collisions with wind turbines; and ii) Disturbance and/or displacement effects.

The 2019 avifaunal report conducted by Arcus for this amendment presents updated ratings of the impacts presented by BioInsight (2016) and also assesses impacts that were not identified and assessed by BioInsight (2016). Impacts were rated for both 'Without Mitigation' and 'With Mitigation' scenarios and in specific relation to the revised 46 turbine layout, after examining this layout against the exclusion zones and sensitivities defined by BioInsight (2016) (Figure 5.1). Updated and more detailed mitigation as well as additional mitigation recommendations based upon the findings of this updated assessment are given in Section 5 below.

Table 1 provides a summary of the bird impacts as rated by BioInsight (2016) for the originally assessed layout and project description (i.e. the 68 turbine layout). Arcus determined whether the significance of each impact would change as a result of the proposed amendments, and this is shown in the last column in Table 1 below. This determination of a change in significance was made by considering all applicable information which included: i) a literature review; ii) review of applicable documents; iii) the latest available information on WEF impacts on birds in South Africa; iv) the specialists experience of monitoring at various operational WEFs and v) the proposed changes to the Gunstfontein WEF layout and turbine specifications. Furthermore, two additional potential impacts during operations have been identified and included in Table 2, i.e. fatalities due to collisions with over-head power lines and fatalities due to electrocution. The significance of these two impacts are rated in the impact tables below.

Table 5.1.1: Summary of the Avifauna Impact Assessment from BioInsight (2016)

Phase	Impact	Significance Without-Mitigation	Significance With-Mitigation	Significance ⁵ will change due to Proposed Amendment (Yes/No)
Construction	Destruction of natural vegetation/habitat alteration.	Medium (32)	Low (12)	No
	Disturbance and/or displacement effects due to construction works, noise, human presence and machinery movements.	Low (18)	Low (6)	No

⁵ Refers to the actual numerical significance score, and not necessarily the significance category of Low/Medium/High

Phase	Impact	Significance Without-Mitigation	Significance With-Mitigation	Significance ⁵ will change due to Proposed Amendment (Yes/No)
Operational	Fatalities due to collision with operating wind turbines.	Medium (60)	Low (30)	Yes
	Collision with powerlines*	Not Rated	Not Rated	Yes
	Electrocution*	Not Rated	Not Rated	Yes
	Disturbance and/or displacement effects due to human presence during maintenance activities.	Low (30)	Low (16)	No
N/A	Cumulative Impacts on Birds	Medium (60)	Low (30)	Yes

*These impacts were not identified and rated by BioInsight (2016), with no clear explanation given for their omission in the 2016 report. Their introduction during this amendment however is not as a result of the proposed amendments requested through this application as confirmed by Arcus in 2019.

It was determined that the significance of the impacts of habitat alteration/destruction and disturbance and/or displacement (during both construction and operation) would not change. The impact ratings of fatalities due to collision with turbines and cumulative impacts have changed, and therefore updated impact rating tables for these impacts are provided below, including a more detailed description of the new (previously un-rated) impacts identified, and those that have changed ratings.

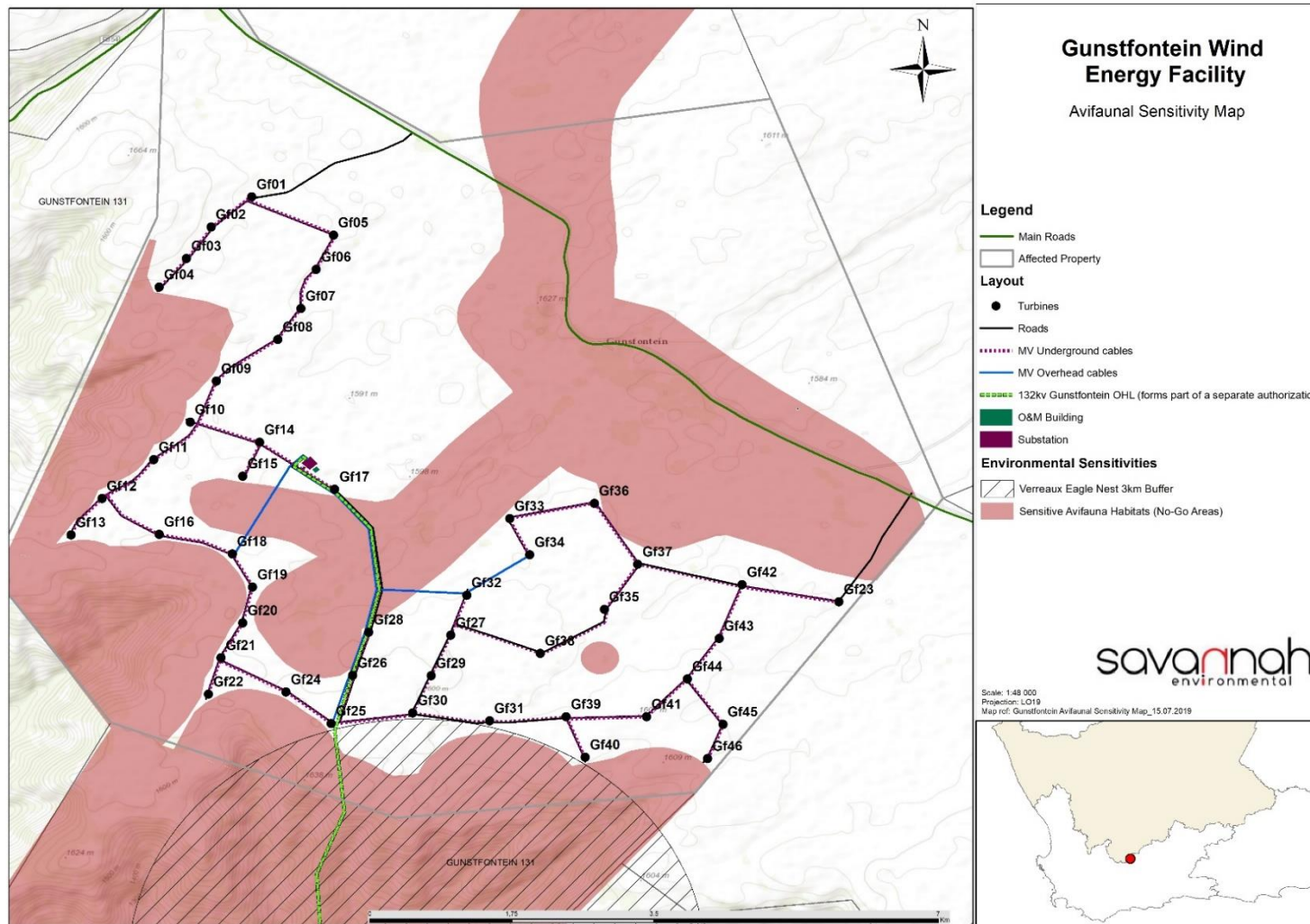


Figure 5.1: The revised 46 Turbine layout with avifaunal sensitivities and a 3km Verreaux's Eagle buffer.⁶

⁶ The layout presented in the avifaunal report was updated following the inclusion of a the 3km Verreaux's Eagle buffer and the avoidance of bat sensitive areas. The layout presented in figure 5.1 adheres to the updated avifaunal exclusion zones (no-go areas). Note that the avifaunal no-go areas are exclusion zones for turbines only, and associated infrastructure (e.g. roads and powerlines) are permissible in these areas.

5.1.1.1. Wind Turbine Collisions

It was found that there is a change in the significance rating of the potential impact of wind turbine collisions from Medium to High without mitigation, and from low to medium with mitigation, for the following reasons:

- » The potential height of the blade tips has increased substantially from a maximum of 190 m to a maximum of 240 m. This introduces additional uncertainty into the updated assessment as BioInsight (2016) based their assessment of the flight height 'within rotor height' on a smaller turbine. Therefore, various flights of key species, previously considered to be 'above rotor height' and therefore not at risk, may now fall within the risk area.
- » The proposed amendments result in an increased Rotor Swept Area (RSA) from that which was assessed by BioInsight, and an even larger increase from that which was approved.
- » The monitoring data is over four years old, which introduces a level of uncertainty regarding the status quo of avifauna on the site.
- » In 2016 limited information regarding actual impacts, particularly on eagles (e.g. Martial Eagle, Verreaux's Eagle and Booted Eagle), was available for consideration by BioInsight (2016). We now have had a number of mortalities caused by wind farms (and their on-site associated infrastructure) of these species and other priority species in South Africa (Ralston-Paton et al. 2017; Pers. Com BARESG; Pers. Obs.), This includes at least 12 Verreaux's Eagle mortalities (that have been confirmed) to date (Pers. Com BLSA), of which half have been caused by powerline electrocutions.
- » BioInsight (2016) placed a protective 2 km No-go buffer around a Verreaux's Eagle nest site. More recent research has led to BLSA recommending a no-go buffer of 3 km in their Verreaux's Eagle guidelines.⁷
- » It was noted that in their text on page 73 when discussing direct fatality due to collision, BioInsight (2016) stated that "*The impact caused by wind turbine operation is considered to be of high significance although with the appropriate mitigation it can be reduced to medium significance impact*", which differs from their assessment of medium without mitigation and low with mitigation, given in the impact table (Table 11, page 76). Arcus are in agreement with the text assessment as per the content included on page 73 of the 2016 BioInsight report.
- » The 'with mitigation' score of 30 obtained by BioInsight was categorised as low. According to Savannah's assessment criteria (Appendix I), this should have been designated as medium.

The above considerations are somewhat counteracted by the lower number of turbine positions (46) that are now assessed, compared with the 68 assessed by BioInsight, however, the specialist was of the opinion that the updated impact assessment still results in an impact of medium significance with the implementation of mitigation.

It was found that the new layout adheres to the no-go areas given by BioInsight (2016). Therefore, this 'embedded design mitigation' was already considered in the 'Without Mitigation' rating. A provisional amended layout (shown in Figure 1 of the avifaunal report, Annexure C) was presented to the specialist for consideration, and the specialist noted that one turbine (Gf48) was situated within a no-go area, while 24 turbines (Gf04, Gf09-Gf13, Gf15, Gf16, Gf19-Gf28, Gf31, Gf33, Gf36, Gf37, Gf40 and Gf46) are situated on the boundary of the no-go area. The specialist recommended that Turbine Gf48 must be removed from the no-go area, while all turbines must be situated at least 70 m back from the no-go boundary in order to reduce the length of blade extending into the airspace above the no-go area. A 3 km No-go buffer should be placed around the Verreaux's Eagle nest site (NEGN03 in Appendix V of BioInsight, 2016) (Figure 5.1). All

⁷ BLSA, 2017. Verreaux's Eagle and Wind Farms. Guidelines for impact assessment, monitoring and mitigation. March 2017. BirdLife South Africa.

turbines should be located at least 70 m beyond the boundary of this buffer and turbines Gf26, Gf27, Gf31 and Gf40 must be relocated at least 70 m outside of the buffer area. Regarding the recommendation of a set-back of at least 70m from a no-go boundary, it must be noted that this is based on a worst-case scenario of a rotor diameter of 180 m. Should a smaller rotor diameter be used, the turbines can be shifted closer to the no-go boundary, so that no more than 20m of any blade extends into the air space above a no-go area. The 'with mitigation assessment' assumes that these recommendations are implemented and the layout adjusted accordingly. Note that the avifaunal areas must be regarded as no-go areas for turbines, but associated infrastructure (such as roads and powerlines) are permissible, subject to the strict implementation of the mitigation measures stipulated in the original specialist report (BioInsight 2016) and the updated mitigation measures stipulated in the tables below and in Section 7 of this report.

Note that the amended (optimised) layout was adjusted in order to adhere to the specialist's recommendations stated above, and all turbines have been shifted outside of the avifaunal no-go buffer areas and have moreover been setback at least 70m away from the edge of the buffer to ensure no blade overhand into the buffer areas. In addition, a 3km buffer has been applied to the Verreux's Eagle nest. The updated amended layout was present to all specialists to consider, and is shown in Figure 5.1 and Appendix H of this report. New mitigation measures are underlined in the tables below.

Table 5.1.2: Updated Impact Table for Wind Turbine Collisions- Operational Phase

Nature: Fatalities due to collision with operating wind turbines				
	Authorised		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	2	1	3	2
Duration	5	5	5	5
Magnitude	8	4	8	6
Probability	4	3	5	3
Significance	60 (Medium)	30 (Low) ⁸	80 (High)	39 (Medium)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	Possible	Possible	Possible	Possible
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation: <ul style="list-style-type: none"> » <u>No turbines may be located within the no-go areas, including the 3 km Verreux's Eagle nest buffer (Figure 5.1).</u> » <u>All turbines must be situated at least 70 m back from the no-go boundary (and preferably 90 m back). This is based on the assumption that a turbine with the maximum specifications is installed. Should a smaller turbine be utilised, the setback distance to the no-go areas may be reduced slightly, which must be confirmed by the specialist during the pre-construction walkthrough and micro-siting process.</u> » <u>Develop and implement a carcass search programme for birds as a minimum during the first two years of operation followed by year 5, 10, 15, 20 and 25, in line with or exceeding the applicable South African monitoring guidelines of the time.</u> » <u>Develop and implement a 24-month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys and is in line with (or exceeds) the applicable South African post-construction monitoring guidelines. This program must include thorough and on-going nest searches and nest monitoring.</u> 				

⁸ Should be medium according to criteria used.

- » Conduct frequent and regular review of operation phase monitoring data (activity and carcass searching) and results by an avifaunal specialist. This review should also establish the requirement for continued monitoring studies (activity and carcass searching) throughout the operation and decommissioning phases of the development.
- » If unacceptable impacts are observed (in the opinion of the bird specialist after consultation with BLSA, relevant stakeholders and an independent review), the specialist should conduct a literature review specific to the impact (e.g. collision and/or electrocution) and provide updated and relevant mitigation options to be implemented. Mitigations that may need to be implemented (and should be considered in the project's financial planning) include:
 - Onsite and off-site habitat management. A habitat management plan which aims to prevent an influx/increase in preferred prey items in the turbine area due to the construction and operation activities, while improving raptor habitat and promoting prey availability away from the site.
 - Using deterrent devices (e.g. visual and noise deterrents), deterrent and/or shutdown systems e.g. Automatic bird detectors (e.g. automated camera-based monitoring systems – McClure et al. 2018) if commercially available; or Radar Assisted Shutdown on Demand (RASOD) to reduce collision risk.
 - Painting a turbine to make it more visible (subject to the requisite approvals being obtained from the applicable authorities e.g. CAA and DEA). Some success has been observed in reducing raptor mortalities in Norway using this method (Stokke et al. 2017).
 - Identify options to modify turbine operation (e.g. temporary curtailment or shut-down on demand) to reduce collision risk if absolutely necessary and if other methods have not had the desired results.

5.1.1.2. Over-head Power Line Collisions

While the impact assessment (section 4) in BioInsight (2016) has a heading "Direct fatality due to collision mortality with wind turbines and power lines" there is no impact rating/table for power line collisions. Collisions with power lines are a well-documented threat to birds in southern Africa (van Rooyen 2004), and smaller Medium Voltage (MV) lines pose a higher threat of electrocution (if not mitigated) but can still be responsible for collisions. Collisions with overhead power lines occur when a flying bird does not see the cables, or is unable to take effective evasive action, and is killed by the impact or impact with the ground. Especially heavy-bodied birds such as bustards, cranes and waterbirds, with limited manoeuvrability are susceptible to this impact (van Rooyen 2004). Many of the collision sensitive species are also considered threatened in southern Africa (Taylor et al. 2015), and on the Gunstfontein site may include Greater Flamingo, Ludwig's Bustard, Black Stork, Karoo Korhaan and Southern Black Korhaan. Martial Eagle, Black Harrier and Verreaux's Eagle may also be prone to power line collisions. Ludwig's Bustard is probably of most concern, as it may be seasonally relatively abundant on the site and is known to be highly susceptible to power-line collision (Shaw 2013; Shaw et al. 2017), although mitigation has proven successful in some instances in the Northern Cape (pers. Com EWT) It is noted that BioInsight (2016) did recommend that "All power lines linking wind turbines to each other and to the internal substation should be buried. In cases where this is not feasible, lines must be fitted with bird flight diverters and bird flappers, especially visible during the night time." The proposed amendment and updated layout include overhead MV power lines totalling approximately 9 km, which is similar to that of the previously assessed layout.

