Holland & Associates
Environmental Consultants

Impact Assessments - Environmental Management Programs - Compliance Monitoring - Process Review

HIGHLANDS CENTRAL WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE WITHIN THE BLUE CRANE ROUTE LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

APPLICATION FOR AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION: DRAFT AMENDMENT ASSESSMENT REPORT

DFFE Reference number: 14/12/16/3/3/1/1958/AM1

DECEMBER 2021

Compiled for:

Highlands Central Wind Energy Facility RF (Pty) Ltd
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PROJECT DETAILS

DFFE Ref No: 14/12/16/3/3/1/1958/AM1

TITLE: Highlands Central Wind Energy Facility and associated infrastructure within the Blue Crane Route Local Municipality, Eastern Cape Province: Application for Amendment of the Environmental Authorisation: Draft Amendment Assessment Report

AUTHORS: Nicole Holland & Tilly Watermeyer

APPLICANT: Highlands Central Wind Energy Facility RF (Ltd) Pty

REPORT STATUS: Draft

SUBMISSION DATE: December 2021

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This report is to be referred to in bibliographies as:

Holland & Associates Environmental Consultants. 2021. Highlands Central Wind Energy Facility and associated infrastructure within the Blue Crane Route Local Municipality, Eastern Cape Province: Application for Amendment of the Environmental Authorisation: Draft Amendment Assessment Report. December 2021.

Executive Summary

1. Background

Highlands Central Wind Energy Facility RF (Pty) Ltd ("the Applicant") was granted Environmental Authorisation (EA) by the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) on 25 January 2020 to establish the Highlands Central Wind Energy Facility (WEF) and associated infrastructure, located approximately 20 km west of the town of Somerset East, and approximately 23 km south-east of the town of Pearston, in the Eastern Cape Province.

The infrastructure associated with the authorised WEF, as described and authorised in the DFFE Environmental Authorisation (EA) dated 25 January 2020 includes the following:

Component	***Description/ Dimensions***
Location of the site	*20 km west of Somerset East, Eastern Cape.*
Facility Area	*The Proposed development site is approximately 10 000 hectares. This is the total area covered, in which six components will be located. The actual infrastructure footprint will be around 1% of this for the Highlands Central WEF.*
Number of turbines	*Up to 12 turbines*
Site Access	*32°41'20.53 S* *25°21'31.02 E*
Hub height from ground level	*up to 135 m.*
Blade Length	*up to 75 m.*
Rotor diameter	*up to 150 m.*
Area occupied by inverter transformer stations/substations	*1.1 hectares.*
Capacity of on-site substation	*66/132 kV.*
Centre point coordinates of on-site substation	*32°43'55.95"S* *25°20'54.72"E*
Area occupied by both permanent and construction laydown areas	*1 hectare permanent laydown area.* *1 hectare construction laydown area.*
Operations and maintenance buildings (O&M building) with parking area	*200 m x 200 m.*
Length of internal roads	*approximately 50km.*
Width of internal roads	*12 m (6 m wide road surface plus 3 m on each side for road reserve and drainage).*
Proximity to grid connection	*On the northern part of the site, where existing 132 kV and 66 kV overhead power lines are located.*
Height of fencing	*Up to 3 m around substation and buildings.*
Type of fencing	*Stock proof palisade and/or diamond mesh.*

The Applicant is now applying to DFFE for an amendment to the EA, including:

- Amendments to the project description (including amendments to the turbine specifications (increased rotor diameter and hub height, in order to align to current international wind turbine generators (WTG) models), a reduction in the number of turbines, removing the specified generation capacity for individual turbines, as well as the addition of a Battery Energy Storage System (BESS) (within the authorized footprint of the WEF));
- Amendments to the preliminary layout of the project, and
- The correction of an editorial error in the EA (where reference is made to 70 MW instead of 72 MW).

The proposed amendments fall within the ambit of amendments to be applied for in terms of "Part 2 of Chapter 5" of the Environmental Impact Assessment (EIA) Regulations (2014), as amended, i.e. "amendments where a change in scope occurs". Holland and Associates Environmental Consultants has been appointed by the Applicant to undertake the requisite "Part 2" EA Amendment Application for the project, in accordance with the National Environmental Management Act (NEMA) (No. 107 of 1998) EIA Regulations (2014), as amended.

2. Project Location

The authorised Highlands Central WEF is located approximately 20 km west of the town of Somerset East, south of the R63 provincial road, in the Eastern Cape Province. The project is situated within Ward 6 of the Blue Crane Route Local Municipality in the Sarah Baartman District Municipality and is located entirely with the Cookhouse Renewable Energy Development Zone (REDZ).

The proposed amendments do not change the affected properties for the Highlands WEF site from the original Basic Assessment process for the project. The affected properties as described in the Revised Final Basic Assessment Report (BAR) (November 2019) thus remain as follows: Farm 102 Rietfontein – Portion 0 Remaining Extent; Farm 104 Coetzees Fontein – Portion 0; Farm 104 Coetzees Fontein – Portion 1; Farm 104 Coetzees Fontein – Portion 2; Farm 105 Doorn Rivier – Portion 0 Remaining Extent; Farm 105 Doorn Rivier – Portion 1; Farm 143 Nels Kraal – Portion 0; Farm 146 Kiepersol – Portion 1; Farm 144 Nelskom – Portion 0 Remaining Extent; Farm 145 De Mullers Kraal – Portion 0; Farm 145 De Mullers Kraal – Portion 8; Farm 361 Highlands – Portion 0 Remaining Extent; Farm 103 Spaarwater – Portion 0; Farm 101 Lekker water – Portion 2; and Farm 104 Coetzees Fontein – Portion 5. (Note: Properties with turbine positions include: Farm 104 Coetzees Fontein – Portion 1; Farm 104 Coetzees Fontein – Portion 2; Farm 105 Doorn Rivier – Portion 0 Remaining Extent; and Farm 105 Doorn Rivier – Portion 1).

3. Proposed Amendments

3.1. Proposed amendments to the project description

The Applicant wishes to increase the maximum dimensions of the Wind Turbine Generators (WTGs) in order to align to current international WTG models. In this regard, the following amendments to the project description are proposed (refer to Table 1):

Table 1: *Proposed amendments to the project description of the authorised Highlands Central WEF. (The proposed amendments are underlined for ease of reference).*

Component	Approved	Proposed amendment
Number of turbines:	Up to 12 turbines	Up to 10 turbines
Generation capacity of the WEF:	Up to 72 MW	No change
Generation capacity per turbine:	Up to 6 MW	Remove generation capacity per turbine
Rotor / blade diameters:	Maximum of 150 m	Maximum of 175 m
Hub height:	Up to 135 m	Up to 180 m
Tip height:	Up to 200 m	Up to 267.5 m
Foundation Size:	up to approximately 25 m x 25 m in total and up to 5 m deep per turbine	up to approximately 35 m x 35 m in total and up to 7 m deep per turbine
Hard Stand area per turbine:	5000 m^2	6000 m^2
Battery Storage	N/A (Not currently included in project description)	Battery Energy Storage System (BESS) adjacent to the substation on the temporary laydown area (with a footprint of approximately 1 ha, and a height of approximately 8 m).
Length of internal roads	Approximately 50 km	Approximately 45 km

The proposed Battery Energy Storage System (BESS), adjacent to the substation (on the authorized temporary laydown area), would have a footprint of approximately 1 ha and a height of up to 8 m. The technologies under consideration include Solid State (e.g. Lithium Ion) or Flow Technologies, however due to rapidly changing preferences and improvements to battery technology, the selection of the type of battery technology would only take place during the detailed design process and after the appointment of the battery supplier.

3.2. Proposed amendment to the preliminary layout

The Applicant proposes minor adjustments to the turbine positions of the preliminary layout in order to minimise wake effects between turbines, as well as to avoid the proposed amended blade length extending into areas identified as highly sensitive for birds and bats. In this regard, the proposed amendments to the preliminary layout include the following:

- Refinement to the turbine positions (with two authorized turbine positions having been removed, given the proposed reduction in the number of turbines for the WEF).
- Refinement to the proposed access roads layout (due to amendments to turbine positions and the reduction in the number of turbines).
- Rotation of the Highlands Central WEF substation yard, to fit the proposed amended road layout.
- The proposed BESS would be located adjacent to the substation, on the temporary laydown area.