Table 5.1.3: Impact Table for Power Line Collisions- Operation Phase

Nature: Fatalities due to collision with internal medium voltage overhead power lines linking wind turbines and the internal substation.				
	Authorised		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	NOT RATED*		2	1
Duration			5	5
Magnitude			6	4

Probability		4	2
Significance		52 (Medium)	20 (Low)
Status (positive or negative)		Negative	Negative
Reversibility		Irreversible	Irreversible
Irreplaceable loss of resources?		Possible	Unlikely
Can impacts be mitigated?		Yes	-

Mitigation:

- » Place power lines underground where possible, unless it is practically impossible to do so due to ecological, geological or topographical considerations, and confirmed by appropriate independent specialists, as part of the walkthrough and micro-siting process.
- » Place any new overhead power lines adjacent to existing power line or linear infrastructure (e.g. roads and fence lines) where possible;
- » Any new overhead lines must avoid avifaunal no-go areas. Where this is practically impossible or ecologically undesirable, the valid reasons thereof must be discussed with the specialist, and the specialist must approve the section of line within any no-go area, as part of the walkthrough and micro-siting process. Should any overhead lines be located in avifaunal no-go areas, appropriate Bird Flight Dividers (BFD) marking devices must be used as referred to below.
- » Attach appropriate (i.e. as advised by an avifaunal specialist) marking devices (BFDs), which may include the need for nocturnal LED marking devices, on all spans of any new overhead power lines to increase visibility. The placement, number and model of the BFDs is to be advised by an avifaunal specialist prior to construction, and may include the need for some sections to be marked with solar powered LED devices, suitable to mitigate for collision prone species that may fly in the dark (e.g. flamingos, ducks, geese and cranes).
- » Develop and implement a carcass search programme for birds during the first two years of operation, in line with or exceeding the applicable monitoring guidelines. This program must include monitoring of overhead power lines.

*This impact was not rated by BioInsight (2016), with no clear explanation given for their ratings omission in the 2016 report. Their introduction during this amendment however was not regarded as being a result of the proposed turbine specification amendment requested through this application as confirmed by Arcus in 2019.

5.1.1.2. Electrocution

The potential impact of electrocution of birds resulting in mortality was not rated by BioInsight (2016). Electrocution of birds from electrical infrastructure including overhead lines and substation components is an important and well documented cause of bird mortality, especially for raptors and storks (APLIC 1994; van Rooyen and Ledger 1999). Electrocution may also occur within newly constructed substations. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Electrocutions are generally more likely for larger species whose wingspan is able to bridge the gap such as eagles or storks. A few large birds (such as Black Stork, African Fish-eagle, Verreaux's Eagle and Martial Eagle), susceptible to electrocution (particularly in the absence of safe and mitigated structures) occur in the area. Electrocution is also possible on electrical infrastructure within the substation particularly for species such as crows and owls.

Table 5.1.4: Impact Table for Electrocution – Operational Phase

Nature: Fatalities due to electrocution on power lines or within the substation.				
	Authorised		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation

Extent	NOT RATED*	2	1
Duration		5	5
Magnitude		6	4
Probability		4	1
Significance		52 (Medium)	10 (Low)
Status (positive or negative)		Negative	Negative
Reversibility		Irreversible	Irreversible
Irreplaceable loss of resources?		Possible	Unlikely
Can impacts be mitigated?		Yes	-
Mitigation: <ul style="list-style-type: none"> » <u>Construction of electrical infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities (i.e. no-go areas) where possible.</u> » <u>Place power lines underground where possible, unless it is practically impossible to do so due to ecological, geological or topographical considerations and confirmed by appropriate independent specialists.</u> » <u>Any new overhead power lines must be of a design that minimises electrocution risk by using adequately insulated 'bird friendly' structures, with clearances between live components of 1.8 m or greater and which provides a safe bird perch. A replica or 'mock up' of the exact pole structures (including bend point structures), or at least a 3D model simulation that specifically shows how the jumpers will be placed and insulated, must be examined and approved by the bird specialist in consultation with EWT.</u> 			

*This impact was not rated by BioInsight (2016), with no clear explanation given for their ratings omission in the 2016 report. Their introduction during this amendment however was not regarded as being a result of the proposed turbine specification amendment requested through this application as confirmed by Arcus in 2019.

5.1.1.2. Cumulative impacts

The mountainous areas south of Sutherland including around the Roggeveld and Komsberg Mountains, have attracted much focus from wind energy developers, and fall within a Renewable Energy Development Zone (REDZ). It is not surprising therefore that a number of wind energy applications (approximately 17) have been made within 50 km of the Gunstfontein WEF, in various stages of application or development. Included in these are three projects that already have preferred bidder status in the Department of Energy's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), and are due for imminent construction, namely Roggeveld Wind Farm (140 MW), Soetwater Wind Farm (140 MW) and Karusa Wind Farm (140 MW). These projects are situated south of Gunstfontein at distances of approximately 30 km, 10 km and 20 km respectively. BioInsight (2016) considered 10 developments in their cumulative assessment, including the Roggeveld, Soetwater and Karusa Wind Farms. It is noted that they rated the significance of cumulative impacts as Medium (60) without mitigation and Low (30) with mitigation. These are the same scores and ratings given to collisions with wind turbines for the Gunstfontein WEF alone, and a higher cumulative rating would be expected. Furthermore, there are now more applications in the vicinity of the Gunstfontein WEF, and there is now evidence of Verreux's Eagle being susceptible to turbine and/or overhead power line impacts in South Africa from several WEFs. The updated significance of the cumulative impacts is rated high without mitigation and medium with mitigation. As stated above, this updated rating is based on the fact that more projects are now proposed in the area than considered in the 2016 study, and not as a result of the amendments proposed.

Table 5.1.5: Updated Impact Assessment Table for Cumulative Impacts

Nature: Nature: Ratings for all impacts (i.e. turbine collisions, habitat destruction, disturbance and displacement, electrocution, collisions with power lines etc.)

	Authorised		Proposed Amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	2	1	4	3
Duration	5	5	5	5
Magnitude	8	4	9	6
Probability	4	3	5	4
Significance	60 (Medium)	30 (Low)	90 (High)	56 (Medium)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	Possible	Possible	Possible	Possible
Can impacts be mitigated?	Yes	-	Yes	-
Mitigation: <ul style="list-style-type: none"> » All site specific recommendations and mitigations given for each impact, for all components of each project must be adhered to. » Wherever possible, the project proponent should utilise the minimum number of turbines to meet the required MW output. » While site specific mitigations can be given for the Gunstfontein WEF (as detailed in this report), it is difficult in the context of this report for the specialist to provide mitigations for the other projects considered for cumulative assessment. It is unlikely that the project proponent would have the authority to implement recommendations on land portions beyond those effected by the Gunstfontein project. » Nonetheless, the specialists should still provide recommendations for the broader area, in the interest of ultimately reducing negative impacts. Therefore, it is recommended that the DEA follows up and ensures that all projects built in the region strictly adhere to all specialist recommendations, and that all final layouts are in line with the project's specific bird specialist's recommendations. » <u>Operational monitoring data (including that from the recommended operational programme for the Gunstfontein WEF) should be made available to appropriate agencies such as Bird Life SA and the Endangered Wildlife Trust, as well as avifaunal specialists through the BARESG, to promote more accurate and detailed cumulative assessments in the future.</u> 				

The specialist's confidence in the cumulative assessment above is medium to low. A detailed (and highly confident) significance rating of cumulative impacts would depend largely on knowledge unavailable at the time of writing such as:

- » The final turbine layouts of all facilities;
- » If turbine placement was informed by adequate pre-construction monitoring and nest surveys (in line with applicable guidelines) on these facilities, and to what extent these layouts were in line with specialist recommendations;
- » The density of the key species (e.g. Verreaux's Eagle, Martial Eagle, Ludwig's Bustard, Black Stork) populations on the facilities (i.e. the regional population of these species), and their behaviour on the different sites.
- » The species richness, abundance and behaviour of the avifaunal community within and around the various WEFs;
- » Whether or not mitigation measures were recommended and implemented and are successful; and
- » The number of facilities that will actually be constructed and the resultant mortality of birds at wind farms in the Sutherland area.

Conducting such a detailed cumulative impact assessment of all of these facilities together on a regional scale is beyond the scope of this specialist study and would need the input of all proponents and specialists working on the above mentioned projects. Such an assessment is best undertaken and commissioned by an appropriate regional or national agency/agencies in the context of strategic planning. In the scope of this study it is therefore difficult to say with medium-high or high confidence at this stage what the cumulative impact of all the proposed developments will be on birds. The extent of actual impacts on the region's avifauna will only become known once a few wind farms are developed in the Sutherland region and operational data becomes available, and regional population viability analysis have been conducted for key species. It must be noted that many of the developments considered may never be constructed. If all proposed projects that are built implement appropriate mitigation measures and adaptive management of impacts as well as post-construction monitoring programmes (in line with applicable guidelines) and share the information gained from these, then the overall significance of cumulative impacts may be reduced.

Additional mitigation measures:

All mitigations given in tables 3- 5 above must be implemented by the developer, as well as those listed below. While Arcus was in general agreement with the mitigations provided by BioInsight (2016), some did not provide sufficient detail. Here follows relevant BioInsight (2016) mitigations, additional measures recommended as well as updated more relevant mitigations, which have all been incorporated into the updated EMP and included in this amendment application:

- » High traffic areas and buildings such as offices, batching plants, storage areas etc. should where possible be situated in areas that are already disturbed and existing roads and farm tracks should be used where possible.
- » The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths.
- » Environmental Control Officer (ECO) to oversee activities and ensure that the site-specific environmental management plan (EMP) is implemented and enforced.
- » Prior to construction, an avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded.
- » Should priority species nests be located, a protective buffer may be applied, within which construction activities may need to be restricted during the breeding season for that species.
- » Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the EMP.
- » The construction Phase ECO, and the on-site Environmental Manager (or Environmental Site Officer as the case may be) should have sufficient experience and knowledge of local avifauna to identify red data and priority bird species, as well as their nests. The EO and Environmental Manager must then, during audits/site visits, make a concerted effort to look out for such breeding activities of red data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify red data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any nests or breeding locations for these species are located, the avifaunal specialist is to be contacted for further instruction.
- » Construction and operation phase bird monitoring, in line with applicable guidelines, must be implemented and must include monitoring of all raptor nest sites for breeding success.

- » Lighting on turbines to be of an intermittent and coloured nature rather than constant white light to reduce the possible impact on the movement patterns of nocturnal migratory species.
- » As the pre-construction monitoring was completed in November 2014, the data set is now over four years old. The current best practise guidelines (Jenkins et al. 2015) indicate that additional monitoring may be advisable if there is a significant gap between the original assessment and the commencement of construction, to assess whether there have been any changes in species abundance, movements and/or habitat use in the interim. Furthermore, the Birdlife South Africa (BLSA) Verreaux's Eagle guidelines ('VE guidelines') are now applicable to this site. The main implications of this are that they recommend that VPs be monitored for 18 hours per season (i.e. 72 hours per year) and that a second year of monitoring is recommended should the site pose a significant risk to Verreaux's Eagle and should turbines be proposed in potentially sensitive areas. We therefore recommend that a pre-construction habitat survey and cliff-nest search (during the eagle breeding season) be undertaken to confirm the likelihood that there has been any change in key species abundance, movements and/or habitat use since the original assessment. This fieldwork can be done after the amendment decision, however the results of this fieldwork must inform the final turbine layout. The results of this fieldwork must also inform whether any additional long-term pre-construction monitoring is warranted to update the avifaunal baseline for operational comparison, and must inform the scope and duration of the monitoring (if required). Updated data sets will allow for more meaningful comparison with operational monitoring data, and the additional monitoring (if required) must also be used to advise the final micro-siting of the layout of the WEF where applicable, prior to any construction taking place.

5.1.2. Conclusion

Cumulative impacts remain a concern for the broader Sutherland area, with 17 proposed WEF projects in the region. If a number of these projects are built, it is likely that the cumulative impact of turbine collision will be medium to high, particularly on red data eagle species such as Verreaux's Eagle and Martial Eagle, and possibly also on Ludwig's Bustard.

However, the extent of actual cumulative impacts on the region's avifauna will only become known once a few wind farms are developed in the Sutherland area and operational data becomes available, and regional population viability analysis have been conducted for key species. All mitigation measures must be incorporated into the updated EMPr and implemented. This includes a thorough operation-phase bird monitoring programme (in line with the guidelines applicable at the start of the operation phase/monitoring programme) that must be implemented, and should start no later than the commercial operation date of the facility. This programme should feed back into an adaptive management strategy, which could include the need to shut down or curtail certain turbines should unacceptably high impacts be found.

Two potential impacts not rated by BioInsight (2016) were identified, i.e. electrocution and collision with internal MV overhead power lines, both of which now have a significance rating of **Low** with mitigation. Following consideration of all new applicable information, including the updated layout and proposed project amendments, the impact of collision with turbines and cumulative impacts were both re-rated as being of **Medium** significance with mitigation. These updated rating are based on additional information being available to that considered in the 2016 study, and not as a result of the amendments proposed. As a result, the amendment is supported from an avifaunal perspective.

5.2. Impacts on bats

As part of the initial EIA, pre-construction bat monitoring was conducted over a 12 month period. During the pre-construction bat monitoring, microphones were placed at 7 m and 80 m on the met mast. Five microphones were placed in the WEF site at 10 m and one outside the boundaries of the WEF area for control purposes at 10 m. Based on the pre-construction monitoring data, bat activity at the site is considered low, with an average below 2 passes per hour. The activity data across all the detectors combined showed higher activity in summer, spring and autumn and almost no activity during winter. Most bat activity was detected at ground level and only 36 % of the overall bat activity was detected at 80 m. In addition, there was a clear influence of specific microhabitat features on bat activity. For example, greater activity was recorded in a water line with riverine vegetation.

The exact turbine dimensions being applied for are up to 150 m for the hub height, and up to 180 m for the rotor diameter. Within this range, 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. To determine the buffer distances required to ensure that no turbine blades enter the bat buffers, the following formula should be used (Mitchell-Jones and Carlin 2014):

$$b = \sqrt{(bd + bl)^2 - (hh - fh)^2}$$

Where: bd = buffer distance, bl = blade length, hh = hub height and fh = feature height (zero in this instance). "b" is the distance required between the base of the turbine and the edge of the buffer area, to ensure no blade overhang into the buffer area.

The original assessment stipulated a buffer of 500 m for all confirmed bat roosts, permanent water bodies, water lines where high activity was recorded, and around the upper ridge line. A 200 m buffer was stipulated for all potential roosting sites, permanent water bodies and water lines (unless high activity was recorded), temporary water bodies, and linear features with potential to be used by bats for commuting. In addition, the EA stated that a 500 m buffer must be applied for all potential and confirmed bat roosting sites. While not stated in the pre-construction bat monitoring report (or the EA), all of these buffers need to be to blade tip according to the best practise guidelines. Therefore, the distance between these features and the turbine base (b) will need to be calculated using the Mitchell-Jones and Carlin equation once the turbine size is selected. Any turbines within bat buffers will need to be relocated. This must be considered and addressed during the detailed design phase. The delineated bat buffers are no-go areas for turbines only, and turbines (including turbine blades) must not be placed in these buffer areas. It should be noted that these bat buffers apply only to turbines and not associated infrastructure such as roads and powerlines.

It is unclear which aquatic GIS dataset(s) Bioinsight used in their determination of the buffers. There are several instances where it appears as if the buffer distances were measured from the centre of the aquatic feature, and not the edge which is best practise, or available data were not used (Plate 1). This results in the current⁹ buffers providing inadequate protection against potential impacts as a smaller area than required has been buffered. Arcus have re-created the sensitivity map using the National Geo-Spatial Information Topographic dataset (2015), and the National Freshwater Ecosystems Priority Areas database (2011). Updated sensitivity map (Figure 5.2) shows that several turbines border the bat buffers and their blades may

⁹ The "current" buffers referred to here, are the original buffers delineated by Bioinsight as part of the original EIA (2016)

intrude across bat sensitive areas, depending on the turbine hub-height and rotor combination. The Mitchell-Jones and Carlin equation must be used to adjust the positioning of these turbines to the appropriate distance, during the detailed design phase and based on the specifications of the final turbine.

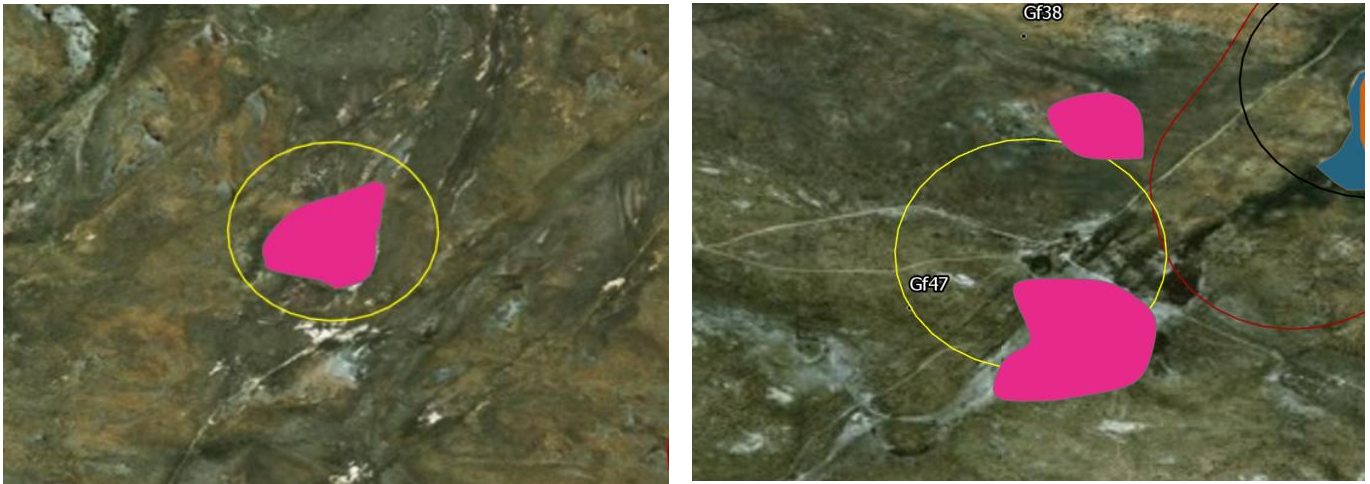


Plate 1: Examples of bat buffers (yellow rings) of aquatic features. The pink polygons are NFEPA wetlands according to the 2011 NFEPA database. On the left, the buffer is approximately 50 m from the wetland edge instead of 200 m. On the right, some NFEPA wetlands have not been buffered. The buffer areas have been updated appropriately, and the amended layout adheres to the updated buffers

No bat activity data are available in the area between the heights of 10 m and 80 m or over 80 m, because activity at these heights was not monitored. Despite the available pre-construction monitoring data showing that bat activity at 80 m is low, it would be preferential to maximise the distance between the ground and blade tips by using turbines with the shortest possible blades and the highest possible hub height. This would reduce the number of species potentially impacted upon by turbine blades during the operation phase. It would also be preferential to use shorter blades so that they don't intrude into higher airspaces and in so doing reduces the potential impact to high flying species such as free-tailed bats. Despite the low activity at height, increasing evidence suggests that bats actively forage around wind turbines (Cryan et al. 2014; Foo et al. 2017) so the installation of turbines in the landscape may alter bat activity patterns, either by increasing activity at height and/or increasing the diversity of species making use of higher airspaces.



5.2.1. Comparative Assessment

The potential collision impact to bats is currently rated as medium before, and low after mitigation with adherence to the sensitivity buffers being the major mitigation measure proposed. No turbines from the layout using the current turbine specifications are located in these sensitivity buffers. The significance of the impact after the proposed change would be dependent on the size of the turbines chosen. The assessments here (Table 5.3 and Table 5.4) is based on the scenario where turbines of the maximum dimensions being applied for are used. This would increase risk to high flying species such as free-tailed bats because the turbines blades would extend higher into the air.

Table 5.2.1: Impact Assessment Table for Increasing Turbine Size at the Gunstfontein WEF

Nature: Mortality of bats due to collision with turbine blades or barotrauma caused by turbine operation.				
	Authorised (2016)		Proposed amendment	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)	Moderate (7)	Low (4)
Probability	Highly probable (4)	Probable (3)	Highly probable (4)	Probable (3)
Significance	48 (Medium)	30 (Low)	52 (Medium)	30 (Low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Irreversible	Irreversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes		Yes	
Mitigation measures » All currently proposed mitigation measures proposed by Bioinsight (2015), Savannah (2016) and in the EA should be adhered to. This includes adhering to the updated sensitivity map (Figure 5.2) which may require micro-siting turbines if their blades will intrude into these buffers. These buffers are regarded as no-go areas for turbines only, and other infrastructure (roads, cables etc) are permissible. » A bat specialist must consider the final turbine layout before micro-siting and assess whether all turbines are appropriately sited such that their blades do not intrude into bat buffers. » All mitigation measures to protect bats proposed in the EMPr (Savannah 2016) must be adhered to.				
Additional mitigation measures » The impacts presented can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point).				
To be included in the EA: a minimum buffer to blade tip for all bat buffer zones is required.				
Cumulative Impact: see Table 5.2.2				
Residual Risks: Residual impacts may still remain even if the moderate and high sensitivity buffers are adhered to and by using turbines of an appropriate size to limit bat fatalities. Bat fatalities are a widely occurring phenomenon having been reported across Europe, North America, Central America, Brazil, India, Australia and South Africa (Baerwald and Barclay 2011; Barros et al. 2015; Hein and Schirmacher 2016; Kumar et al. 2013; Rodríguez-Durán and Feliciano-Robles 2015; Rydell et al. 2010). Further, evidence has shown that pre-construction monitoring data may not be able to adequately predict post-construction fatality risk (Hein et al. 2013), and that bats actively investigate and forge around turbines (Cryan et al. 2014; Foo et al. 2017). This suggests that there may still be fatality impacts. Residual impacts can likely be reduced to very low if curtailment is used when appropriate and this has been shown to be one of the most effective mitigation measures (Arnett and May 2016).				

Table 5.2.2: Cumulative Impact Assessment

<p>Nature: Cumulative mortality of bats due to collision with turbine blades or barotrauma caused by turbine operation across multiple wind energy facilities.</p> <p>The cumulative impacts will depend on the number of wind energy facilities in the region, the species involved, the levels of bat mortality and mitigation measures implemented at each wind energy facility. Bats reproduce slowly and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.</p> <p>There are approximately 17 wind energy facilities planned within a 50 km radius of the Gunstfontein WEF. The assessment below assumes all 17 facilities implement appropriate mitigation measures.</p>				
	Authorised (Bioinsight 2015)		Proposed Amendment	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Extent	Regional (2)	Local (1)	Regional (2)	Regional (2)
Duration	Permanent (5)	Permanent (5)	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)	Definite (5)	Probable (3)
Significance	52 (Medium)	30 (Low)	70 (High)	39 (Medium)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Irreversible	Irreversible	Low	Low
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes		Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> » <u>All currently proposed mitigation measures proposed by Bioinsight (2015), Savannah (2016) and in the EA should be adhered to. This includes adhering to the updated sensitivity map (Figure 5.2) which may require micro-siting turbines if their blades will intrude into these buffers. The buffers in the updated sensitivity map are regarded as no-go areas for turbines only.</u> » A bat specialist must consider the final turbine layout and assess whether all turbines are appropriately sited such that their blades do not intrude into bat buffers. » All mitigation measures to protect bats proposed in the EMPr (Savannah 2016) must be adhered to. <p>Additional mitigation measures</p> <ul style="list-style-type: none"> » <u>The impacts presented can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point).</u> <p>Residual Impacts: Residual impacts may still remain even if the moderate and high sensitivity buffers are adhered to and by using turbines of an appropriate size to limit bat fatalities. Bat fatalities are a widely occurring phenomenon having been reported across Europe, North America, Central America, Brazil, India, Australia and South Africa (Baerwald and Barclay 2011; Barros et al. 2015; Hein and Schirmacher 2016; Hull and Cawthen 2012; Kumar et al. 2013; Rodríguez-Durán and Feliciano-Robles 2015; Rydell et al. 2010). Further, evidence has shown that pre-construction monitoring data may not be able to adequately predict post-construction fatality risk (Hein et al. 2013), and that bats actively investigate and forge around turbines (Cryan et al. 2014; Foo et al. 2017). This suggests that there may still be fatality impacts. Residual impacts can likely be reduced to very low if curtailment is used when appropriate as this has been shown to be one of the most effective mitigation measures (Arnett and May 2016).</p>				

5.2.2. Conclusion

Compared to the previous impact assessment undertaken by BioInsight in 2015, it is likely that the amendments to the turbine dimensions proposed for the Gunstfontein WEF would (without mitigation) slightly

increase mortality impacts to bats. This is primarily because the blades will extend higher into the air and place bats using open spaces for commuting and foraging at greater risk. Based on bat activity levels as assessed from pre-construction monitoring data, impacts to bats are likely to be of a medium significance before mitigation and low after mitigation. Cumulative mortality impacts after mitigation would also increase, due to the increased number of wind energy facilities that are now proposed in the region. Cumulative impacts are likely to be of a high significance before mitigation and medium after mitigation. The magnitude of bat impacts may differ based on the exact dimensions of the turbines chosen. Turbines with longer blades that reach lower to the ground would likely have a greater impact by putting a greater diversity of species, and greater magnitude of individual bats, at risk. Longer blades will also extend higher into the air and place open air species such as free-tailed bats at greater risk. Therefore, it is recommended that the ground clearance is maximised and the tip height is minimised (i.e. the distance between the ground and the blade tip at its highest point) as much as possible.

The key initial mitigation measure that should be implemented at the Gunstfontein WEF would be adherence to the updated sensitivity map (Figure 5.2). The exact combination of turbine dimensions that will be selected is unknown but depending on the size of the turbines selected, turbines may need to be micro-sited to prevent the blade tips intruding into bat buffers as several turbines border bat sensitive areas (Figure 5.2). These buffers are regarded as no-go areas for turbines only, and other infrastructure (roads, cables etc) are permissible. The final layout will therefore need to be assessed by a bat specialist to ensure this is adhered to once the turbines are chosen. This can be done during the pre-construction specialist walk-through and micro-siting process and must include the specialist mapping the final layout and determining if all turbine blades are outside bat buffers. Any turbine micro-siting will need to be done before construction. Residual impacts that occur will need to be evaluated during the operation phase using carcass searches to monitor actual impacts. As a result, the amendment is supported from an bats perspective.

5.3. Ecological Impact

The revised layout for the amendment and the revised sensitivity mapping as produced for the amendment is provided in Figure 5.3. The revised sensitivity mapping is based on the original ecological study by Todd (2016), the review and field assessment of MacDonald (2017), as well as the specific field assessment that was conducted for the current assessment on the 16th of January 2019 by Todd. During the field assessment for the current study, those areas that had previously been identified as high or very high sensitivity¹⁰ were checked and where necessary refined in the field and specific note was taken of the presence of species or habitats of conservation concern in these areas. Where appropriate, the sensitivity of these areas was adjusted upwards, downwards or kept the same as necessary. This information was provided to the developer in the form of the revised sensitivity map, which was then used to inform the layout for the amendment. In addition to the sensitivity mapping, to ensure that the impacts associated with the project remain within acceptable bounds, limits of acceptable change associated with each sensitivity class were provided to the developer. This provides a guide for the developer in terms of ensuring that the spatial distribution of impact associated with the final layout is appropriate with respect to the sensitivity of the site. In addition, it provides a benchmark against which impacts can be assessed and represents an explicit threshold that when exceeded indicates that potentially unacceptable impacts may have occurred. The

¹⁰ The areas that were mapped as high and very high sensitivity by Todd (2016) were those areas that had the potential to contain pockets of sensitive vegetation or species of special concern. These areas were subsequently revisited, and the pockets of sensitivity on site were delineated at a finer scale based on further site visits by Macdonald (2017) and Todd (2019).

updated (including revised turbine positions and additional access road)¹¹ turbine layout is presented below in Figure 5.3, along with the revised sensitivity assessment. The limits of acceptable change provided to the developer are listed in Table 5.3.1.

The final development footprint in relation to the above limits of change are listed below in Table 5.3.2. The extent of the development within each sensitivity class is well-within the specified limits of acceptable change and as such, there are no fatal flaws associated with the amended layout. As there are also no turbines or other development features within the mapped no-go areas, no specific recommendations are made with regards to relocating any of the turbines or other features of the layout. As such, the final layout as provided for the amendment is considered acceptable with regards to the identified sensitive features and general sensitivity mapping at the site.

Table 5.3.1. Limits of acceptable change provided to the developer for the assessment, to provide guidance on the distribution of impact within the different sensitivity classes as indicated. The total extent and the final footprint within each class is indicated in Table 5.3.2.

Sensitivity	Acceptable Loss	Description
Low	5%	Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.
Medium	2.5%	Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impacts such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
High	0.25%	Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
Very High/No-Go	Zero Loss	Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible. Where these features need to be traversed, existing roads or disturbance footprints should be used.

Table 5.3.2. The final development footprint within the different sensitivity classes as indicated. This includes the footprint of the turbines, hard stands, access roads and underground cabling.

Sensitivity	Acceptable Loss	Mapped Extent (ha)	Tolerance (ha)	No. Turbines	Development Footprint (ha)
Low	5%	2 561	128	29	38.49
Medium	2.50%	848	21.2	17	18.35
High	0.25%	1 272	3.18	0	2.88
Very High/No-Go	Zero Loss	800	0	0	0.00

¹¹ During the original EIA process, 68 turbines were assessed but only 46 of these were approved in the Environmental Authorization. This amendment application therefore only assessed the amended layout that consists of 46 turbines.

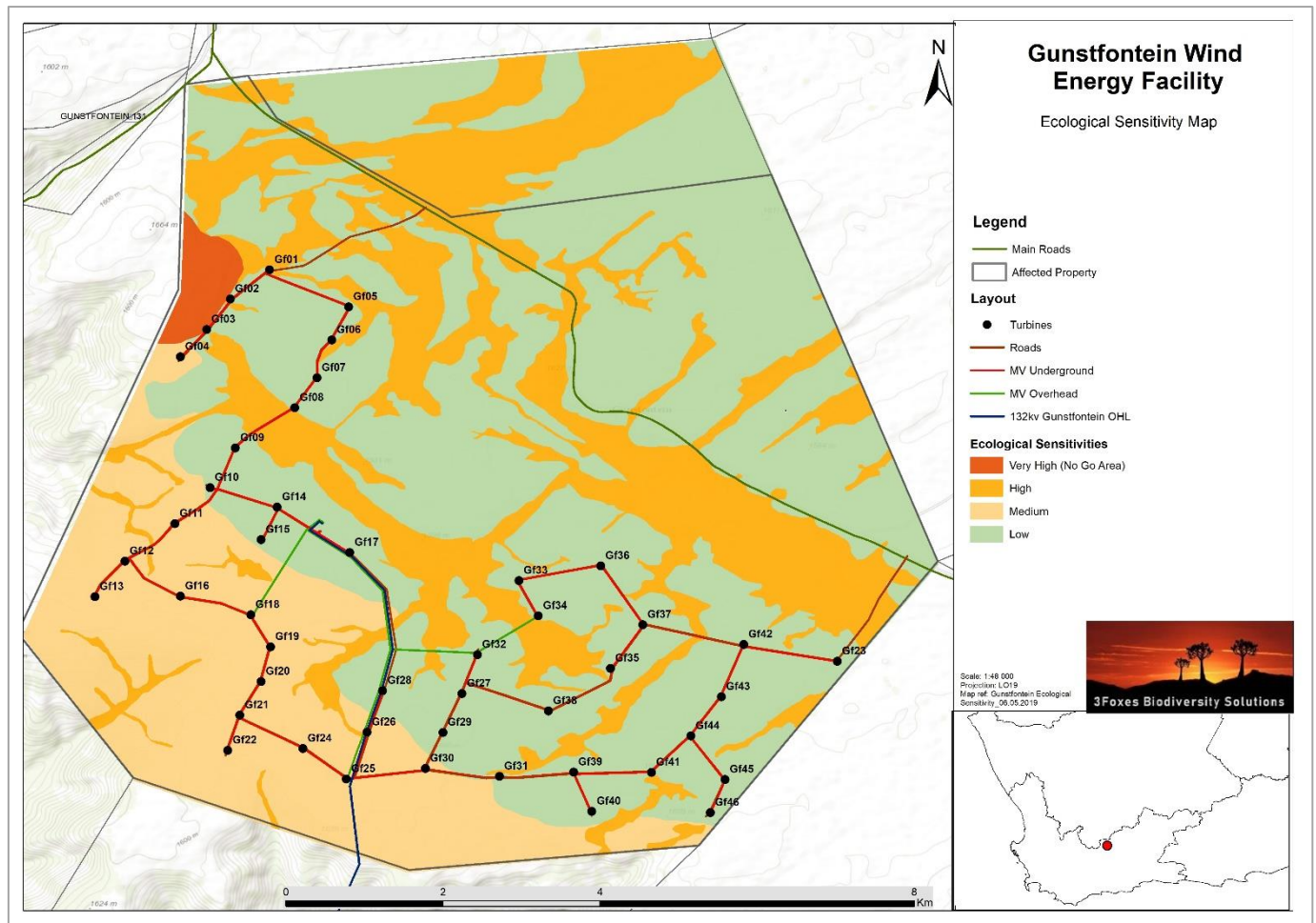


Figure 5.3. Revised and refined sensitivity map of the Gunstfontein WEF site, depicting the amended layout of the facility. No parts of the development are within the no-go area.