3.3. Proposed correction of editorial error in the EA

On page 1 of the EA, the project title refers to "*70 MW*" instead of "72 MW". This editorial error is also made in Condition 1 on page 9 of the EA. However, the heading of the cover letter to the Environmental Authorisation contains the correct description (i.e. "*72 MW*"). The Applicant therefore proposes the correction of the editorial errors pertaining to the generation capacity of the WEF on pages 1 and 9 of the EA, to ensure the project title and Condition 1 correctly reflect the project, as described in the Revised Final BAR (November 2019) and associated Application Form for Environmental Authorisation.

4. Assessment of potential environmental impacts associated with the proposed amendments

The potential environmental impacts associated with the proposed amendments have been outlined and assessed in the Amendment Assessment Report. In this regard, all of the specialist studies that were undertaken during the Basic Assessment process for the Highlands Central WEF (which was concluded in 2020), have been updated as part of this EA Amendment Application process, to address and assess the potential environmental impacts associated with the proposed amendments, including the following:

- Flora and fauna;
- Aquatic;
- Avifauna (birds);
- Bats;
- Heritage, archaeology and palaeontology;
- Noise;
- Social;
- Agricultural;
- Traffic; and
- Visual.

The main conclusions of the specialists' assessments for the proposed amendments, as per the specialist amendment reports/ statements, are summarised below:

- Flora and Fauna: The proposed amendments are not considered significant from an ecological perspective and the impacts associated with the proposed amendments are considered consistent with the original impacts as assessed in the Fauna and Flora Basic Assessment study. There would therefore be no impacts associated with the proposed amendments, including the amended layout, that would be higher than the original layout as assessed. Furthermore, no additional mitigation or avoidance measures beyond those already recommended in the original Fauna and Flora Basic Assessment are required for the proposed amendments (Todd, 2021).

- Aquatic: The potential impact of the proposed amendments on the aquatic environment will remain unchanged from the original Aquatic Impact Assessment Report (August 2018) provided all the recommended mitigation measures are upheld. Although the impact significance rating will remain low (-) for all the potential aquatic impacts, there is an overall advantage to the proposed amended layout as the overall number of watercourse crossings has been reduced. Based on the findings of the assessment of potential aquatic impacts associated with the proposed amendments, the aquatic specialist has no objection to the authorisation of any of the proposed amendments, assuming that all mitigation measures recommended within the original

aquatic impact assessment report are carried out. No changes to the original mitigations or EMPr considerations are required (Colloty, 2021).

- Avifauna: Overall, the proposed amendments have potentially different impacts on birds. The proposed increase in blade length would result in a larger rotor swept area, which increases the collision risk area of a turbine, and would be disadvantageous to birds. This is however offset by a decrease in the number of turbines, which is advantageous to avifauna. Any potential changes are not significant enough to change any of the impact assessment ratings. Therefore, the proposed amendments will not result in an increased level or change in the nature of the impact, and the significance of all identified and re-assessed impacts is expected to be the same as those in the original bird impact assessment, with mitigations. There is no reason why the proposed amendments should not be authorised from an avifaunal perspective (Albertyn, 2021).

- Bats: The proposed amendments will have a differential impact on bat species, with most changes being positive for low flying species but negative for high flying species. The proposed amendments will not alter the overall impact of the Highlands Central WEF on bats. Provided the recommended mitigation measures are adhered to, including avoiding the placement of turbines in high bat sensitivity areas, maintaining a lower blade sweep of at least 40m, and using curtailment or deterrents if bat fatality exceeds threshold levels, the proposed development can proceed without unacceptable impacts to bats (Arcus, 2021).

- Heritage, archaeology and palaeontology: It is the opinion of the heritage specialist that the proposed amendments will not result in any new or increased level of negative impacts to heritage resources and that there will be no change in the nature of impacts. There are no disadvantages to the proposed amended layout. In fact, there are two minor benefits in that (1) the overall footprint is decreased which means potentially fewer impacts to archaeological and palaeontological resources and (2) the reduction in turbines will very slightly reduce the visual intrusion of the facility in the cultural landscape. No changes to the proposed mitigation measures are required. The existing measures must continue to apply. It is worth emphasizing that the archaeological pre-construction survey should be conducted as early as possible in order to facilitate planning of both any required mitigation and the construction phase of the project (Orton, 2021).

- Noise: Considering the outcome of the modelling, based on the conceptual scenarios as envisaged and input parameters used, the noise specialist concluded the following: (a) The proposed amendments to the project will not result in an increased level or significance of the noise impact, nor result in a change in the nature of potential noise impacts; (b) The proposed amendments to the project have the advantage that it will decrease the projected noise levels as well as the significance of the noise impact during the operational phase; (c) The proposed amendments to the project, due to the slightly lower noise levels, will require less mitigation measures and management as recommended in the original noise study (Reid, 2018) (de Jager, 2021).

- Visual: The increased hub height, rotor diameter and blade tip height would result in increased visibility of the 3 phases of the Highlands wind farm project (i.e. Highlands North, Central and South WEFs), particularly when viewed from the R63. Given that the visual significance of the increased height is generally limited to within 5km of the

turbines, and that there will be fewer turbines, the overall visual impact significance rating for the turbines is not expected to change from that of the originally assessed layout or authorised layout. The impact significance rating would thus remain moderate (-) before and after mitigation. Amendments to the related infrastructure, such as internal access roads and powerlines, would result in no change in the overall visual impact significance ratings in relation to those of the previously assessed proposals, and would remain low (-) before and after mitigation. Minor changes to substations and internal roads would have marginal visual implications and therefore their visual impact significance rating also remains unchanged at low (-). The addition of the battery storage facility adjacent to the substation would not have any major visual significance, given its maximum height of 8m and distance from visual receptors. Provided that the visual mitigations listed in the original Visual Impact Assessment Report (dated November 2018) (including post-construction rehabilitation of the site) are adhered to, the findings of the Visual Impact Assessment for the 3 phases of the Highlands Wind Farm Project (including the subject Highlands Central WEF) would still be valid for the proposed amendments, and it is the opinion of the visual specialists that the proposed amendments could be approved (Lawson & Oberholzer, 2021).

- Social: The reduction of the number of wind turbines and increase in the hub height and rotor diameter of the wind turbines associated with the Part 2 Amendment will not change the nature or significance of any of the social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs. The construction and operation of the proposed BESS will not result in any material social impacts that were not previously assessed as part of the SIA (2018) for the Highlands WEFs. The addition of a BESS also represents an advantage by ensuring a more secure and efficient renewable energy-based grid that is more resistant to disruptions. The mitigation measures for the construction of the Highlands WEFs listed in the SIA (2018) are appropriate for the Part 2 Amendment, including the establishment of the BESS. No additional management outcomes or mitigation measures in terms of social impacts are therefore required for the Highlands Central WEF. The social specialist concluded that the Part 2 Amendment for the Highlands Central WEF, including the establishment of the BESS, is therefore supported (Barbour, 2021).

- Agriculture: The proposed amendments will result in no changes to the projects agricultural impacts. The specialist therefore concluded that, "*from an agricultural impact point of view, the amendments and final layout should be authorised*" (Lanz, 2021).

- Traffic: The proposed amendments to the Environmental Authorisation do not trigger any new impact to the traffic and transportation on site and to and from, and no further recommendations or mitigation measures to those outlined in the Traffic Assessment dated 4 September 2018 are required. The proposed amendments therefore will not result in any significant increased level or change in the nature of traffic impacts. Based on the further assessment and original Traffic Specialist Report, the amendment can be granted to the applicant (Fautley, 2021).

In light of the findings of the specialist assessments, the proposed amendments are not anticipated to change the nature of impacts or result in an increased level of impact. The impact significance ratings would remain the same as for the authorised project, except for

potential noise impacts, where a reduction in the significance ratings (for operational phase activities) has occurred due to the proposed amendments, which is advantageous.

5. Public Participation Process

A public participation process (PPP), in accordance with the approved Public Participation Plan for the EA amendment application process, is being undertaken to ensure that potential and registered I&APs are given an opportunity to comment on the proposed amendments to the EA. Note: A **combined Public Participation Process** for the three Applications for Amendment of the Environmental Authorisations for the three Highlands WEFs, i.e. Highlands North WEF (DFFE REF: 14/12/16/3/3/1/1955), Highlands Central WEF (DFFE Ref: 14/12/16/3/3/1/1958) and Highlands South WEF (DFFE Ref: 14/12/16/3/3/1/1960) is being conducted, as was conducted for the Basic Assessment processes for the Highlands WEF projects in 2018 - 2020.

The Public Participation Process includes, amongst others, the following:

- **Advertisements** in English and Afrikaans, placed in *The Herald* newspaper, as well as in the local "*Hartland News*" newspaper.
- **Site Notices** in English and Afrikaans, placed at visible locations within the site and/or at the boundary of the site.
- **Notification posters** (in English and Afrikaans) placed in the towns of Pearston and Somerset East at venues such as the Post Office, local municipal offices, police station, public library, and local supermarket.
- Written notifications (sent via email, post and/or sms) to registered I&APs (in the **existing registered I&AP database**[1] provided by the Applicant for the Basic Assessment Processes that were concluded for the Highlands WEF projects in 2020), notifying registered I&APs of the EA Amendment Application and the availability of the associated Draft Amendment Assessment Report for review and comment.
- All potential and registered I&AP's (including relevant Organs of State and State Departments) will be given an opportunity to review and comment on the Draft Amendment Assessment Report for a **30 day comment period (excluding the period 15 December – 5 January)[2], i.e. from 6 December 2021 - 27 January 2022**.
- Copies of the Draft Amendment Assessment Report will be available as follows during the 30 day I&AP comment period:
    - A hard copy of the Draft Amendment Assessment Report will be lodged at the following public libraries for the 30 day I&AP comment period:
        - Ernst van Heerden Library in Pearston
        - Langenhoven Public Library in Somerset East
    - An electronic copy of the Draft Amendment Assessment Report will be made available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net). Furthermore, a copy of the Executive Summary for the Amendment Assessment Report will be made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs who may not want to download the full report.
    - Upon request, the report will be made available to I&APs via electronic file

[1] Note: The existing registered I&AP database has been updated subsequent to the Basic Assessment process, to include updated State Department's details.

[2] As per the EIA Regulations, 2014, as amended, Regulation 3(2) of GN R. 982, as amended, states that "*For any action contemplated in terms of these Regulations for which a timeframe is prescribed, the period of 15 December to 5 January must be excluded in the reckoning of days*".

transfer or Dropbox link. (The Dropbox link will be provided in the cover email for notifications sent to I&APs via email). Electronic copies of the report on CD or USB will be available on request.
    - An outline of the proposed amendments can be provided verbally (telephonically) to I&APs who are illiterate and/or those with disabilities and/or any other disadvantage, if necessary. Such I&APs may provide their comments via telephone and/or sms (if preferred), and such comments will be included in the Comments and Responses Report.
- Any additional I&APs who register during the Part 2 EA Amendment Application process will be added to the registered I&AP database.
- All comments submitted by I&APs during the 30 day I&AP comment period will be collated and responded to in a Comments and Response Report (CRR), which will be submitted to DFFE, together with the Final Amendment Assessment Report, for decision-making.
- Registered I&APs will be notified, in writing, of DFFE's decision.

6. Conclusions and Recommendations

In light of the findings of the specialist assessments, it is evident that no significant additional impacts are anticipated due to the proposed amendments. Furthermore, the proposed amendments are not anticipated to change the nature of impacts or result in an increased level of impact. The impact significance ratings as contained in the specialist reports included in the Revised Final BAR (November 2019) are accordingly still applicable for all assessed impacts, except for potential noise impacts, where a reduction in the significance ratings (for operational phase night-time activities) has occurred due to the proposed amendments, which is advantageous.

Given that no significant additional impacts are associated with the proposed amendments and that the significance of the potential environmental impacts are not expected to be higher than originally determined for the authorised project, the EAP is of the opinion that the proposed amendments to the Highlands Central WEF, as described in Section 2 of the Amendment Assessment Report, be considered for approval. The proposed amendments are considered acceptable to the specialists and EAP, provided that the recommended mitigation measures, as outlined in Section 3 of the Amendment Assessment Report (and in the associated specialist amendment reports) are implemented.

The draft Environmental Management Programme (EMPr) for the project, dated November 2019, has been updated to include the proposed amendments to the project description, the High-Level Risk Assessment for the proposed BESS, as well as the updated mitigation measures recommended by the bat and noise specialists in light of the proposed amendments. The recommended mitigation measures included in the fauna and flora, avifauna, agricultural, aquatic, heritage, traffic, social and visual specialist studies included in the Revised Final BAR (November 2019) have not required any changes or additions to their respective recommended mitigation measures as a result of the proposed amendments, and therefore remain valid.

In terms of the proposed BESS, the Applicant has indicated that, due to rapidly changing preferences and improvements to battery technology, the selection of the type of battery technology (i.e. either Solid State (e.g. Lithium-Ion) or Flow technologies) would only take place during the detailed design process and after the appointment of the battery supplier. It is therefore recommended that an updated Risk Assessment be submitted to DFFE once the

technology type has been determined, and that technology specific mitigation measures for the BESS must be included in the final EMPr that will be made available for public review and submitted to DFFE for approval in due course, i.e. prior to commencement of the activity, as required in terms of Condition of Authorisation 15 of the EA.

7. Way Forward

The Draft Amendment Assessment Report will be made available to I&APs for a 30 day comment period (excluding the period 15 December – 5 January)[3], i.e. from 6 December 2021 – 27 January 2022. Copies of the report will be available as follows during the 30 day I&AP comment period:

- A hard copy of the Draft Amendment Assessment Report will be available for viewing at the following public libraries:
  - Ernst van Heerden Library in Pearston
  - Langenhoven Public Library in Somerset East
- An electronic copy will be available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net). (Note: A copy of the Executive Summary for the Amendment Assessment Report will be made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs who may not want to download the full report).
- Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link. A Dropbox link will also be provided in the cover email for notifications sent to I&APs via email. Electronic copies of the report on CD or USB will be available on request, if required.

I&APs are invited to review and comment on the abovementioned document during the 30 day comment period (excluding the period 15 December – 5 January), i.e. 6 December 2021 - 27 January 2022. Should you have any comments, issues or concerns regarding the proposed amendments, please submit your comments in writing via post, e-mail or fax to Ms Tilly Watermeyer of Holland & Associates Environmental Consultants (email: tilly@hollandandassociates.net or post: P.O. Box 31108, Tokai, 7966, Fax: 0867626126, Tel: 060 319 1217) on or before **27 January 2022**.

All comments received during the 30 day I&AP comment period will be recorded and responded to in a Comments and Response Report, which will be included in the Final Amendment Assessment Report that is submitted to DFFE for decision making. Once DFFE issues their decision on the proposed amendment application, all registered I&APs will be notified in writing of DFFE's decision.

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ABBREVIATIONS

(-)	Negative
(+)	Positive
BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CBA	Critical Biodiversity Area
CEMP	Construction Phase Environmental Management Programme
DEA	Department of Environmental Affairs
DEFF	Department of Environment Forestry and Fisheries
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIA Report	Environmental Impact Assessment Report
EMPr	Environmental Management Programme Report
GN	Government Notice
Ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NPAES	National Protected Areas Expansion Strategy
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NSD	Noise Sensitive Development
OEMP	Operational Phase Environmental Management Programme
PPP	Public Participation Process
REDZs	Renewable Energy Development Zones
RSA	Rotor Swept Area

SARHA	South African Resources Heritage Agency
SIA	Social Impact Assessment
SCC	Species of Conservation Concern
SPV	Special Purpose Vehicle
VIA	Visual Impact Assessment
WEF	Wind Energy Facility
WTG	Wind Turbine Generators

1 INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND

Highlands Central Wind Energy Facility RF (Pty) Ltd ("the Applicant") was granted Environmental Authorisation by the Department of Environmental Affairs (DEA) (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) on 25 January 2020 to establish the Highlands Central Wind Energy Facility (WEF) and associated infrastructure, located approximately 20 km west of the town of Somerset East, and approximately 23 km south-east of the town of Pearston, in the Eastern Cape Province.

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- Correction of an editorial error in the EA (where reference is made to 70 MW instead of 72 MW).

Holland and Associates Environmental Consultants (herein referred to as "Holland & Associates") has been appointed by the Applicant to undertake the requisite Part 2 Application for Amendment of the EA for the project, in accordance with the National Environmental Management Act (NEMA) (No. 107 of 1998) Environmental Impact Assessment (EIA) Regulations (2014), as amended.