In terms of impact of the development on CBAs, no parts of the original layout were within a CBA, although the whole footprint was within an ESA. As a result, the original assessed impacts on CBAs and broad-scale processes was assessed as being of Low significance after mitigation. Similarly no parts of the amended layout is within the same CBAs as defined under the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008). The CBA map for the Northern Cape has however been released in the intervening period between the original assessment and the current amendment. Under the more recent Northern Cape CBA map, the whole footprint is within a CBA 1 or a CBA 2 (Figure 5.4). If the application was for a new development, this could bring the suitability of the development into question. However, as this is an amendment, the current assessment is in relation to the original assessment and the baseline information as available at that time. Under this scenario, there are no significant differences in impact on CBAs and broad-scale processes between the original layout and the amended layout.

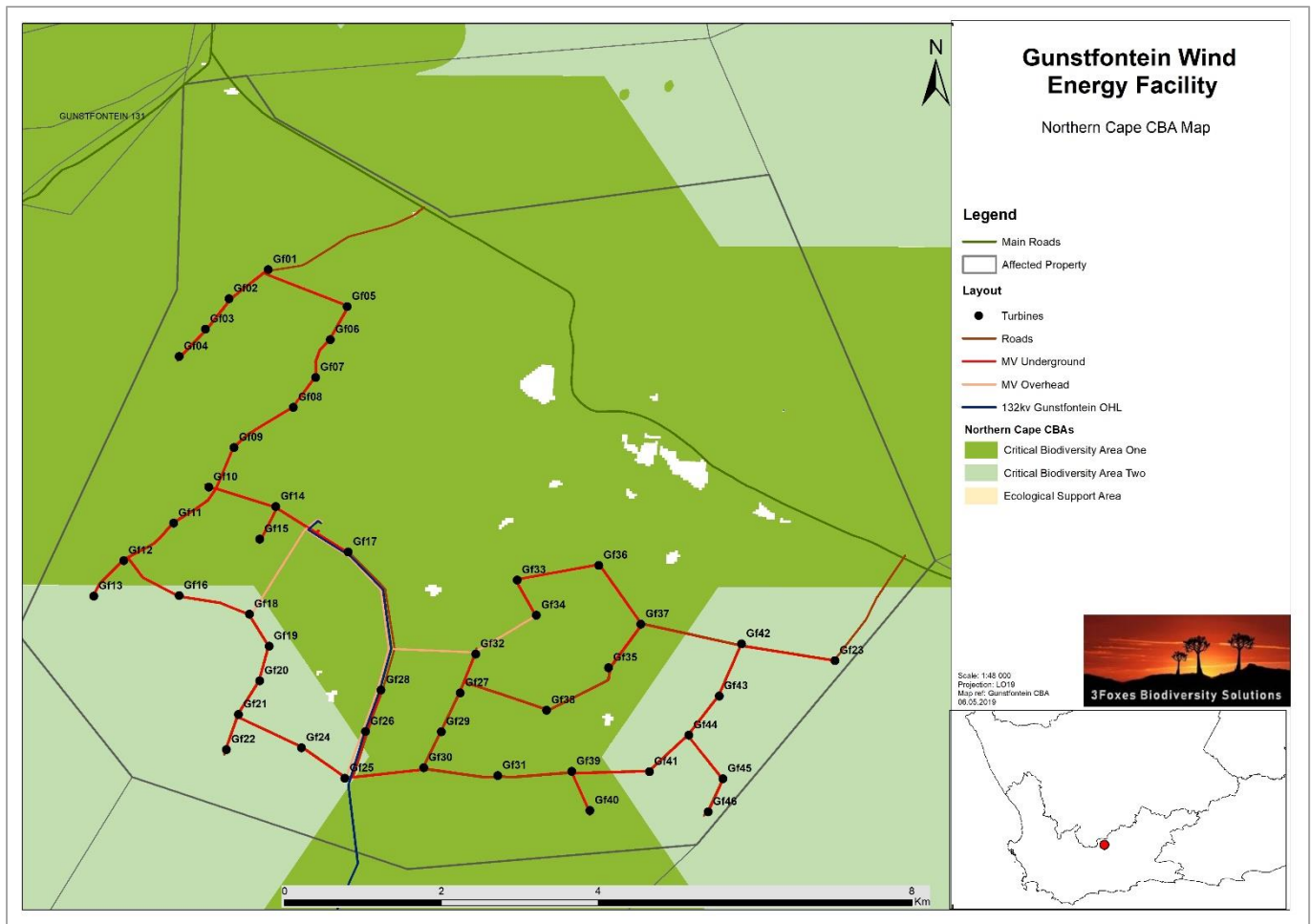


Figure 5.4. The current turbine layout in relation to the Northern Cape CBA map which has superseded the Namakwa District CBA map which was used for the original assessment.

5.3.1. Comparative assessment and advantages and disadvantages

The major change to the development in terms of the current amendment and which could have potentially significant ecological impacts, is the increase in turbine size as this could result in an increase in the footprint of each turbine. However, this would occur simultaneously with a decrease in the number of turbines required from that assessed in the EIA. The change in turbine size is not likely to result in significant additional impact as any increase from the original assessed turbine size would be simultaneously associated with a decrease in turbine number, thereby largely ameliorating the increased individual footprint. In terms of the roads, the total extent of the road footprint is similar to the original assessed layout and as such there is not likely to be any change in impact associated with the roads as the amount of footprint within the high sensitivity parts of the site has not increased. Overall, no upward or downward adjustment of impacts is justified based on the changes to the layout (Table 5.3.3). As such, the amendment is supported from an ecological perspective as it would not increase or change any impacts associated with the development. As the amended layout and development proposal are similar to the original assessed impacts, no specific additional mitigation and avoidance are recommended for inclusion in the amendment.

Table 5.3.3. The original summary assessment as assessed in the EIA and the impacts of the amended layout as assessed here. No changes in impact are seen as a result of the amendment.

Phase & Impact	Original Assessment		Amendment Layout	
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
Planning & Construction Phase Impacts				
Impacts on vegetation and listed plant species	Medium	Medium	Medium	Medium
Faunal impacts due to construction activities	Medium	Medium	Medium	Medium
Increased erosion risk during construction	Low	Low	Low	Low
Operational Phase Impacts				
Faunal impacts due to operational activities	Medium	Low	Medium	Low
Increased alien plant invasion risk	Medium	Low	Medium	Low
Increased erosion risk during operation	Medium	Low	Medium	Low
Decommissioning				
Faunal impacts due to decommissioning activities	Medium	Low	Medium	Low
Increased alien plant invasion risk	Medium	Low	Medium	Low
Increased erosion risk during decommissioning	Low	Low	Low	Low
Cumulative Impacts				
Impacts on broad-scale ecological processes	Medium	Low	Medium	Low

5.3.2. Conclusion

- » An additional site visit was carried out in January 2019 specifically to inform the amendment. This was used to verify the mapped features on-site as well as confirm that the revised positions of the turbines are acceptable from an ecological perspective. In addition to this, limits of acceptable change for each sensitivity category were provided to the developer to ensure that the layout was within acceptable limits of change. The extent of the development within each sensitivity class are well-within the specified limits of acceptable change and as such, there are no fatal flaws associated with the amended layout.
- » As there are no turbines or other development features within the mapped no-go areas, no specific recommendations are made with regards to relocating any of the turbines or other features of the layout. As such, the final layout as provided for the amendment is considered acceptable with regards to the identified sensitive features and general sensitivity mapping at the site.
- » The findings of this statement are contingent of the layout as provided for the assessment. There are a variety of high sensitivity areas and features at the site, which are currently outside of the development footprint or which have acceptable levels of impact, but which could be impacted by any changes to the road or turbine layout. As such any further changes to the road or turbine positions should be checked by the specialist to ensure that sensitive features are avoided.
- » Should the development proceed to construction, the final development footprint should be subject to a preconstruction walk-through 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.

- » The Gunstfontein Wind Farm Amended layout is well supported in terms of terrestrial ecology impacts. Overall the impact of the amended layout on fauna and flora would be the same as the authorized layout and there are no fatal flaws or critical issues associated with the proposed changes. As a result, the amendment is supported from an ecological perspective as it will not result in an increase in the significance in any of the assessed ecological impacts.

5.4. Impacts on heritage

Archaeology

In the original heritage assessment undertaken by Van der Walt (2016) 8 sites of heritage significance were identified. These sites have been mapped in Figures 5. 5a to 5.5e. In addition, these are tabled below with impacts as per the previous layout and new impacts (which are underlined to illustrate the difference between old and new impacts):

Site No:	Grading	Type	2016 Impacts and mitigation (van der Walt 2016)	2019 Impacts and mitigation
129285	Grade IIIb	Rock Art	No impact anticipated	No impact anticipated A 60m no-go buffer must be implemented around the sites and no impact is permitted
129286	Grade IIIb	Fort	No impact anticipated	Potential impact from overhead powerline between GF04 and GF09, however no impact on the ground is anticipated. ¹² A 60m no-go buffer must be implemented around the sites and no impact is permitted.
129287	Grade IIIc	Fort	No impact anticipated	Potential impact from overhead powerline between GF04 and GF09, however no impact on the ground is anticipated. ¹³ A 60m no-go buffer must be implemented around the sites and no impact is permitted.
129288	Grade IIIc	Stone Cairn (possible grave)	No impact anticipated	No impact anticipated. This site must be demarcated and fenced off with a perimeter buffer zone of 60m
129289	Grade IIIa	Fort	Impact from tower 14 and access road The sites should be preserved and demarcated as a no-go area	Impact from GF10 and access road A 60m no-go buffer must be implemented around the sites and no impact is permitted
129290	Grade IIIc	Ruin	No impact anticipated	No impact anticipated A 60m no-go buffer must be implemented around the sites and no impact is permitted

¹² Note: based on the recommendation of the specialist, the overhead MV between GF04 and GF09 was subsequently removed from the updated site layout plan presented in this amendment report

Site No:	Grading	Type	2016 Impacts and mitigation (van der Walt 2016)	2019 Impacts and mitigation
129291	Grade IIIb	Fort	No impact anticipated	No impact anticipated A 60m no-go buffer must be implemented around the sites and no impact is permitted
129292	Grade IIIb	Fort	No impact anticipated	No impact anticipated A 60m no-go buffer must be implemented around the sites and no impact is permitted

Note that the 60m buffer recommended by the specialist has been adhered to in the amended layout, and no turbines or infrastructure are proposed within 60m of the identified heritage resources.

In addition, concern was noted regarding the visual impact of the proposed development on the Verlatenkloof Pass. In their comment dated 20 June 2018, SAHRA required that a no-go buffer of 1.6km be implemented around the Verlatenkloof Pass, and that no turbines should be placed within 1.6km of the pass. The new proposed layout complies with this requirement and all turbines are proposed to be located more than 2km from the Verlatenkloof Pass.

As such, the proposed changes to the EA and site layout will **not** increase the significance of impacts to archaeological and built environment heritage resources originally identified in the EIA report or lead to any additional impacts

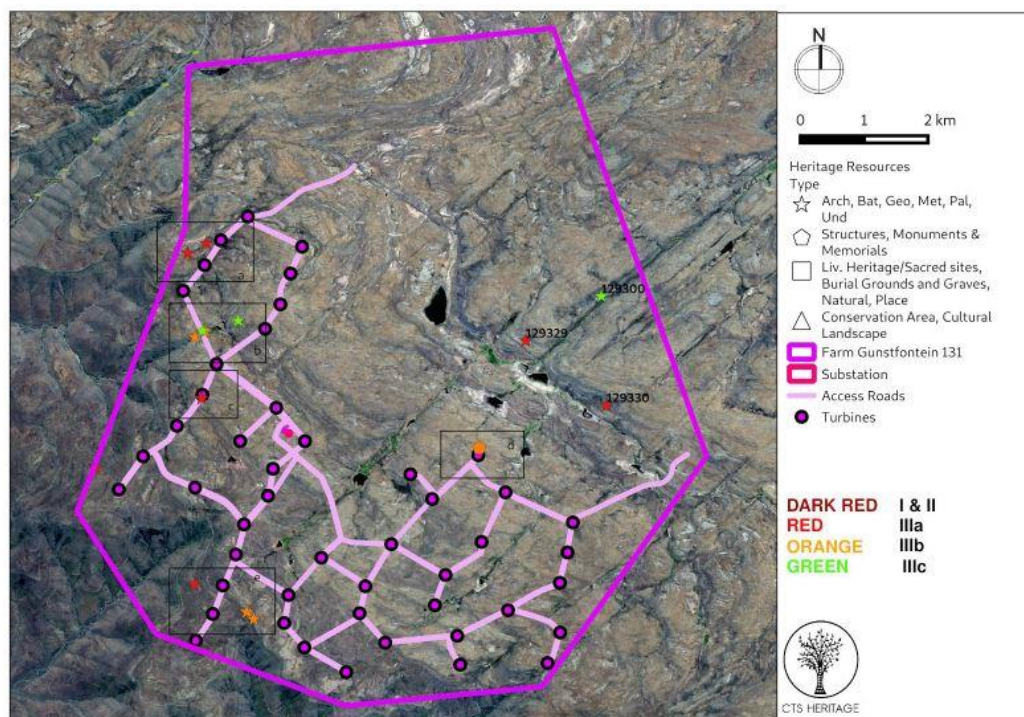


Figure 5.5. Heritage Resources Map. Heritage Resources previously identified within the study area, with SAHRIS Site IDs indicated in the insets below. Please See Appendix 4 for full description of heritage resource types.



Figure 5.51a: Heritage Resources Map.