Note: WKN Windcurrent SA (Pty) Ltd, via the Special Purpose Vehicles (SPV's) Highlands North Wind Energy Facility RF (Pty) Ltd, Highlands Central Wind Energy Facility RF (Pty) Ltd, and Highlands South Wind Energy Facility RF (Pty) Ltd, applied for EA from DFFE in 2019, to establish the Highlands WEF, comprising three phases (WEFs), i.e. the Highlands North WEF (DFFE Ref: 14/12/16/3/3/1/1955), the Highlands Central WEF (DFFE Ref: 14/12/16/3/3/1/1958) and the Highlands South WEF (DFFE Ref: 14/12/16/3/3/1/1960) and associated infrastructure, located approximately 20 km west of the town of Somerset East, and approximately 23 km south-east of the town of Pearston, in the Eastern Cape Province. The Highlands WEF projects, including the subject Highlands Central WEF, are located within the Cookhouse Renewable Energy Development Zone (REDZ) (refer to Figure 1), therefore Basic Assessment processes were followed in line with GN R114 in Government Gazette 41445 of 16 February 2018. The three Basic Assessment processes for the three Highlands WEF projects were undertaken by Arcus Consultancy Services South Africa (Pty) Ltd in 2018 - 2020, and Environmental Authorisations for the three WEFs were granted by DEA (now DFFE) in early 2020. A combined total of up to 41 turbine positions (i.e. 14 turbines in the Highlands North WEF, up to 12 turbines in the Highlands Central WEF, and up to 15 turbines in Highlands South WEF) were approved for the three WEF projects, as well as associated infrastructure. Highlands North Wind Energy Facility RF (Pty) Ltd, Highlands Central Wind Energy Facility RF (Pty) Ltd, and Highlands South Wind Energy Facility RF (Pty) Ltd are now applying to DFFE for an amendment to their respective EAs, which, amongst others, would reduce the combined number of turbines at the three WEFs from the authorized 41 turbine positions, to 34 turbine positions (i.e. 12 turbines in the Highlands North WEF, up to 10 turbines in the Highlands Central WEF, and up to 12 turbines in Highlands South WEF) (refer to Figure 2). A separate EA Amendment Application process is being undertaken for each of the three WEFs, given that each WEF has its own EA.

This report pertains to the Application for Amendment of the EA for the Highlands Central WEF.

1.2 PROJECT LOCATION

The authorised Highlands Central WEF is located approximately 20 km west of the town of Somerset East and approximately 23 km south-east of the town of Pearston, south of the R63 provincial road, in the Eastern Cape Province (refer to Figures 1 and 2). The proposed project is situated within Ward 6 of the Blue Crane Route Local Municipality in the Sarah Baartman District Municipality.

The proposed amendments do not change the affected properties for the Highlands WEF site from the original Basic Assessment process for the project. The affected properties thus remain as follows:

- Farm 102 Rietfontein – Portion 0 Remaining Extent,
- Farm 104 Coetzees Fontein – Portion 0,
- Farm 104 Coetzees Fontein – Portion 1,
- Farm 104 Coetzees Fontein – Portion 2,
- Farm 105 Doorn Rivier – Portion 0 Remaining Extent,
- Farm 105 Doorn Rivier – Portion 1,
- Farm 143 Nels Kraal – Portion 0,
- Farm 146 Kiepersol – Portion 1,
- Farm 144 Nelskom – Portion 0 Remaining Extent,
- Farm 145 De Mullers Kraal – Portion 0,
- Farm 145 De Mullers Kraal – Portion 8,
- Farm 361 Highlands – Portion 0 Remaining Extent,
- Farm 103 Spaarwater – Portion 0,
- Farm 101 Lekker water – Portion 2, and
- Farm 104 Coetzees Fontein – Portion 5.

Note: Properties with turbine positions are as follows:

- Farm 104 Coetzees Fontein – Portion 1
- Farm 104 Coetzees Fontein – Portion 2
- Farm 105 Doorn Rivier – Portion 0 Remaining Extent
- Farm 105 Doorn Rivier – Portion 1

The project is situated entirely within the Cookhouse Renewable Energy Development Zone (REDZ), a region which was identified through a Strategic Environmental Assessment for wind and solar photovoltaic PV energy in South Africa, and which is of strategic importance for the large scale wind and solar photovoltaic energy development, including the rollout of its supporting transmission and distribution infrastructure, in terms of *Strategic Integrated Project 8: Green Energy in Support of the South African Economy*.

1.3 ENVIRONMENTAL LEGAL REQUIREMENTS

1.3.1 Application in terms of the NEMA 2014 EIA Regulations, as amended

In terms of the NEMA EIA Regulations (2014), as amended, the proposed amendments fall within the ambit of amendments to be applied for in terms of “Part 2 of Chapter 5” of the EIA Regulations (2014), as amended, i.e. “*amendments where a change in scope occurs*”.

Accordingly, an Application for Amendment of the EA must be undertaken in terms of Part 2 of Chapter 5 of the EIA Regulations (2014) as amended (Regulations 31 and 32 of GN R. 982, as amended), and submitted to DFFE for authorisation. In this regard, after submission of the Application for Amendment of the Environmental Authorisation to DFFE, the holder of the EA must submit a report to DFFE reflecting:

> *"(i) an assessment of all impacts related to the proposed change;*
>
> *(ii) advantages and disadvantages associated with the proposed change; and*
>
> *(iii) measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and*
>
> *(iv) any changes to the EMPr";*

This EA Amendment Assessment Report has been prepared in accordance with the requirements of Part 2 of Chapter 5 of the NEMA EIA Regulations (2014), as amended. A copy of the Application Form for Amendment of the Environmental Authorisation, which was submitted to DFFE, is attached herewith in **Appendix B**.

As required in terms of the NEMA EIA Regulations (2014), as amended, a Public Participation Process (including a 30 day comment period on the EA Amendment Assessment Report (this report)) is being undertaken for the proposed EA amendment application. Refer to Section 4 below for a summary of the Public Participation Process. The final EA Amendment Assessment Report will be submitted to DFFE at the end of the 30 day Interested and Affected Party (I&AP) comment period, for decision making. Note: The timeframe for decision making by the competent authority (i.e. DFFE) will be 57 days, given that the authorised WEF is located entirely within the Cookhouse REDZ, accordingly the decision-making timeframe stipulated in Government Notice (GN) No. 142 is applicable[4].

[4] GN No. 142: "*Identification of procedures to be followed when applying for or deciding on an Environmental Authorisation Application for large scale wind and solar photovoltaic facilities, when occurring in Renewable Energy Development Zones*", dated 26 February 2021.

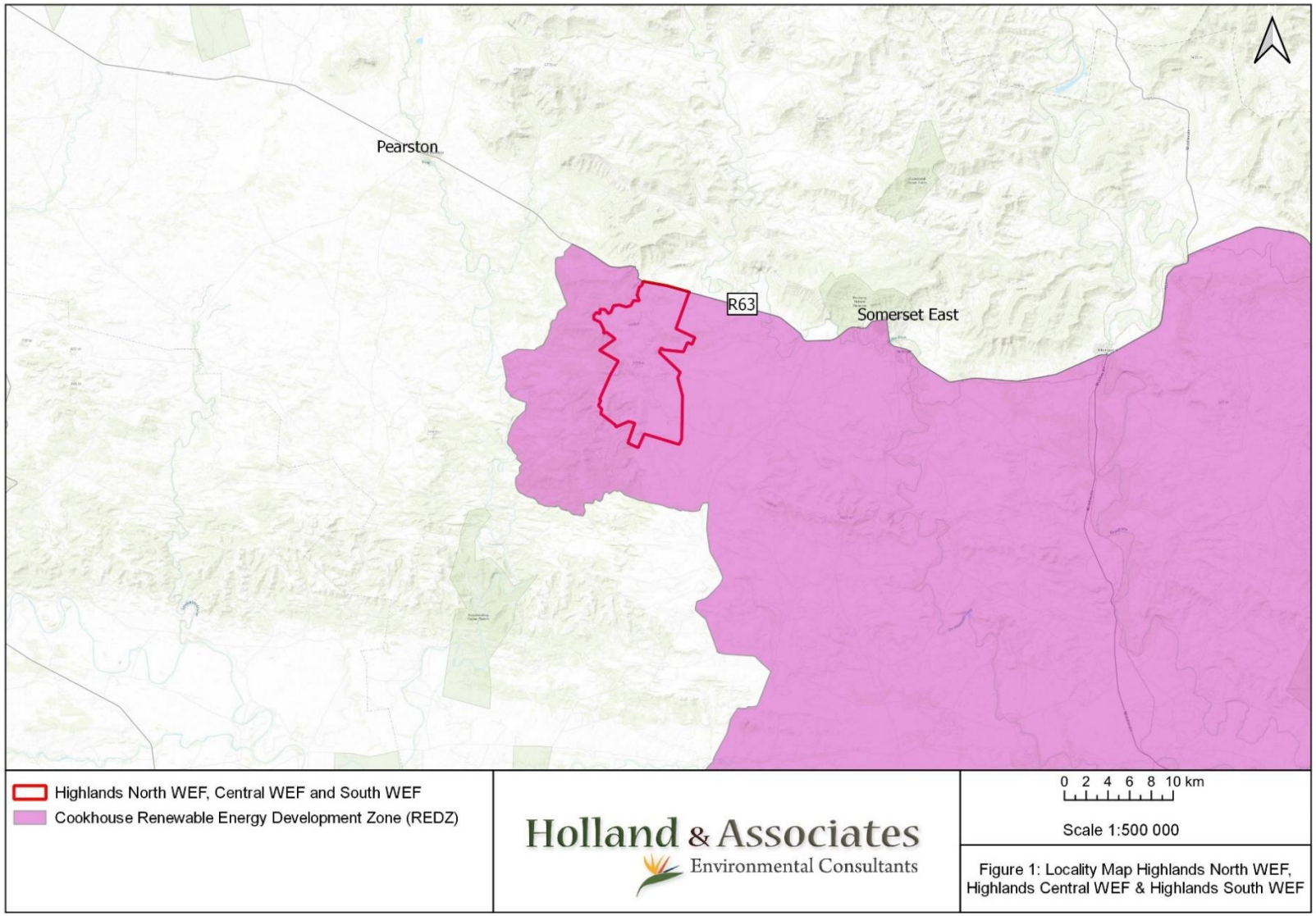

Figure 1: *Locality map showing the location of the Highlands WEFs site within the Cookhouse Renewable Energy Zone (REDZ)*

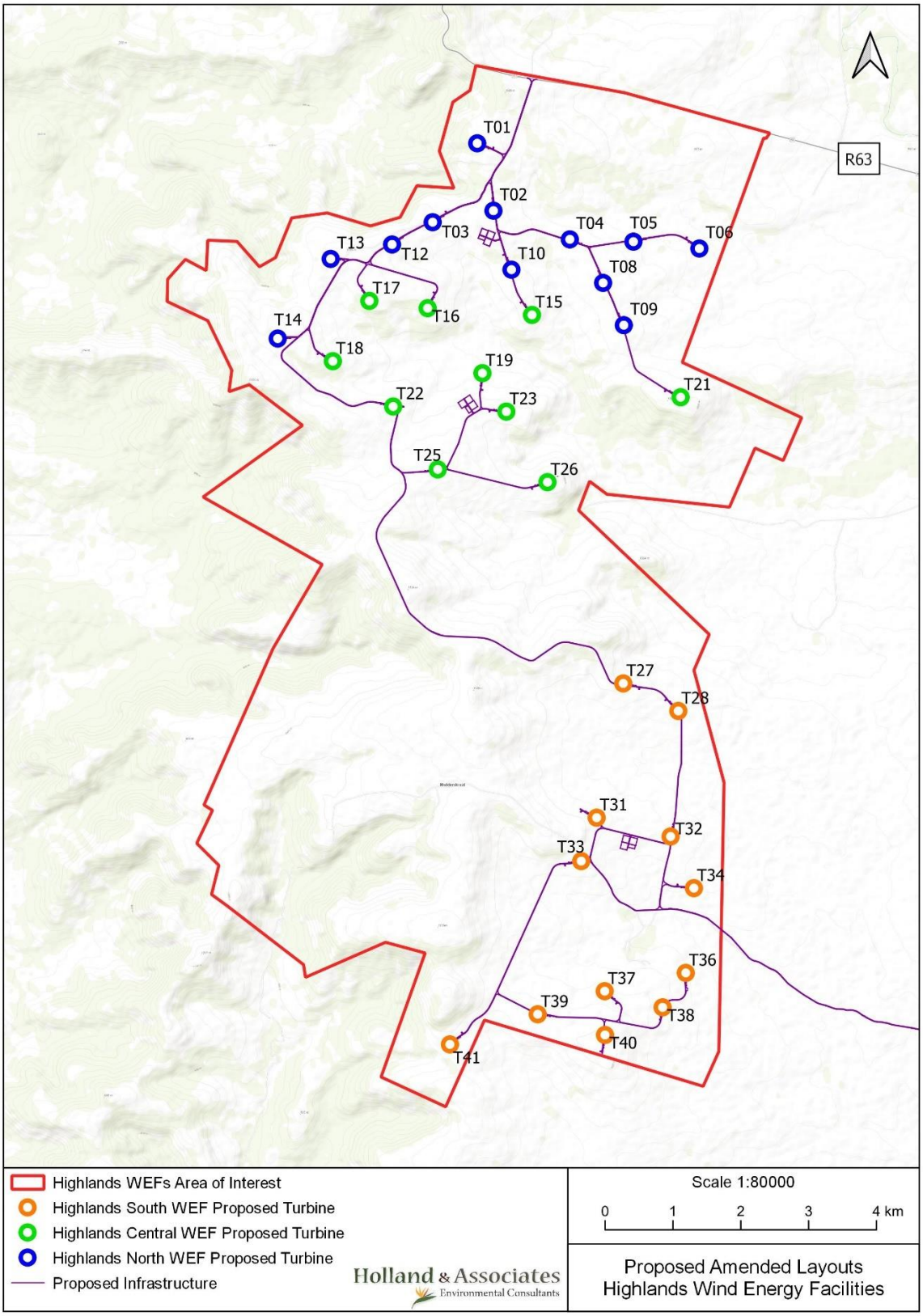

Figure 2: *Proposed Highlands North (blue), Highlands South (orange) & Highlands Central (green) WEFs (proposed amended layouts).*

1.3.2 NEMA EIA Listed Activities Authorised for the project

As per the Environmental Authorisation for the Highlands Central WEF dated 25 January 2020 (DFFE Ref: 14/12/16/3/3/1/1958), a number of applicable activities listed in Listing Notice 1, Listing Notice 2 and Listing Notice 3 (GN R.983, GN R.984 and GN R.985, as amended) of the EIA Regulations (2014), as amended, have been authorised by DFFE for the WEF. The authorised EIA Listed Activities are outlined in the table below. (Refer to the EA included in **Appendix E** for the description of authorised project components associated with each authorised listed activity).

***Table 1**: Authorised EIA listed activities in terms of the NEMA 2014 EIA Regulations, as amended*

Activity	Description
Listing Notice 1 (GN R.983, as amended) (noted as GN R327 in the EA)	
11:	*"The development of facilities or infrastructure for the transmission and distribution of electricity -* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV."*
12:	*"The development of-* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs* *(a) within a watercourse* *(c) if no development setback exists within 32m of a watercourse, measured from the edge of a watercourse. "*
19:	*"The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."*
24:	*"The development of a road-* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres."*
27:	*"The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.* (except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.")
28:	*"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.*
48:	*"The expansion of-* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs-* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;"*

56:	*"The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-* *(ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.*
Listing Notice 2 (GN R.984, as amended) (noted as GN R325 in the EA)	
1:	*"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more."*
6:	*"The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent."*
Listing Notice 3 (GN R.985, as amended) (noted as GN R324 in the EA)	
4:	*"The development of a road wider than 4 metres with reserve less than 13, 5 metres.* *a.* ***Eastern Cape:*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy* *Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans ... "*
10:	*'The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* ***a. Eastern Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;"*
12:	*"The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* ***a. Eastern Cape:*** *ii. Within critical biodiversity areas identified in bioregional plans;"*
14:	*"The development of-* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs-* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* ***a. Eastern Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ft) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*
18:	*"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1kilometre.*

	a. Eastern Cape: *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;"*
23:	*"The expansion of-* *(iii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs-* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* ***a. Eastern Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;"*

The proposed amendments will not require amendments to the listed activities that have been authorized for the project in terms of the NEMA EIA Regulations, 2014, as amended, i.e. no listed activities will need to be added or removed as a result of the proposed amendments.

Note: The proposed battery storage facility does not trigger any additional listed activities. The BESS would be located on an area already authorised as part of the development footprint for the project (i.e. on the temporary laydown area). Furthermore, activities relating to storage of dangerous goods, such as Activity 14 of Listing Notice 1 and Activity 10 of Listing Notice 3[5], would not be triggered by the proposed battery storage facility installation, as:

- A battery is not deemed to be a container; and
- In terms of the electrolytes that are used within battery storage facilities, their function is deemed to be like transformers within substations, converting high voltage electricity to lower voltage electricity for further distribution. The function of the battery is not for “storage” or “storage and handling” of a dangerous good. Should flow technologies be utilized, for flow batteries that need to be recharged, the Applicant confirmed that the truck would arrive at the BESS, recharge the flow batteries and leave immediately, accordingly there would be no temporary storage on site for the BESS.

Furthermore, battery storage does not trigger any listed activities relating to the generation of electricity, as batteries do not ‘generate’ electricity, they simply store electricity generated by the renewable energy facility (in this case, the Highlands Central WEF) and discharge the stored electricity when required by the grid.