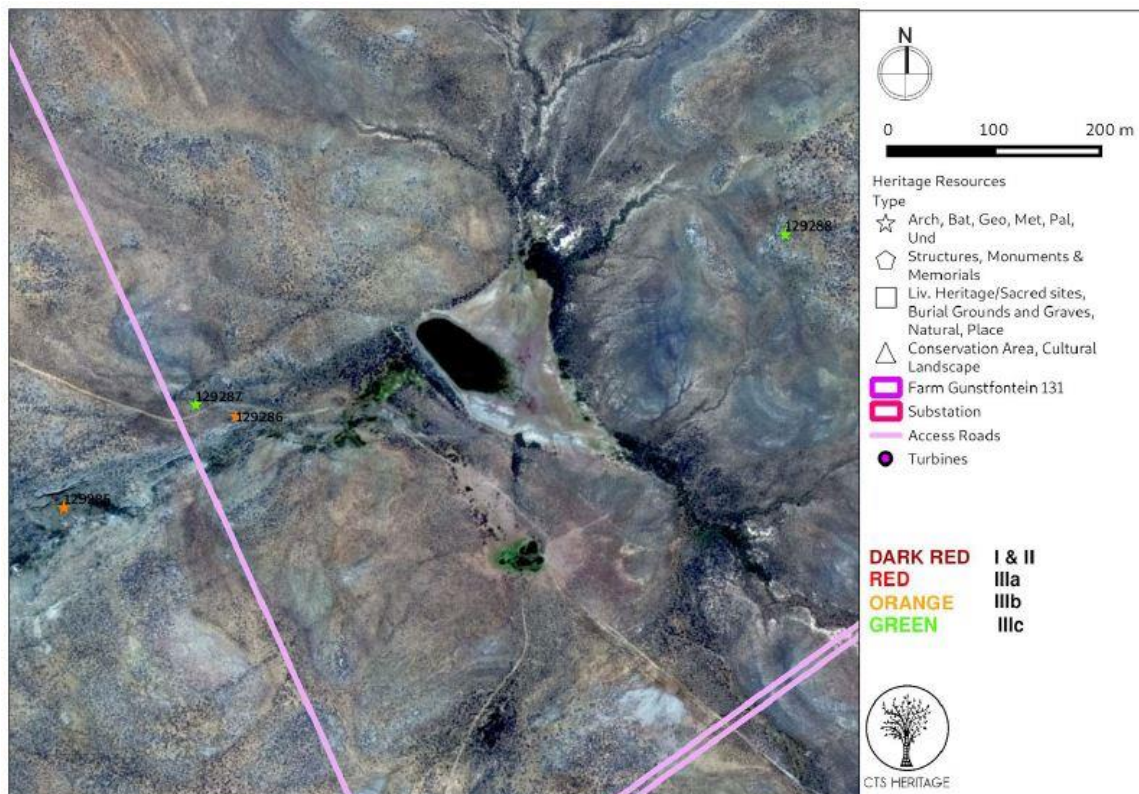
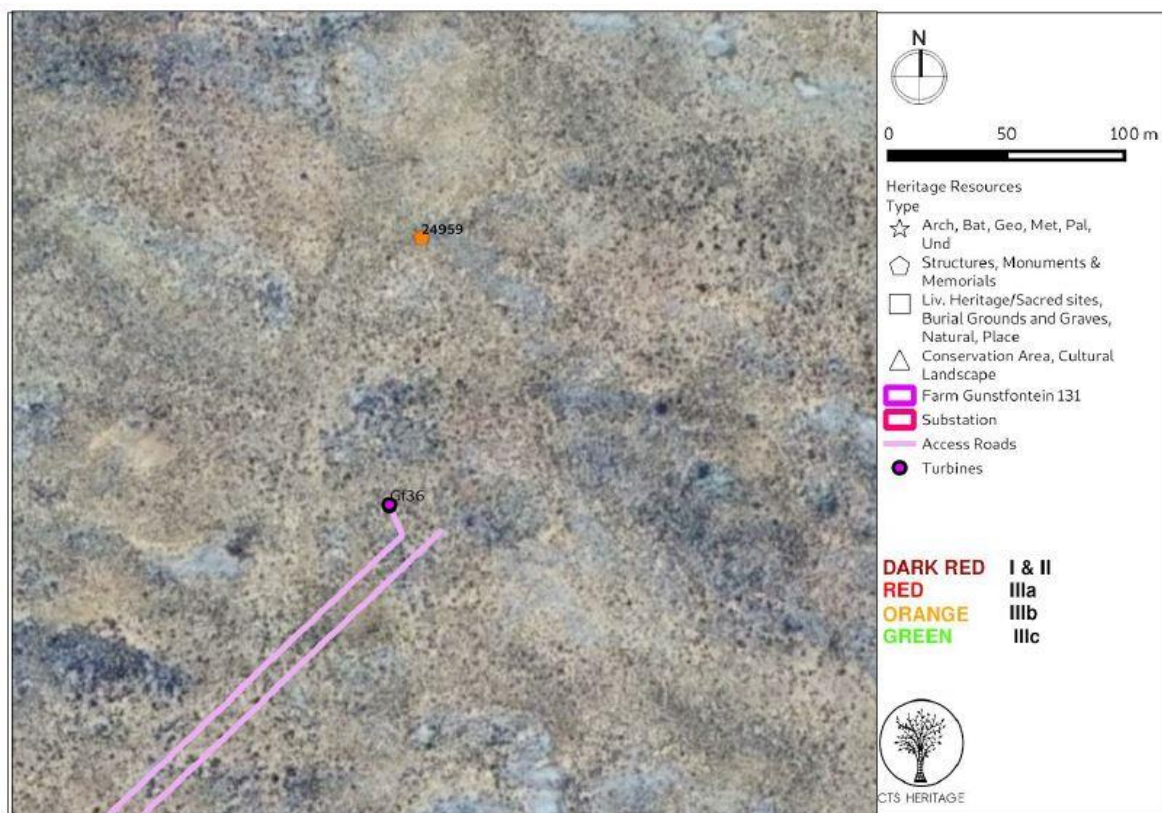


Figure 5.51b: Heritage Resources Map. (note that the MV line between Gf04 & Gf09 (labelled here as an “Access Road”, running from north-west to south-east) was subsequently removed from the updated layout).



Figure 5.51c: Heritage Resources Map. ¹³



¹³ The layout was revised to ensure a 60m buffer

Figure 5.51d. Heritage Resources Map.



Figure 5.5.1.e. Heritage Resources Map.

Palaeontology

Almond (2015) conducted a detailed palaeontological assessment for the proposed development and concluded that "the Lower Beaufort Group bedrocks within the Gunstfontein WEF study area are generally of low palaeontological sensitivity, and this also applies to the overlying late Caenozoic superficial sediments. Construction of the proposed Gunstfontein WEF is unlikely to entail significant impacts on local heritage resources. Due to the general scarcity of well-preserved fossil remains as well as the extensive superficial sediment cover observed within the study area, the overall impact significance of the construction phase of the proposed Gunstfontein WEF is assessed as **low**."

Almond (2015) noted that 5 uranium core occurrences had previously been identified on Gunstfontein Farm 131 (SAHRIS Site ID 129326 to 129330). Almond (2015) notes that these uranium occurrences may well be associated with fossil plant material. In addition, Almond (2015) identified a site that features concentrations of woody plant fossils and koffiekliip (SAHRIS Site ID 129325). Both the uranium sites and the plant fossil site have been mapped in Figures 3a to 3e. Almond (2015) recommends that a 30m no-go buffer be implemented around both the uranium sites (SAHRIS Site ID 129326 to 129330) and the plant fossil site (SAHRIS Site ID 129325). SAHRA recommended that this buffer be enlarged to 60m as per their comments dated 10 March 2016 and 20 June 2016. In the new layout that is currently proposed, all infrastructure is located more than 100m away from the identified uranium anomalies and plant fossil site (see Figures 5.6.2.a and 5.6.2 b)

As such, the proposed changes to the EA and site layout will **not** increase the significance of impacts to palaeontological heritage resources originally identified in the EIA report or lead to any additional impacts.



Figure 5.6.2.a. Palaeo-sensitivity Map: Indicating fossil sensitivity underlying the study area.

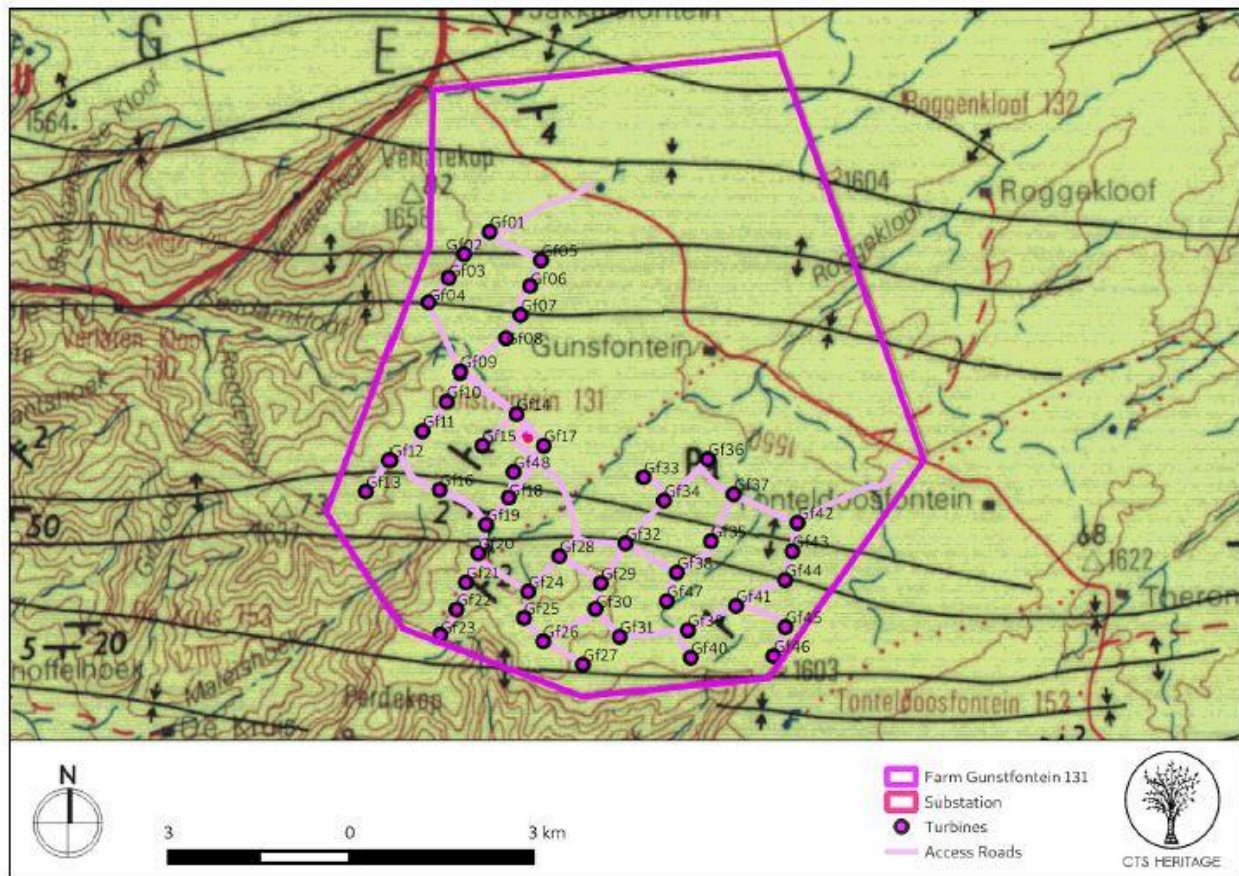


Figure 5.6.2.b. Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the development area is underlain by sediments of the Karoo Supergroup assigned to the Beaufort group, within the Abrahamskraal Formation of the Adelaide Subgroup.

5.4.1. Conclusion

In addition to the above, the following recommendations were endorsed by SAHRA in their letter dated 18 March 2016 and 20 June 2016, and subsequently still apply:

- » A buffer zone of 60 m must be maintained from all identified heritage and palaeontological resources. Micro adjustment of all relevant proposed infrastructure must occur in order to achieve this. (note that the proposed updated layout adheres to these buffers)
- » The stone cairn/possible grave (Site ID 129288), should be demarcated and fenced off with a perimeter buffer zone of 60m;
- » A Conservation Management Plan must be developed to ensure the on-going conservation of identified heritage resources during the life of the development. The report must include a map of all identified heritage and palaeontological resources with buffer zones of 60 m in relation to the proposed development. This report must be submitted to SAHRA if the EA has been approved and must form part of the final EMPr; and
- » On-site monitoring of excavations deeper than 1m must be conducted by a qualified palaeontologist during the construction phase of any infrastructure located within the Abrahamskraal formation. Site monitoring reports must be submitted to SAHRA upon completion.

The proposed changes to the EA and site layout will not increase the significance of impacts originally identified in the EIA report or lead to any additional impacts. The proposed amendments will have zero or negligible effect on the significance of impacts identified in the EIA report as long as the recommendations contained in Van der Walt (2016) and Almond (2015), and repeated above, are implemented.

5.5. Visual Impact

An updated visual assessment was conducted for the proposed amendment. The original authorised development was 190m high and the proposed amended development would be up to 240m in height and could be visible for a distance of 49.2km and 55.3km respectively. From short range the difference in height of the authorised and proposed structures could be noticeable. However, as the viewer moves away from the development, the difference in height is likely to become increasingly less noticeable. Whilst the authorised development layout and the proposed amended development layout have the same number of turbines, the area over which they are proposed differs. Key differences include:

- » The proposed amended layout includes turbines approximately 3km closer to the edge of the Komsberg than the authorised layout. This is likely to intensify visual impacts that might be experienced in the valley below the ridgeline.
- » The authorised layout includes turbines approximately 1km closer to the top of the Verlatenkloof Pass than the proposed amended layout. As turbines associated with the proposed amended layout are further away, this is likely to help mitigate the additional as seen from the R354 at the top of the Pass.

Four viewpoints have been adopted in order to provide an indication of the differences in views of the proposed development that might be expected. Selected viewpoints include:

- » **VP1 (Figure 5.7) Verlatenkloof Pass:** The turbine structures used in the proposed amended layout are approximately 25% taller than those proposed in the authorised layout, due to the fact that the closest structure is approximately 2.9km (proposed amended layout) from the viewpoint as opposed to 1.9km (authorised layout), the apparent height of the structures due to this increased difference is noticeably lower. This indicates that the proposed development layout is likely to result in a reduced visual impact from the top of Verlatenkloof Pass and the closest sections of the R354 when compared with the authorised layout.
- » **VP2 (Figure 5.7) the R354:** This is one of two main routes into and out of the town of Sutherland and is approximately 6.5km to the north of the project site. The additional height associated with the proposed amended layout is not highly obvious when compared with the authorised project. Visual impact on this section of road is therefore not likely to increase to any significant degree therefore.
- » **VP3 (Figure 5.7) un-surfaced road that runs down the Komsberg Pass:** This road is 7.2km to the east south of the site. The additional height associated with the proposed amended layout is not highly obvious when compared with the authorised project and the proposed amended layout does extend over a marginally wider section of the landscape when compared with the Authorised Layout. From this area therefore the proposed project is likely to have a marginally greater level of visual impact.
- » **VP4 (Figure 5.7) this viewpoint is approximately 18.5km to the south west on the R354 and within the Buffels River Valley.** From this viewpoint the additional height of structures is not highly obvious. It is obvious that the proposed amended layout will result in a greater number of turbine structures visible when compared with the authorised layout. This is likely to be largely due to the proposed amended layout resulting in turbines being located approximately 3km closer to the edge of the Komsberg ridgeline when compared with the authorised layout.