1.4 DETAILS AND EXPERTISE OF THE EAP WHO COMPILED THIS REPORT

Nicole Holland of Holland & Associates Environmental Consultants (the Environmental Assessment Practitioner (EAP) prepared this report on the Application for Amendment of the Environmental Authorisation, assisted by Tilly Watermeyer of Holland and Associates

[5] Activity 10 of LN 3 is currently authorised for the project.

Environmental Consultants. The qualifications of the Environmental Assessment Practitioner (EAP) are outlined below:

***Table 2**: Details and expertise of the EAP*

Name	Academic Qualifications	Registration	Expertise
Nicole Holland	BSc (Hons) Environmental and Geographical Science	• Registered with the South African Council for Natural Scientific Professions (SACNASP). • Registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA). • Member of the IAIAsa (International Association for Impact Assessment (Western Cape branch)	Nicole Holland has a Bachelor of Science (Hons) in Environmental and Geographical Science from the University of Cape Town, specializing in Environmental Management. She has 19 years of experience in the environmental management field and has compiled and managed numerous environmental investigations including Environmental Impact Assessments, Environmental Management Plans/ Programmes (EMP), waste management license application processes, as well as applications for amendments of Environmental Authorisations. Nicole has extensive experience in managing environmental impact assessments and EA amendment processes including, amongst others, agricultural development projects, renewable energy developments, water supply dams, wastewater treatment works, housing and resort developments, cemeteries, road upgrades, pipelines, waste sites, and a cement manufacturing plant. Nicole has also undertaken the independent review of a number of Scoping and Environmental Impact Reports, and has been involved in a broad spectrum of other environmental work including Environmental Auditing, the drafting of Environmental Management Programmes, and Environmental Control Officer Work.
Tilly Watermeyer	MSc (Botany)	IAIAsa Member	Tilly Watermeyer has a Master of Science in Botany from Stellenbosch University. She has over 2 years of experience working in environmental management assisting with the compilation of numerous Environmental Impact Assessments, Environmental Management Programmes (EMP) and applications for Environmental Authorisations. She has experience in renewable energy projects, agricultural development projects and residential housing. Tilly has also assisted with and undertaken Environmental Audits, independent environmental reviews and Environmental Compliance monitoring.

The *Curriculum Vitae* of the EAP, including the details of the EAP and the EAP's Declaration of Interest are included in **Appendix D**.

1.5 DETAILS OF SPECIALISTS

Table 3 below outlines the specialist studies that were identified and undertaken as part of the original Basic Assessment process for the project in 2018 - 2020, and which have been updated to inform this Application for Amendment of the EA process[6].

***Table 3**: Details of Specialists Studies and Specialists*

Specialist study	Specialist for Original Basic Assessment Process	Specialist for EA Amendment Application Process
Agricultural Assessment	Johann Lanz	Johann Lanz
Aquatic Assessment	Dr Brian Colloty (Scherman Colloty & Associates)	Dr Brian Colloty (EnviroSci (Pty) Ltd)
Flora and Fauna Assessment	Simon Todd (3Foxes Biodiversity Solutions)	Simon Todd (3Foxes Biodiversity Solutions)
Avifaunal (bird) Assessment	Andrew Pearson (Arcus Consultancy Services South Africa)	Anja Albertyn (Holland and Associates Environmental Consultants)
External review of Avifaunal Assessment	Jon Smallie (Wildskies Ecological Services (Pty) Ltd)	Jon Smallie (Wildskies Ecological Services (Pty) Ltd)
Bat Assessment	Jonathan Aronson (Arcus Consultancy Services South Africa (Pty) Ltd)	Jonathan Aronson (Camissa Sustainability Consulting, for Arcus Consultancy Services South Africa (Pty) Ltd)
External review of Bat Assessment	Stephanie Dippenaar (Bird & Bats Unlimited)	N/A (External review specialist not required, as the bat specialist is not employed by the same company as the EAP).
Noise Assessment	Michael Reid (Arcus Consultancy Services)	Morné de Jager (Enviro-Acoustic Research cc.)
External review of Noise Assessment	Morné de Jager (Enviro-Acoustic Research cc)	N/A (External review specialist not required, as the noise specialist is not employed by the same company as the EAP. Morné de Jager did however undertake the Environmental Noise Impact Assessment for the proposed amendments to the EA).
Heritage, Archaeology & Paleontology	Dr Jayson Orton (ASHA Consulting) and Dr John Almond (Natura Viva cc)	Dr Jayson Orton (ASHA Consulting) and Dr John Almond (Natura Viva cc)
Visual Assessment	Quinton Lawson and Bernard Oberholzer	Quinton Lawson and Bernard Oberholzer
Social Assessment	Tony Barbour (Tony Barbour Environmental Consulting and Research)	Tony Barbour (Tony Barbour Environmental Consulting and Research)
Traffic Assessment	Stephen Fautley (Techso)	Stephen Fautley (Techso)

[6] Copies of the original specialist studies, as well as the original BAR, are available on request from Holland & Associates.

Refer to each of the respective specialist investigations included in **Appendix C** for the details of the specialists (including their CVs) and Declarations of Interest. The findings of the specialists' re-assessments/ comments for the proposed amendments are outlined in Section 3 of this report.

Note: Eight of the ten specialists who undertook the specialist studies for the original BAR process in 2018 – 2020 were appointed to re-assess the potential impacts associated with the proposed amendments to the EA. The two changes to the specialist team are for the avifaunal assessment, and noise assessment. In terms of the avifaunal assessment, Mr Andrew Pearson of Arcus Consultancy Services South Africa has left the avifaunal consulting industry and is no longer working as an avifaunal specialist. As a result, Ms Anja Albertyn, of Holland and Associates Environmental Consultants was appointed to undertake the assessment. Ms Albertyn was involved in the project previously as an assistant to the avifaunal specialist and the EAP, has been to site on several occasions and is familiar with the project. She is a registered, qualified avifaunal specialist and a selected member of the Birds and Renewable Energy Specialist Group (BARESG). Furthermore, her avifaunal impact assessment was reviewed by an external specialist, Mr Jon Smallie of WildSkies Ecological Services (Pty) Ltd. The original noise specialist, Michael Reid of Arcus Consultancy Services South Africa is located overseas (in Europe), therefore it was decided to utilize a local noise specialist, Mr Morne de Jager of Enviro-Acoustic Research cc., to undertake the re-assessment of noise impacts for the proposed amendment application. As Mr de Jager was the external review specialist for the original noise impact assessment during the Basic Assessment process for the project, Mr de Jager is familiar with the project, and is also highly experienced with environmental noise impact assessments for wind energy facilities in South Africa.

1.6 ASSUMPTIONS AND LIMITATIONS

1.6.1 Assumptions

In undertaking this investigation and compiling the Application for the Amendment of the EA, it has been assumed that:

- The information provided by the Applicant and specialists is accurate, unbiased and valid at the time it was provided.
- The scope of this investigation is limited to assessing the environmental impacts as associated with the proposed amendments, as outlined in Section 2 of this report.
- The baseline environmental information and assessment methodology contained in the Revised Final BAR (November 2019) for the Highlands Central WEF project and associated specialist reports is accurate and valid, and is not repeated in the current report[7].

1.6.2 Limitations and gaps in knowledge

- The layout of the WEF included in this EA amendment application process, as per the layout included in the Revised Final BAR (November 2019), is preliminary. (The final layout for the WEF will be submitted to DFFE for approval, in due course, before commencement of construction, as required in terms of Condition of Authorisation 12 of the EA).

[7] Copies of the original specialist studies, as well as the Revised Final BAR (dated November 2019), are available on request from Holland & Associates.

- The assumptions and limitations of the specialist reports and statements included in **Appendix C** of this report are noted and relevant for this EA Amendment Assessment Report.

2 PROPOSED AMENDMENTS TO THE ENVIRONMENTAL AUTHORISATION

2.1 DESCRIPTION OF PROPOSED AMENDMENTS

Highlands Central Wind Energy Facility RF (Pty) Ltd is proposing the following amendments[8] to the EA for the Highlands Central WEF:

- Amendments to the project description (including amendments to the turbine specifications (in order to align to current international wind turbine generators (WTG) models), a reduction in the number of turbines, removal of the specified generation capacity for individual turbines[9], as well as the addition of a Battery Energy Storage System (BESS) (within the authorized footprint of the WEF));
- Amendments (refinement) to the preliminary layout of the project; and
- Correction of an editorial error in the EA (where reference is made to 70 MW instead of 72 MW).

The proposed amendments are described further below.

2.1.1 Proposed amendments to the project description

The following amendments to the project description of the project are proposed:

- Reducing the maximum number of turbines from "up to 12 turbines" to "up to 10 turbines";
- Removing the specified generation capacity per turbine from the project description;
- Increasing the rotor diameter from a maximum of 150 m to a maximum of 175 m;
- Increasing the blade length from a maximum of 75 m to up to 87.5 m;
- Increasing the hub height from a maximum of 135 m to up to 180 m;
- Increasing the tip height from a maximum of 200 m to up to 267.5 m;
- Increasing in foundation size from "*approximately 25m x 25m in total and up to 5m deep per turbine*" as described in the Revised Final BAR (November 2019), to "up to approximately 35 m x 35 m in total and up to 7 m deep per turbine";
- The addition of a Battery Energy Storage System (BESS) adjacent to the substation on the temporary laydown area (with a footprint of approximately 1 ha and a height of up to 8m); and
- Reducing the length of internal roads from approximately 50 km to approximately 45 km (given the reduction in the number of turbines). (The width of internal roads would remain unchanged from the EA, i.e. approximately 12 m).

Table 4 below summarises the proposed project components to be amended, the authorised description of the components, as well as the proposed amendments.

[8] Should the proposed amendments be granted, it is recommended that the text of Condition 16.1 be amended to ensure that the updated mitigation measures outlined by the bat and noise specialists as a result of the proposed amendments, are addressed in the EA. Refer to Section 2.2 below in this regard.

[9] Note: The generation capacity of the individual turbines is not specified in the EA, however was included as part of the project description in the Revised Final BAR (November 2019).

Table 4: *Proposed amendments to the project description*

Component	Approved	Proposed amendment
Number of turbines:	Up to 12 turbines	Up to 10 turbines
Generation capacity of the WEF:	Up to 72 MW	No change
Generation capacity per turbine:	Up to 6 MW	Remove generation capacity per turbine
Rotor / blade diameters:	Maximum of 150 m	Maximum of 175 m
Hub height:	Up to 135 m	Up to 180 m
Tip height:	Up to 200 m	Up to 267.5 m
Foundation Size:	up to approximately 25 m x 25 m in total and up to 5 m deep per turbine	up to approximately 35 m x 35 m in total and up to 7 m deep per turbine
Hard Stand area per turbine:	5000 m^2	6000 m^2
Battery Storage	N/A (Not currently included in project description)	Battery Energy Storage System (BESS) adjacent to the substation on the temporary laydown area (with a footprint of approximately 1 ha, and a height of approximately 8 m).
Length of internal roads	Approximately 50 km	Approximately 45 km

The proposed Battery Energy Storage System (BESS), adjacent to the substation (on the temporary laydown area), would have a footprint of approximately 1 ha, a height of up to 8 m, and would include the following details described in Table 5 below:

Table 5: *Proposed BESS and Associated Infrastructure*

INFRASTRUCTURE	FOOTPRINT, DIMENSION AND DETAILS
Technology	Solid State (eg: Lithium Ion) or Flow Technologies
BESS footprint	Up to 1ha in total extent, including foundation and containerised battery system
Capacity	870MWh
Access road to BESS	The authorised road used to approach the substation compound would be used for the BESS, and once inside the substation compound, there would be internal roads to the office parking, substation and BESS. The roads may be approximately 8m in width.
Height	Up to 8m
Fencing	Fencing around the footprint of the BESS will be installed for access restriction measures.

Refer to **Appendix H** for a description (i.e. technical information and High-Level Risk Assessment) for the proposed BESS. Note: Due to rapidly changing preferences and improvements to battery technology, the selection of the type of battery technology would only take place during the detailed design process and after the appointment of the battery supplier.

It should be noted that, according to the Applicant, the proposed amendments to the project description, as outlined above, will not result in an increase in the size of the approved development footprint for the project. In this regard, the EA currently states the following: "*The Proposed development site is approximately 10 000 hectares. This is the total area covered, in which all six components will be located. The actual infrastructure footprint will be around 1% of this for the Highlands Central WEF*". The final EIA Report indicated that: "*Typically, in wind energy facilities, the amount of surface area covered by turbines and associated infrastructure such as roads is less than 1% of the total site. The footprint of the facility is estimated at 41 ha*". The development footprint with the proposed amendments would be approximately 39 ha[10].

2.1.2 **Proposed amendment to the preliminary layout**

The Applicant proposes minor adjustments to the turbine positions of the preliminary layout in order to minimise wake effects between turbines as well as to avoid the proposed amended blade length extending into areas identified as highly sensitive for birds and bats. In this regard, the proposed amendments to the preliminary layout include the following:

- Refinement to the turbine positions (with two authorized turbine positions having been removed, given the proposed reduction in the number of turbines for the WEF).
- Refinement to the proposed access roads layout (due to amendments to turbine positions and the reduction in the number of turbines).
- Rotation of the WEF substation yard, to fit the proposed amended road layout.
- The proposed BESS would be located adjacent to the substation, on the temporary laydown area (refer to Annexure H).

Refer to Figure 3 below for the proposed amended layout for the Highlands Central WEF. (The layout that was included in the Revised Final BAR (November 2019) that was submitted to DFFE for decision making is attached in **Appendix A** for ease of reference. It should however be noted that the aforementioned layouts are still preliminary, and the Applicant will still need to submit a final site layout plan to DFFE for approval, in due course, prior to commencement of the activity, as required in terms of Condition 12 of the EA.

[10] Note: The estimated 41 ha development footprint for the authorized project includes the access roads that go through Highlands North WEF to reach the Highlands Central WEF. The approximately 39 ha development footprint estimated for the proposed amendment has been estimated on the same principle, i.e. the 39 ha includes the access road that goes through Highlands North WEF to reach the Highlands Central WEF. Therefore, if all three WEFs (i.e. Highlands North, Central and South WEFs) are constructed, the total footprint of the combined WEFs would be smaller than the sum of all three individual WEFs (given that sections of access roads would be shared). To provide a "worst case scenario", however, the entire access road has been included in each WEF's EA.