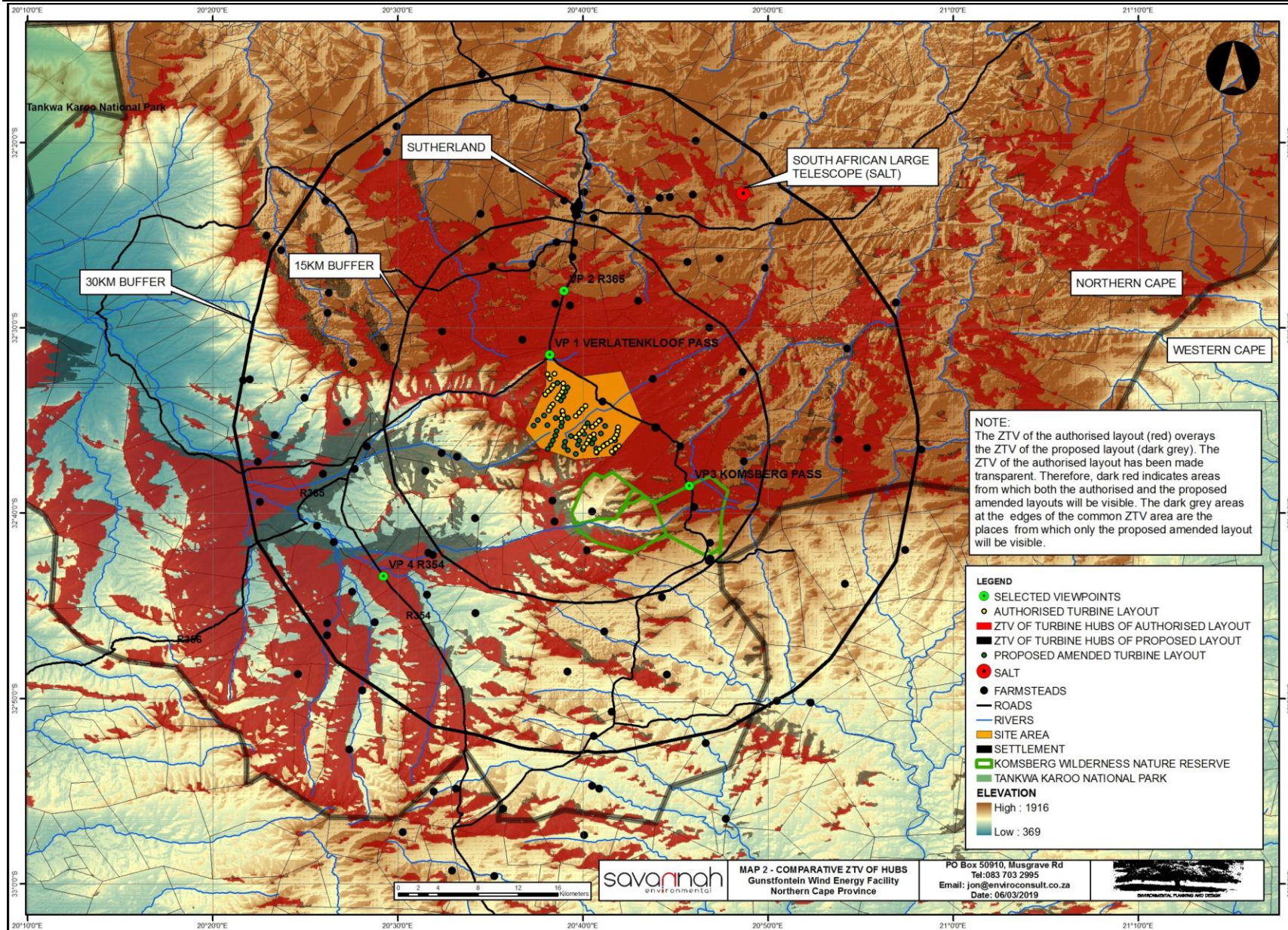


Figure 7: Comparative Viewshed Analysis – Gunstfontein Wind Energy Facility.

5.5.1. Comparative Assessment

The Original VIA assessed impacts on both general landscape character as well as identified sensitive receptors. Impacts on sensitive receptors included:

- a) The visibility of the facility to, and potential visual impact on farmsteads that have been identified as potentially being impacted.
- b) The visibility of the facility to, and potential visual impact on the South African Large Telescope (including light impacts).
- c) The visibility of the facility to, and potential visual impact on sections of the R354 and R365 that have been identified as potentially being impacted.
- d) The visibility of the facility to, and potential visual impact the western section of the town of Sutherland that has been identified as potentially being impacted.
- e) The impact of shadow flicker on farmsteads within and close to the proposed wind farm.
- f) The possible impact of lighting associated with night time operation, security and aviation warning lights.
- g) Visual impacts associated with construction of the proposed wind farm.
- h) The visibility of the facility to, and potential visual impact on the private nature reserve (Komsberg Wilderness Nature Reserve).

5.5.1.1. Potential Impact of existing landscape character

Two obvious possible areas of impact were identified by the original VIA:

- » The proposed wind farm will further introduce industrial elements into the Upper Plateau LCA. This is likely to change the character of the area over which it is obvious; and
- » The proposed wind farm will increase the influence of wind farms in the landscape that it overlooks. The character of the Buffels Valley and the Tankwa Valley below the Komsberg could be affected.

Both of these areas of impact will also be associated with the proposed amended layout. The potential area of impact is likely to increase marginally due mainly to the proposed increase in height of the structures. Over the distance involved, the additional height of structures is unlikely to be noticeable. Due to the additional area and the fact that the development is proposed closer to the edge of the ridgeline, the Proposed Amended Layout could intensify levels of certain identified impacts when compared with the Authorised Layout. Impacts associated with the proposed amended layout are therefore likely to be similar to those assessed for the authorised layout.

The original assessment matrix is indicated below. This has been amended to take account of the reduced number of turbines that were actually authorised (i.e. 68 turbines original assessed, 46 of which were authorised). Assessed impact levels associated with the proposed amended layout are underlined where they differ from the impact levels assessed for the authorised development layout.

Nature of impact:		
There are two obvious possible areas of impact;		
<ul style="list-style-type: none"> • The proposed wind farm will further introduce industrial elements into the Upper Plateau LCA. This is likely to change the character of the area over which it is obvious; and • The proposed wind farm will increase the influence of wind farms in the landscape that it overlooks. The character of the Buffels Valley and the Tankwa Valley below the Komsberg could be affected. 		
	Without mitigation	With mitigation

Extent	Upper Plateau LCA Immediate surroundings, (2)	(2)
	Buffels valley and Tankwa Valley LCAs Region, (3)	(3)
Duration	Long term, (4)	Long term, (4)
Magnitude	Upper Plateau LCA High, (8)	High, (8)
	Buffels valley and Tankwa Valley LCAs Minor, (2) <u>Low, 4</u>	Minor, (2) <u>Low, 4</u>
Probability	Upper Plateau LCA Definite, (5)	Definite, (5)
	Buffels valley and Tankwa Valley LCAs Probable, (3) <u>Highly Probable (4)</u>	Probable, (3) <u>Highly Probable (4)</u>
Significance	Upper Plateau LCA High, (70)	High, (70)
	Buffels valley and Tankwa Valley LCAs Low, (27) <u>Medium, (44)</u>	Low, (27) <u>Medium, (44)</u>
Status	<p>The character of the rural landscape will be changed. Within 5km, it is likely that the loss of rural characteristics will be highly obvious to the majority of people. The most sensitive to the change are likely to include tourism related establishments including guest houses.</p> <p>It appears likely however, that the majority of people who are involved primarily in agriculture will see the development as neither a positive or negative impact.</p> <p>It is possible that a small proportion of the population, particularly those that may benefit from the project, will view the development as a positive addition to the local landscape.</p> <p>It is likely however, that the majority of people will consider the sight of turbines in a relatively natural landscape to be negative.</p>	negative
Irreplaceable loss	The area of greatest impact is located on the Upper Plateau. This area has been impacted by development to a small degree already including at least one large scale farmstead and numerous associated overhead power lines. It is therefore not the most sensitive LCA.	No irreplaceable loss

	<p>The proposed development can also be dismantled and it is assumed that productive agriculture might continue during the operational phase.</p> <p>There will therefore be no irreplaceable loss, however, given the long-term nature of the project, it is likely that a proportion of stakeholders will view the loss of view as irreplaceable.</p>	
Can impacts be mitigated?	Yes, to a small degree	
Mitigation / Management: Planning: <ul style="list-style-type: none">» Ensure that ground level development is minimised.» Select the 140MW alternative over the 200MW alternative. This will reduce the intensity of the impact resulting in a reduction in visible turbines from 68 to 57. It will not reduce the extent of view that will be impacted however. Operations: <ul style="list-style-type: none">» Use non reflective finishes for all turbine structures. This will help to mitigate impacts associated with reflections particularly from spinning blades.» Maintain existing uses below the development. Decommissioning: <ul style="list-style-type: none">» Remove infrastructure not required for the post-decommissioning use of the site.» Return all affected areas to productive agricultural use.» Monitor rehabilitated areas post-decommissioning and implement remedial actions.		
Cumulative Impacts: <p>There are three wind energy projects authorised in the area which will result in approximately 428 wind turbines being developed in the area. Over 300 of these are located on the Komsberg to the east of Gunstfontein. These will primarily impact on the Upper Plateau LCA and without the influence of the Gunstfontein project will change the character of the area.</p> <p>There are also approximately 72 turbines associated with authorised projects that overlook the Buffels and the Tankwa Valleys that are associated with authorised projects with a further four wind energy projects pending approval in the Tankwa Valley.</p> <p>Gunstfontein will add approximately an additional 22% to the turbines that are already authorised within and that will directly affect the character of the Upper Plateau LCA.</p> <p>The influence of Gunstfontein on the character of the Buffels and Tankwa Valleys is likely to be small relative to the potential extent of wind energy projects that are authorised and pending authorisation within these areas. This is due to;</p> <ul style="list-style-type: none">» The Gunstfontein facility being a substantial distance from the main viewpoints in these areas;» The fact that intervening ridgelines will screen views of the Gunstfontein facility from large areas of the valleys.» The way that the turbines are located in lines running away from the edge of the ridgeline which progressively increases screening associated with the ridgeline.		

5.5.1.2. The visibility of the facility to, and potential visual impact on sections of the R354 and R365

The assessment broke the impacts down into lower sections of the roads that run through the valley beneath the site and a section of the R354 that runs across the plateau between the site and Sutherland. The assessment was influenced by the fact that whilst the development may not be as obvious, the lower valley areas appear more natural and have the dramatic landform of the Komsberg as a backdrop whereas the upper plateau areas are less natural but the proposed project is likely to be more conspicuous.

From lower valley areas, there is unlikely to be a significant change in the view of the development associated with the proposed amended project. From higher sections of the roads on the plateau, due to the increased distance between the closest turbines and the road (R345 Plateau) and due to the decreased number of turbines, the magnitude of the impact associated with the proposed amended scheme is likely to be lower. However, the overall impact will still have a high significance.

The original assessment matrix is indicated below. This has been amended to take account of the reduced number of turbines that were actually authorised. Assessed impact levels associated with the proposed amended layout are underlined where they differ from the impact levels assessed for the authorised development layout.

Nature of impact:		
These roads carry tourists into and through the area. The view from the road is everyone's introduction to the landscape and is the way that most visitors experience the area.		
The introduction of wind turbines potentially introduces man made elements on an industrial scale. Opinions regarding the nature of impacts differs. Some people see wind farms as a beneficial addition appreciate the engineered form. It is probably fair to say however that the majority of visitors and tourists who access natural areas would prefer to experience a natural area with as little evidence of human intervention as possible. For this reason, the assessment considers the change in landscape character affected by the introduction of wind turbines as negative.		
	Without mitigation	With mitigation
Extent	Regional, (3)	Regional, (3)
Duration	Long term, (4)	Long term, (4)
Magnitude	R354 Buffels Valley Minor, (2) <u>Low, (3)</u> R354 Upper Plateau High (8) R356 Buffels Valley Minor, (2) <u>Low, (3)</u> R356 Sutherland east Small, (0)	R354 Buffels Valley Minor, (2) <u>Low, (3)</u> R354 Upper Plateau High (8) R356 Buffels Valley Minor (2) <u>Low, (3)</u> R356 Sutherland east Small, (0)
Probability	R354 Buffels Valley, Highly Probable, (4) R354 Upper Plateau Definite (5) R356 Buffels Valley, Highly Probable (4)	R354 Buffels Valley Distinctly Possible, (3) R354 Upper Plateau Definite, (5)

	R356 Sutherland east, Very Improbable (1)	R356 Buffels Valley, Distinctly Possible, (3) R356 Sutherland east, Very Improbable (1)
Significance	<p>R354 Buffels Valley, Medium, (36) <u>Medium, (40)</u></p> <p>R354 Upper Plateau High, (75)</p> <p>R356 Buffels Valley, Medium, (36) <u>Medium, (40)</u></p> <p>R356 Sutherland east Low, (7)</p>	<p>R354 Buffels Valley Low, (27) <u>Medium, (30)</u></p> <p>R354 Upper Plateau, High, (75)</p> <p>R356 Buffels Valley, Low, (27) <u>Medium, (30)</u></p> <p>R356 Sutherland east Low, (7)</p>
Status	Negative	Negative
Irreplaceable loss	<p>Because the turbines can be removed and all associated, relatively minor, development demolished, there will be no irreplaceable loss.</p> <p>However, due to the long-term nature of the project, many people are likely to feel that the natural landscape has been irreplaceably lost.</p>	<p>Because the turbines can be removed and all associated, relatively minor, development demolished, there will be no irreplaceable loss. However, due to the long-term nature of the project, many people are likely to feel that the natural landscape has been irreplaceably lost.</p>
Can impacts be mitigated?	Part mitigation only is possible	Part mitigation only is possible
<p>Mitigation:</p> <ul style="list-style-type: none"> » The use of non-reflective finishes on turbine structures including blades will help to reduce impacts particularly when viewed from a distance. This will reduce reflections including the flashing effect that is often apparent from spinning blades. » Selection of the 140MW alternative over the 200MW alternative will reduce the number of turbines that are visible in the landscape. This will be most effective for views from the Upper Plateau. However, the proportion of the view impacted will not significantly reduce. This will therefore have little effect in reducing the level of impact. » Ensuring that natural vegetation remains beneath the turbine field. This will be most beneficial for views from the Upper Plateau from where views over the site are possible. This measure obviously will not mitigate the impact of the turbine structures. It will however help prevent exacerbation of the impact particularly for close views. 		
<p>Cumulative Impacts:</p> <p>There are three projects authorised in the area which will result in approximately 428 wind turbines being developed in the area. Over 300 of these are located on the Komsberg to the east of Gunstfontein. In addition, there are six proposed wind energy projects including Gunstfontein that are likely to add a significant additional number of turbines to the local landscape. The Renewable Energy Development Zones (REDZ) as defined by the Department of Environmental Affairs, is intended to focus development of renewable energy projects to areas where they are likely to be most effective. This will also help to protect other areas of the landscape. The area within which the project is proposed has been identified at REDZ 2 and has been highlighted for wind energy projects. This focus will undoubtedly change the local landscape and will make views over extensive areas of wind turbines the norm in the area.</p> <p>The Gunstfontein project will not add significantly to the area of impact (ZTV) associated with currently authorised projects. From most viewpoints, other wind energy projects are likely to be seen at closer distances than Gunstfontein which is likely to draw attention away from the proposed project. The exception to this is as the R354 enters the Upper</p>		

Plateau through the Komsberg Pass. In this area the Gunstfontein project will be seen in the foreground. There will however be in excess of 300 other turbines visible from this upper area. This view will extend along approximately 7km of the road before it starts to fall towards Sutherland.

The short point therefore is that the landscape, including the ridgeline will be highly transformed by the development of wind energy projects. The Gunstfontein will add slightly to this impact but the only area where significant additional impacts are likely to be experienced is not the most dramatic landscape area.

5.2.3. The visibility of the facility to, and potential visual impact on the Komsberg Wilderness Nature Reserve

The VIA indicated that the authorised project will be visible to the upper section of this reserve with the bulk of the reserve being located below the plateau. VP 3 is just within the Reserve; it indicates the level of impact associated with both the authorised and the proposed amended projects. At this distance (7.2km) there is little difference in the apparent height of the turbines. However, the approximate extent of development associated with the authorised development layout appears marginally lower than that associated with the proposed amended layout.

Based on the above, there is likely to be a marginally increased level of impact associated with the proposed amended layout when compared with the authorised layout.

The original assessment matrix is indicated below. This has been amended to take account of the reduced number of turbines that were actually authorised. Assessed impact levels associated with the proposed amended layout are underlined where they differ from the impact levels assessed for the authorised development layout.

Nature of impact:

During the site visit, it was reasonably obvious that this private reserve is likely to be impacted by the proposed development.

The assessment indicates that only the area of the reserve on the Upper Plateau has the potential to be impacted by the development. The bulk of the reserve is located below the main plateau and is unlikely to be impacted by the development to any significant degree.

The proposed project is approximately 6.5km from the boundary of the reserve on the Upper Plateau. The closest boundary however is located below the plateau and is approximately 2.3km from the closest turbine. This is an attraction that is advertised to international clientele as a wilderness experience. The presence of a wind farm that is visible to the reserve is likely to detract from the impression of it being a wilderness area.

	Without mitigation	With mitigation
Extent	Site & immediate surroundings, (2)	Site & immediate surroundings, (2)
Duration	Long term, (4)	Long term, (4)
Magnitude	Moderate to low, (5) <u>Moderate, (6)</u>	Low, (4) <u>Moderate to low, (5)</u>
Probability	Very probable, (4)	Very probable, (4)
Significance	Medium, (44) <u>Medium, (48)</u>	Medium, (40) <u>Medium, (44)</u>
Status	Negative	Negative
Irreplaceable loss	There will be no irreplaceable loss.	There will be no irreplaceable loss.
Can impacts be mitigated?	No	

Mitigation:

- » Due to proximity, there is no real mitigation that will reduce visibility of the project from the nature reserve.
- » The preservation of natural vegetation below the turbines and the active management of the site to maintain a natural appearance will ensure that visual impacts are not exacerbated.

Cumulative Impact:

The authorised Mainstream Sutherland Wind Energy project is located between the Gunstfontein project and the reserve. The Mainstream project is likely to be visible from all areas of the reserve.

Views of the Gunstfontein project on the Upper Plateau will only be possible through a field of approximately 43 turbines that are associated with Mainstream project. Therefore, impacts that are already authorised will to a large degree negate potential impacts associated with the proposed Gunstfontein project.

5.5.2. Conclusion

The revised layout and the necessary increase in hub height and rotor diameter of the turbines are likely to result in the following changes in likely visual impact:

- » The fact that turbines associated with the proposed amended layout will be located closer to the edge of the Komsberg ridge will mean that additional turbines are likely to be visible from the Buffels River Valley below the ridgeline when compared with the authorised layout. This is likely to increase the influence of the WEF project on the relatively natural valley landscape as well as making development more obvious for travellers on the R354 and 356 through this valley area. However, it must be noted that the layout assessed in the EIA (68 turbines) included turbines equally as close to the ridge as in the amended layout, and the impacts of the amended layout are thus the same as the originally assessed layout in that regard. For views from the R354 at the top of the Verlatenkloof pass, the proposed additional height of turbine structures is negated by the additional distance that the structures will be located from the road (i.e. turbines are now located further away from the R354). This additional distance is likely to reduce the visual impact as experienced from this area.
- » From the R354 as it crosses the upper plateau, the additional proposed height of turbine structures is unlikely to increase visual impact; and
- » From the top of the Komsberg Pass to the south-east of the proposed Project, the proposed amended layout will extend over a marginally wider section of the landscape when compared with the authorised layout. This will marginally increase the visual impact when compared with the Authorised layout

The proposed height increase does not appear to be a major concern in itself, however, the main concern associated with the proposed amendment is the likely impact on views from the relatively natural valley below the Komsberg ridgeline which is caused by the turbines of the amended layout being located closer to the ridgeline than the turbines of the approved layout. However, it is noted that the turbines of the amended layout occupy a similar footprint to that which was assessed in the original VIA. In the 68-turbine layout that was assessed in the original VIA, turbines were located in similar proximity to the ridgeline as is proposed in the amended layout.

From review of Figure 5.7 which indicate the approximate number of turbines that are likely to be visible from each area, it appears that approximately 9 – 10 proposed turbine locations are responsible for creating this additional impact. The possible relocation of turbines in order to minimise this additional impact has been discussed with the Applicant. However, it has been confirmed that because the larger turbines require more space between them to reduce internal wake effects they have to be spread across the previously assessed footprint.

From review of the original VIA, it is obvious that WEF projects are likely to be a common sight within the valley and that there are projects that are significantly closer to the road than the proposed project. The proposed amendment will result in a change to the upper ridgeline that will form a backdrop the these other projects.

The original VIA concluded:

If the proposed project were to be considered without knowledge the Department of Environmental Affairs strategic planning for renewable energy projects and of the nature and extent of windfarm development that is due to occur in the vicinity in the near future, on visual grounds, the development of the proposed project would be difficult to support.

However, given the degree of transformation that will occur due to other wind energy projects, because the proposed project will not significantly add to visual impacts of projects that are currently authorised and because potential impacts on nationally significant attractions (SALT and Tankwa Karoo National Park), from a visual perspective, there is no major reason why the proposed project should not be considered for authorisation.

Given the additional area of impact, the statement remains relevant. Overall, the proposed amendments may result in a minor change in the previously assessed impacts, however all impacts remain within the same significance class (e.g. "medium") as the authorised layout. The updated visual impact assessment concurred with the original VIA and concluded that from a visual perspective, there is no major reason why the proposed project should not be considered for authorisation.

5.6. Noise impact

The noise amendment comment letter (Appendix F) addresses the potential changes in noise impact significance in terms of the proposed amendments by comparison with the original assessment undertaken in 2015. With the input data (as used), the above-mentioned assessment indicated that the proposed wind farm will have a noise impact of low significance on all potential noise-sensitive developments (NSDs) in the area during both the construction and operational phases, using the Acciona AW125/3000 wind turbine for all operational wind speeds (generating 108.4 dBA, which is a relatively noisy turbine and considered a worst-case scenario).

5.6.1. Comparative Assessment

An optimized layout is proposed for the Gunstfontein Wind Farm, designing the wind turbines at optimal locations (see Figure 5.8). The change however does not move any wind turbines closer than 1 000 m from any potential noise sensitive developments (NSDs), with the closest wind turbine located more than 1 700 m from the closest NSD. Considering the location of the wind turbines and the potential noise impact, it is the opinion of the specialist that the change will not increase the significance of the noise impact.

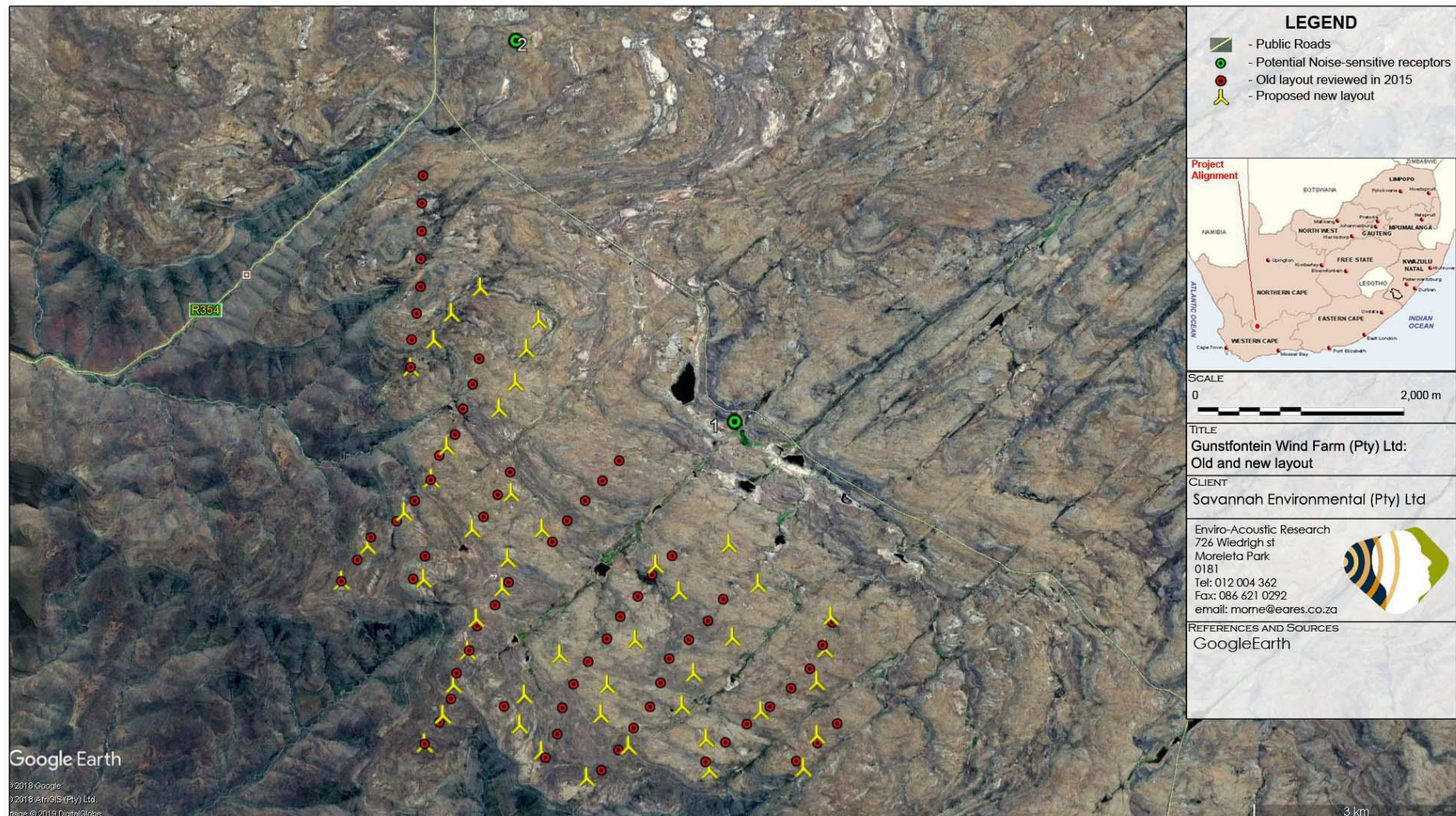


Figure 5.6: New locations of wind turbines compared with old layout.

5.6.2. Conclusion

A full noise impact assessment with new modelling will not be required and the recommendations as contained in the previous document will still be valid. This recommendation is based on the outcome of the report which indicated that the extent of the potential impact is limited to 1 000m from the closest wind turbines. The impacts, the significance, findings and the recommendations of the original noise report will remain the same, and it will not be required to do any additional or other acoustic studies for the proposed changes.

6. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

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

Advantages of the amendment	Disadvantages of the amendment
General	
<p>The increase in rotor diameter will increase the efficiency of the facility and consequently the economic viability thereof. Increased efficiency of a facility is considered to be beneficial to the environment as this will reduce the need for additional facilities to generate additional electricity.</p> <p>It is also beneficial from a macro-economic perspective as it results in the lower cost per unit of energy (i.e. lower tariff), ultimately benefiting the South African public.</p>	None
Avifauna	
Overall reduction in construction footprint – reducing extent of peripheral degradation of habitat and possibly reducing disturbance caused by construction	None
The impact of bird mortalities from turbine collisions is unlikely to change because any increased risk due to an increased RSA per turbine may be offset by a reduction in the number of turbines built.	
As a result of this amendment, the Gunstfontein WEF is now in line with Updated Verreux's Eagle best practice guidelines and a new 3km buffer was imposed on the layout.	
Bats	
No turbines from the amended layout are located in the sensitivity buffers.	The proposed amendment to the turbines at the wind farm would result in a greater per turbine rotor swept area and hence a potentially greater likelihood bats would collide with turbine blades or experience barotrauma. With mitigation however, the significance of this impact is the same as that previously assessed and authorised (i.e. Low)
Ecology	
The increase in turbine size would occur simultaneously with a decrease in the number of turbines required.	None
In terms of the roads, the total extent of the road footprint is similar to the original assessed layout and as such there is not likely to be any change in impact associated with the roads as the amount of footprint within the high sensitivity parts of the site has not increased.	None
Heritage (including Palaeontology)	
A 60m buffer has been provided for around all mapped heritage features and uranium anomalies.	None

Advantages of the amendment	Disadvantages of the amendment
Visual	
Turbines will be positioned further away from the Verlatenkloof Pass	None
Noise	
Turbines are located further away from the identified noise sensitive developments.	None - the change will not increase the significance of the noise impact, subject that a wind turbine with a maximum sound power emission level of 108 dBA is used for the Gunstfontein WEF.

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

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

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

Impacts on Avifauna

- » No turbines may be located within the no-go areas, including the 3 km Verreaux's Eagle nest buffer (Figure 5.1 and 9.1). These no-go areas do not apply to associated infrastructure (this was confirmed with the avifaunal specialist).
- » All turbines must be situated at least 70 m back from the no-go boundary. This is based on the assumption that a turbine with the maximum specifications is installed. Should a smaller turbine be utilised, the setback distance to the no-go areas may be reduced slightly, which must be confirmed by the specialist during the pre-construction walkthrough and micro-siting process.
- » Place power lines underground where possible, unless it is practically impossible to do so due to ecological, geological or topographical considerations, and confirmed by appropriate independent specialists, as part of the walkthrough and micro-siting process;
- » Place any new overhead power lines adjacent to existing power line or linear infrastructure (e.g. roads and fence lines) where possible;
- » High traffic areas and buildings such as offices, batching plants, storage areas etc. should where possible be situated in areas that are already disturbed and existing roads and farm tracks should be used where possible.
- » The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths.
- » Environmental Officer (EO) to oversee activities and ensure that the site specific environmental management plan (EMP) is implemented and enforced.
- » Prior to construction, an avifaunal specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded.
- » Should priority species nests be located, a protective buffer may be applied, within which construction activities may need to be restricted during the breeding season for that species.
- » Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the EMP.
- » The construction Phase EO, and the on-site Environmental Manager (or Environmental Site Officer as the case may be) should have sufficient experience and knowledge of local avifauna to identify red data and priority bird species, as well as their nests. The ECO and Environmental Manager must then, during audits/site visits, make a concerted effort to look out for such breeding activities of red data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify red data species, followed by regular questioning of staff as to the regular whereabouts on site of these species.

If any nests or breeding locations for these species are located, the avifaunal specialist is to be contacted for further instruction.

- » Develop and implement a 24-month post-construction bird activity monitoring program that mirrors the pre-construction monitoring surveys and is in line with (or exceeds) the applicable South African post-construction monitoring guidelines. This program must include thorough and on-going nest searches and nest monitoring.
- » Develop and implement a carcass search programme for birds as a minimum during the first two years of operation followed by year 5, 10, 15, 20 and 25, in line with or exceeding the applicable South African monitoring guidelines of the time.
- » Construction and operation phase bird monitoring, in line with applicable guidelines, must be implemented and must include monitoring of all raptor nest sites for breeding success.
- » Operational monitoring data (including that from the recommended operational programme for the Gunstfontein WEF) should be made available to appropriate agencies such as Bird Life SA and the Endangered Wildlife Trust, as well as avifaunal specialists through the BARESG, to promote more accurate and detailed cumulative assessments in the future.
- » If unacceptable impacts are observed (in the opinion of the bird specialist after consultation with BLSA, relevant stakeholders and an independent review), the specialist should conduct a literature review specific to the impact (e.g. collision and/or electrocution) and provide updated and relevant mitigation options to be implemented. Mitigations that may need to be implemented (and should be considered in the project's financial planning) include:
 - Onsite and off-site habitat management. A habitat management plan which aims to prevent an influx/increase in preferred prey items in the turbine area due to the construction and operation activities, while improving raptor habitat and promoting prey availability away from the site.
 - Using deterrent devices (e.g. visual and noise deterrents), deterrent and/or shutdown systems e.g. Automatic bird detectors (e.g. automated camera-based monitoring systems – McClure et al. 2018) if commercially available; or Radar Assisted Shutdown on Demand (RASOD) to reduce collision risk.
 - Painting a turbine to make it more visible (subject to the requisite approvals being obtained from the applicable authorities e.g. CAA and DEA). Some success has been observed in reducing raptor mortalities in Norway using this method.
 - Identify options to modify turbine operation (e.g. temporary curtailment or shut-down on demand) to reduce collision risk if absolutely necessary and if other methods have not had the desired results.
- » Any new overhead lines must avoid avifaunal no-go areas. Where this is practically impossible or ecologically undesirable, the valid reasons thereof must be discussed with the specialist, and the specialist must approve the section of line within any no-go area, as part of the walkthrough and micro-siting process. Should any overhead lines be located in avifaunal no-go areas, appropriate Bird Flight Dividers (BFD) marking devices must be used as referred to below.
- » Attach appropriate (i.e. as advised by an avifaunal specialist) marking devices (BFDs), which may include the need for nocturnal LED marking devices, on all spans of any new overhead power lines to increase visibility. The placement, number and model of the BFDs is to be advised by an avifaunal specialist prior to construction, and may include the need for some sections to be marked with solar powered LED devices, suitable to mitigate for collision prone species that regularly in the dark (e.g. flamingos, ducks, geese and cranes).
- » Any new overhead power lines must be of a design that minimises electrocution risk by using adequately insulated 'bird friendly' structures, with clearances between live components of 1.8 m or greater and which provides a safe bird perch. A replica or 'mock up' of the exact pole structures (including bend point structures), or at least a 3D model simulation that specifically shows how the jumpers will be placed and insulated, must be examined and approved by the bird specialist in consultation with EWT.

- » As the pre-construction monitoring was completed in November 2014, the data set is now over four years old. The current best practise guidelines (Jenkins et al. 2015) indicate that additional monitoring may be advisable if there is a significant gap between the original assessment and the commencement of construction, to assess whether there have been any changes in species abundance, movements and/or habitat use in the interim. Furthermore, the Birdlife South Africa (BLSA) Verreaux's Eagle guidelines ('VE guidelines') are now applicable to this site. The main implications of this are that they recommend that VPs be monitored for 18 hours per season (i.e. 72 hours per year) and that a second year of monitoring is recommended should the site pose a significant risk to Verreaux's Eagle and should turbines be proposed in potentially sensitive areas. We therefore recommend that a pre-construction habitat survey and cliff-nest search (during the eagle breeding season) be undertaken to confirm the likelihood that there has been any change in key species abundance, movements and/or habitat use since the original assessment. This fieldwork can be done after the amendment decision, however the results of this fieldwork must inform the final turbine layout. The results of this fieldwork must also inform whether any additional long-term pre-construction monitoring is warranted to update the avifaunal baseline for operational comparison, and must inform the scope and duration of the monitoring (if required). Updated data sets will allow for more meaningful comparison with operational monitoring data, and the additional monitoring (if required) must also be used to advise the final micro-siting of the layout of the WEF where applicable, prior to any construction taking place.

Impacts on Bats:

- » The impacts on bats can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point).

Impacts on Ecology:

- » Should the development proceed to construction, the final development footprint should be subject to a preconstruction walk-through 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.

Heritage Impacts:

- » A buffer zone of 60 m must be maintained from all identified heritage and palaeontological resources. Micro adjustment of all relevant proposed infrastructure must occur in order to achieve this. These buffer zones have been mapped in Figures 5a and 5b in the areas where impact is likely.
- » The stone cairn/possible grave (Site ID 129288), should be demarcated and fenced off with a perimeter buffer zone of 60m;
- » A Conservation Management Plan must be developed to ensure the on-going conservation of identified heritage resources during the life of the development. The report must include a map of all identified heritage and palaeontological resources with buffer zones of 60 m in relation to the proposed development. This report must be submitted to SAHRA if the EA has been approved and must form part of the final EMPr; and
- » On-site monitoring of excavations deeper than 1m must be conducted by a qualified palaeontologist during the construction phase of any infrastructure located within the Abrahamskraal formation. Site monitoring reports must be submitted to SAHRA upon completion.

No other novel mitigation measures are introduced from the other specialists. These additional mitigation measures are recommended based on additional information available regarding interactions of sensitive species with wind farms and additional specialist work having been conducted since the initial EA issuance. **These updated mitigation measures have been updated in the Draft EMPr (Appendix I) and should be included within the approved project EMPr when the updated layout and EMPr are finalised and submitted for final approval to the DEA** (in accordance with Conditions 18, 19, 20 and 21 of the EA).

8. PUBLIC PARTICIPATION

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

- » Site notices were placed at the site on **17 January 2019** (refer to **Appendix G4**).
- » The draft motivation report was made available for a public review period on www.savannahsa.com from **Friday, 10 May 2019** and **Tuesday 2 July 2019**.
- » Written notification to registered I&APs regarding the availability of the amendment motivation report was distributed on **10 May 2019**. A subset of registered I&APs who were inadvertently excluded from the aforementioned notification were subsequently notified on Friday 31 May 2019 and provided with a full 30-day review and comment period from Friday 31 May 2019 to Tuesday 2 July 2019. (refer to **Appendix G2**).
- » Advertisements were placed in the Noordwester newspaper on **10 May 2019** (refer to **Appendix G4**).

Comments received (refer to **Appendix G6**) during the public review period have been included in this final submission to the DEA for consideration in the decision-making process. Comments have been included and responded to in the Comments and Responses Report (**Appendix G5**). Proof of attempts made to obtain comments are included in **Appendix G2** and **Appendix G3**, accordingly. Where necessary, this amendment report has been updated in order to address comments raised by I&APs.

9. CONCLUSION

Based on the specialist findings, it is concluded that the proposed amendments to the turbine specifications, wind farm layout and Conditions of the EA are not expected to result in an increase to the significance ratings for the identified potential impacts. In some cases (avifauna and bats), the quantitative value has changed in terms of the magnitude of impacts, but this has not resulted in a change to the qualitative category (i.e. Low, Medium, High) of the significance rating after mitigation measures. There is a reduction in significance in some impacts as a result of the reduced number of turbines and the location of these outside of identified high sensitivity areas. In some instances, the significance rating has been amended (increased) based on additional information available (e.g. more wind farms are now proposed in the vicinity of the Gunstfontein WEF, which has influenced the assessment of cumulative impacts). In addition, the amended wind turbine positions considered avoids all identified avifaunal and bat exclusion zones and areas of high sensitivity (refer to Figure 9.1). These exclusion zones apply to turbines only and not to associated infrastructure such as roads and power lines.

The avifaunal specialist concluded that the significance of all impacts, except for collision with turbines and cumulative impacts, will remain the same after mitigation. The impact ratings of collision with turbines and cumulative impacts have been adjusted slightly and both re-rated as being of Medium significance with mitigation. An operational-phase bird monitoring programme was also recommended by the avifaunal specialist (in line with the guidelines applicable at the start of the operational phase) as well as pre-construction habitat survey and cliff-nest search (during the eagle breeding season) be undertaken to confirm that there has been no change in key species abundance, movements and/or habitat use since the original assessment, and to determine whether additional pre-construction monitoring is warranted to update the avifaunal baseline for operational comparison. This fieldwork can be done after the amendment decision; however the results of this fieldwork must inform the final micro-siting of the turbine layout.

The bats specialist report concluded that the amendments to the turbine dimensions proposed at the Gunstfontein Wind Farm would slightly increase mortality impacts to bats, but that the overall impact significance would remain unchanged. Based on bat activity levels as assessed from pre-construction monitoring data, impacts to bats are likely to be of a medium significance before mitigation and low after mitigation. It was recommended that ground clearance be maximised and the tip height (i.e. the distance between the ground and the blade tip at its height point) be minimised as far as possible in the final turbine selection. The bat specialist also recommended that a minimum buffer to blade tip for all bat buffer zones is required, and that this must be checked and confirmed by a specialist during the detail design and micro-siting process.

In terms of aspects relating to heritage and noise, the proposed changes to the EA and site layout plan will not increase the significance of impacts originally identified in the EIA report or lead to any additional impacts. The proposed amendments may result in a marginal increase in visual impact when compared to the authorised 46 turbines layout, but the visual impacts associated with the amendment would be similar to that of the originally assessed 68 turbine layout, which were found to be acceptable in the original EIA.

The avifaunal and bats specialist updated the significance of the cumulative impacts and these were rated high without mitigation and medium with mitigation. These updated ratings were concluded to be as a result of more proposed WEFs in the area compared to 2016, and not as a result of the amendments proposed. The ecological cumulative impacts assessed for the amendments determined that the impacts before mitigation was medium and after mitigation measures would be low. In terms of heritage and noise, the

cumulative impacts were not adjusted as a result of the amendment and the visual assessment concluded that the Gunstfontein WEF will not add significantly to the area of impact associated with currently authorised projects but that WEF projects are likely to be a common sight within the valley. The project site is located within the Komsberg Renewable Energy Development Zone, and it is not surprising therefore that a number of wind energy applications have been made within 50 km of the Gunstfontein WEF. The project is likely to add slightly to the cumulative impacts of these projects, but this is based on the fact that more projects are now proposed in the area than considered in the 2016 study, and not as a result of the amendments proposed. The cumulative impacts as a result of this amendment were found to be acceptable.

The amendment in itself does not constitute a listed activity. The mitigation measures described in the original EIA document are adequate to manage the expected impacts for the project. Additional mitigation measures have been recommended by the avifauna and bat specialists and, as a result of this proposed amendment, have been included within the project EMPr (refer to Appendix I).

Given the above, Gunstfontein WEF (Pty) Ltd requests the following amendments to its EA:

1. An increase to the rotor diameter for each wind turbine from the authorised diameter of up to 140m, to **up to 180m**;
2. An increase in hub height from up to 120m, to a range of **up to 150m**;
3. Update the layout as required based on the revised turbine numbers and turbine specifications;
4. Amendment to site access co-ordinates:

It is requested that the site access co-ordinates (as specified on page 6 of the EA) is to be amended:

From:

Access to site: 32°32'12.91" S, 20°39'06.97" E

To:

Site access point 1: 32°32'32.67" S, 20°39'40.95" E

Site access point 2: 32°34'56.62" S, 20°42'59.77" E

And it is requested that the description of the technical details of the facility on page 7 of the EA be amended

From:

Site access: Site access will be via a gravel road which branches off of the R354. The access point is located approximately 2.0-2.5km from the R354 turn-off to Klein Roggeveld.

To:

Site access will be via a gravel road which branches off of the R354. Two access points are proposed approximately 2.0-2.5km and approximately 10.5-11.0km from the R354 turn-off to Klein Roggeveld.

5. It is requested that the following conditions be removed from the Environmental Authorisation, since the numbering of turbines has been updated in the amended layout, the turbines have been removed from sensitive areas, and the following conditions are therefore no longer relevant:
 - **Condition 2:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67
 - **Condition 3:** The following turbine positions is not approved; i.e. 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68 and does not form part of the development
 - **Condition 41:** The underground MV line route linking turbine 40 to turbine 49 is not approved

- **Condition 130:** The following turbine positions are hereby approved, i.e. 1-13, 19-22, 25-29, 38-43, 48-54, 57-67
- **Condition 131:** The following turbine positions are excluded from this environmental authorisation: turbine positions 14-18, 23, 24, 30-37, 44-47, 55, 56 and 68.

6. Amendment of Condition 42 of the EA:

from:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 is not approved"

To:

"The underground MV line and overhead MV line linking turbine 08 to turbine 11 (as shown on the layout plan submitted with the final EIR report, dated April 2016) is not approved".

7. Amendment of Condition 51 of the EA:

from:

"Condition 51: The area identified as "high sensitive escarpment" by the Environmental Sensitivity and Final Optimised Layout Map (Mitigation Strategy) received by the Department on 29 June 2016 is regarded as a "no-go" area."

To:

Areas identified as high and very high ecological sensitivity in the Environmental Sensitivity Map (**Ref Gunstfontein Updated Layout, Date 06 May 2019**) be regarded as no-go areas for turbines.

It is important to note that the high sensitivity areas are no-go for turbines only, not for associated infrastructure such as roads.

8. Amendment of Condition 27 of the EA (in order to align the Environmental Authorisation with the current EIA Regulations):

From:

Condition 27: The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. The holder must notify the Department of its intention to amend the EMPr at least 60 days prior to submitting such amendments to the EMPr to the Department for approval. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in Regulation 37 of GNR 982.

To:

The holder of the authorisation may apply for an amendment of an EMPr, if such amendment is required before an audit is required. In assessing whether to grant such approval or not, the Department will consider the processes and requirements prescribed in the relevant EIA Regulations at the time of application.

9. Amendment of Condition 123 of the EA:

From:

Pre-construction archaeological monitoring is required. The appointed archaeologist must keep a list documenting all identified farm infrastructure.

To:

Pre-construction archaeological walkthrough is required of the final layout. A report detailing the results of the walk-down must be submitted to SAHRA for comment. The holder must keep a list documenting

all features of archaeological significance, identified by the archaeologist, which may be impacted by the development and which must be demarcated as no-go areas.

The requested amendments of the turbine specifications and number will result in an optimisation of the layout assessed within the EIA and the avoidance of sensitive areas. As required in terms of Condition 13 of the EA, the final layout will be submitted to the DEA for review and approval once a turbine supplier has been selected for the project.

Taking into consideration the conclusions of the studies undertaken for the proposed amendments associated, with the revised turbine specifications and updated layout (as detailed in Appendix A – F), and taking into consideration all comments received from I&APs, it is concluded that these amendments are considered **acceptable** from an environmental perspective, provided that the original, and additional mitigation measures stipulated herein, are rigorously implemented.

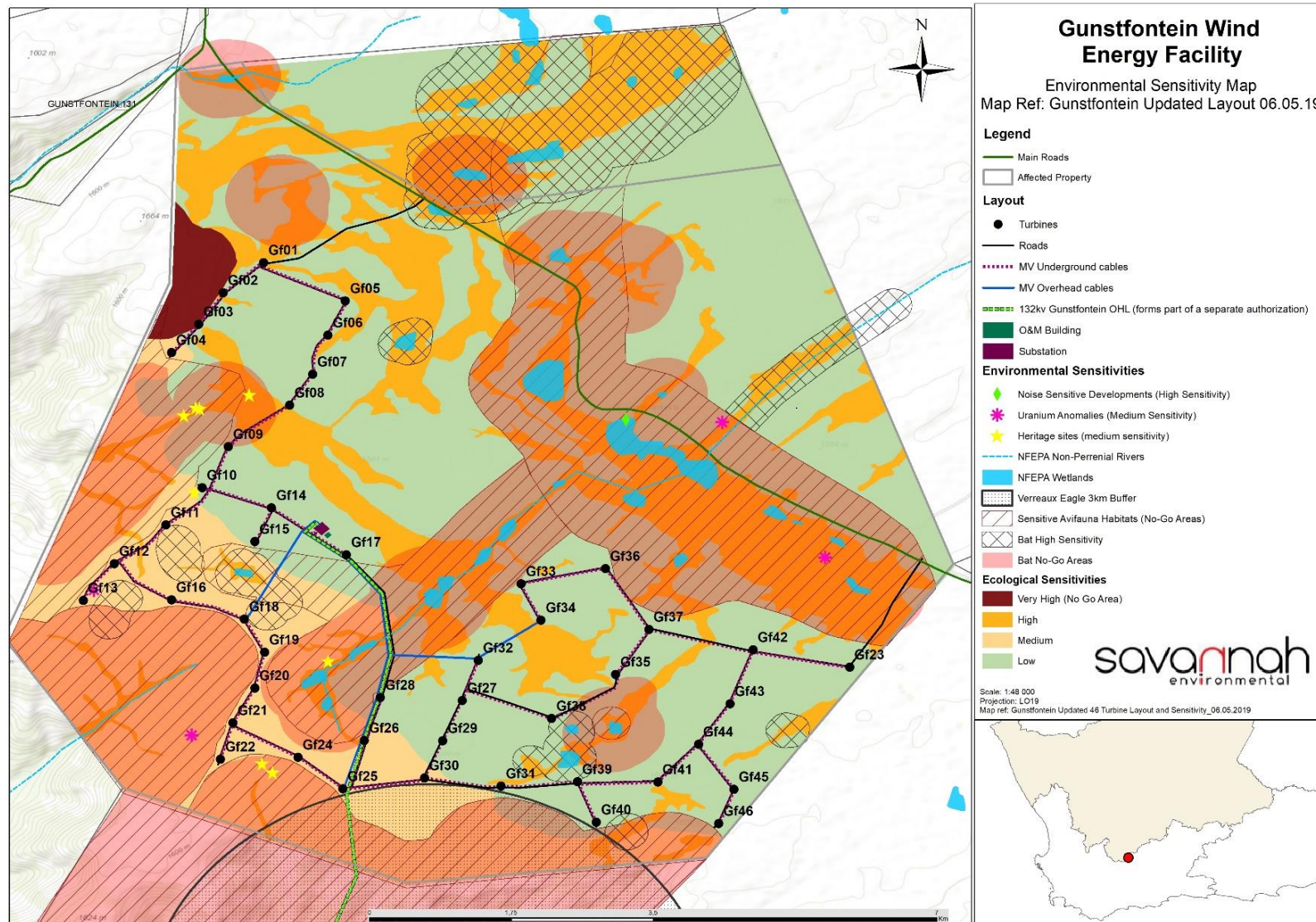


Figure 9.1: Updated wind farm layout with specialist environmental sensitivities (A3 Map included in **Appendix H**)

APPENDIX A:
AVIFAUNAL SPECIALIST ADDENDUM REPORT

APPENDIX B:
BAT SPECIALIST ADDENDUM REPORT

APPENDIX C:
ECOLOGICAL SPECIALIST ADDENDUM REPORT

APPENDIX D:
HERITAGE SPECIALIST ADDENDUM REPORT

APPENDIX E:
VISUAL SPECIALIST ADDENDUM REPORT

APPENDIX F:
NOISE SPECIALIST COMMENT LETTER