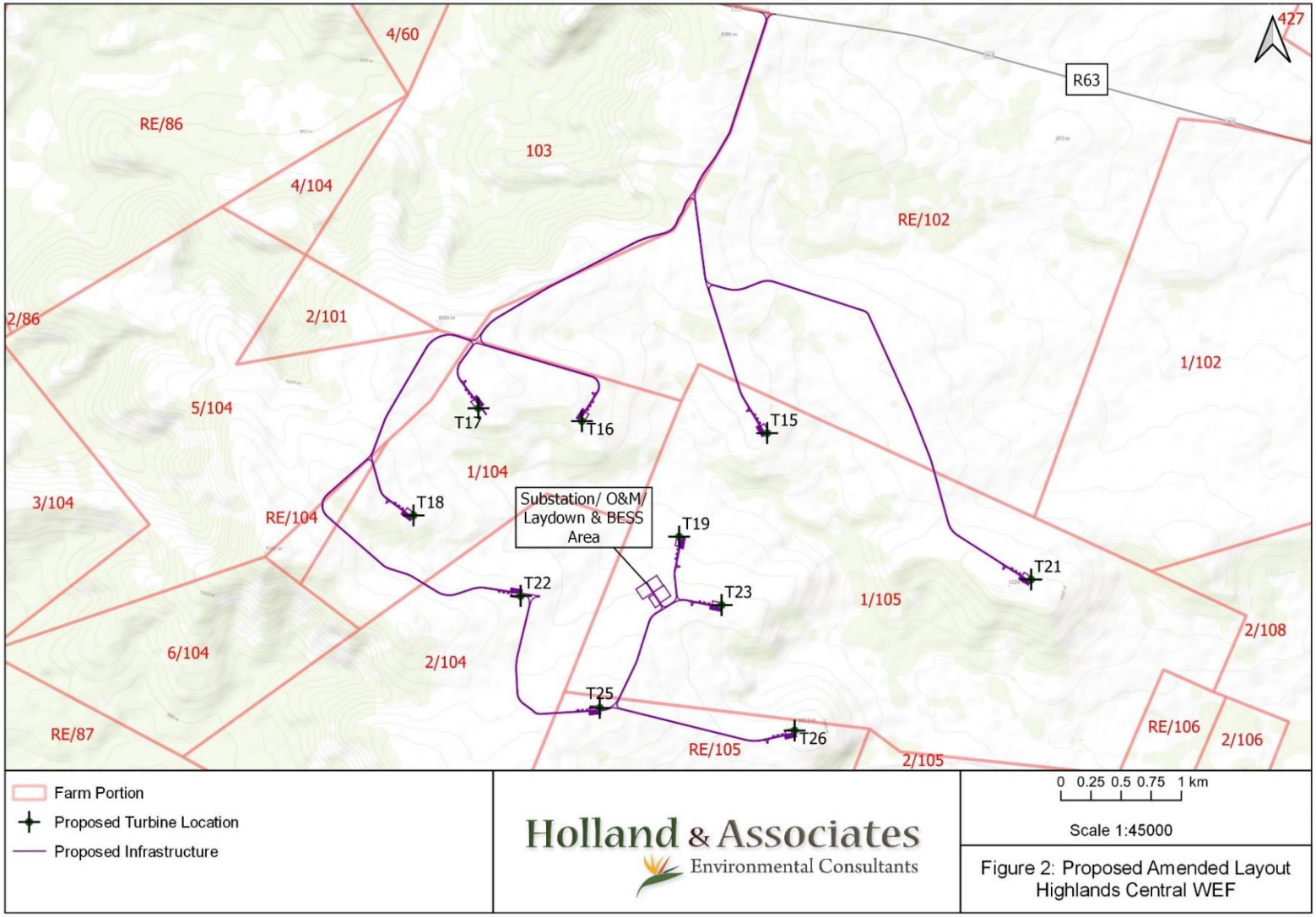

Figure 3: *Proposed amended layout*

The proposed amended co-ordinates of the turbine positions in the preliminary layout are provided in Table 6 below:

Table 6: *Co-ordinates of turbine position in the preliminary layout, as presented on page 21 of the EA (dated 25 January 2020), and the proposed amended co-ordinates of turbine positions (Note: Amendments are underlined for ease of reference)*

	Preliminary Layout included in Revised Final BAR (November 2019) (as presented on page 21 of the EA)		**Proposed Amendment**	
Wind Turbine Number	**Latitude (S)**	**Longitude (E)**	**Latitude (S)**	**Longitude (E)**
T18	32°43'34.72"S	25°19'39.76"E	32°43'35.32"S	25°19'38.33"E
T17	32°43'6.88"S	25°19'58.07"E	32°43'6.55"S	25°19'59.03"E
T16	32°43'2.11"S	25°20'25.69"E	32°43'10.02"S	25°20'32.08"E
T15	32°43'12.21"S	25°21'27.31"E	32°43'13.24"S	25°21'31.25"E
T21	32°43'53.20"S	25°22'55.72"E	32°43'52.52"S	25°22'55.50"E
T23	32°44'0.81"S	25°21'16.85"E	32°43'59.38"S	25°21'16.69"E
T20	32°43'45.06"S	25°20'32.08"E	~~32°43'45.06"S~~ (Removed)	~~25°20'32.08"E~~ (Removed)
T22	32°43'57.26"S	25°20'12.26"E	32°43'56.94"S	25°20'12.54"E
T25	32°44'27.50"S	25°20'37.44"E	32°44'26.95"S	25°20'37.80"E
T24	32°44'9.36"S	25°20'52.57"E	~~32°44'9.36"S~~ (Removed)	~~25°20'52.57"E~~ (Removed)
T19	32°43'38.78"S	25°20'58.63"E	32°43'41.02"S	25°21'3.13"E
T26	32°44'32.01"S	25°21'41.06"E	32°44'33.03"S	25°21'40.00"E

2.1.3 Proposed correction of editorial error in the Environmental Authorisation

On page 1 of the EA, the project title currently refers to "*70 MW*" instead of "72 MW" for the generation capacity of the WEF. This editorial error is also made in Condition 1 on page 9 of the EA. However, the heading of the cover letter to the Environmental Authorisation contains the correct description (i.e. "*72 MW*"). The Applicant therefore proposes the correction of the editorial errors pertaining to the generation capacity of the WEF on pages 1 and 9 of the EA, to ensure the project title and condition 1 correctly reflect the project, as described in the Revised Final BAR (November 2019) and associated Application Form for Environmental Authorisation (i.e. 72 MW).

2.2 PROPOSED AMENDMENTS TO THE TEXT OF THE ENVIRONMENTAL AUTHORISATION

The proposed amendments outlined in Section 2.1 above would require an amendment to the text in the Environmental Authorisation for the project, as outlined in Table 7 below:

Table 7: *Proposed amendments to the text of the Environmental Authorisation issued on 25 January 2020*

Environmental Authorisation - Highlands Central WEF			
Aspect to be amended	**Authorised (Text in EA dated 25 January 2020)**	**Proposed amendment to text of EA (in light of proposed amendments)**	
Project Title on page 1 of EA	*Construction of the 70MW highlands central wind energy facility and its associated infrastructure With in Blue Crane Local Municipality in the Eastern Cape Province*	Construction of the 72MW Highlands Central wind energy facility and its associated infrastructure within Blue Crane Local Municipality in the Eastern Cape Province	
Page 3	*GN R327 Item 12* *The development of* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs* *(a) within a watercourse* *(c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.* Infrastructure will be required at 12 water crossings and within 32 metres of a watercourse that covers an area of more than 100 m^2.	GN R327 Item 12 "The development of- (ii) Infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) Within a watercourse (c) If no development setback exists within 32m of a watercourse, measures from the edge of a watercourse."	Infrastructure will be required at 5 water crossings and within 32 meters of a watercourse that covers an area of more than 100 m^2
Page 4	*GN R325 Item 1* *The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.* The WEF will consist of up to 12 turbines for electricity generation with a combined capacity of more than 20 MW.	GN R325 Item 1 "The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more"	The WEF will consist of up to 10 turbines for electricity generation with a combined capacity of more than 20MW.

Page 8

The infrastructure associated with this facility includes:

Component	Description/Dimensions
Location of the site	20 km west of Somerset East, Eastern Cape.
Facility Area	The Proposed development site is approximately 10 000 hectares. This is the total area covered, in which all six components will be located. The actual infrastructure footprint will be around 1% of this for the Highlands Central WEF.
Number of Turbines	Up to 12 turbines
Site Access	32°41'20.53"S 25°21'31.02"E
Hub Height from ground level	up to 135 m.
Blade Length	up to 75 m.
Rotor Diameter	up to 150 m.
Area occupied by inverter transformer stations/substations	1.1 hectares.
Capacity of on-site substation	66/132 kV.
Centre point coordinates of on-site substation	32°43'55.95"S 25°20'54.72"E
Area occupied by both permanent and construction laydown areas	1 hectare permanent laydown area. 1 hectare construction laydown area.
Operations and maintenance buildings (O&M building) with parking area	200 m x 200 m.
Length of internal roads	approximately 50 km.
Width of internal roads	12 m (6 m wide road surface plus 3 m on each side for road reserve and drainage).
Proximity to grid connection	On the northern part of the site, where existing 132 kV and 66 kV overhead power lines are located.
Height of fencing	Up to 3 m around substations and buildings.
Type of fencing	Stock proof palisade and/or diamond mesh.

Component	**Description/ Dimensions**
Location of the site	20km west of Somerset East, Eastern Cape
Facility Area	The Proposed development site is approximately 10 000 hectares. This is the total area covered, in which all six components will be located. The actual infrastructure footprint will be around 1% of this for the Highlands Central WEF.
Number of turbines	Up to 10 turbines
Site Access	32°41'20.53"S 25° 21'31.02"E
Hub height from ground level	Up to 180 m
Blade Length	Up to 87.5m
Rotor Diameter	Up to 175 m
Tip Height	Up to 267.5 m
Area occupied by inverter transformer stations/ sub stations	1.1 hectares.
Capacity of on-site substation	66/132 kV.
Centre Point co-ordinates of on-site substation	~~32° 43'55.95"S~~ ~~25°20'54.72"E~~ 32° 43'56.44"S 25°20'57.40"E
Area occupied by both permanent and construction laydown areas	1 hectare permanent laydown area. 1 hectare construction laydown area.

<table>
<tr><td></td><td></td><td><table>
<tr><td>Operations and maintenance buildings (O&M building) with parking area</td><td>200 m x 200 m.</td></tr>
<tr><td>Length of internal roads</td><td>Approximately 45 km.</td></tr>
<tr><td>Width of internal roads</td><td>12 m (6 m wide road surface plus 3 m on each side for road reserve and drainage).</td></tr>
<tr><td>Proximity to grid connection</td><td>On the northern part of the site, where existing 132 kV and 66 kV overhead power lines are located.</td></tr>
<tr><td>Height of fencing</td><td>Up to 3 m around substations and buildings.</td></tr>
<tr><td>Type of fencing</td><td>Stock proof palisade and/or diamond mesh.</td></tr>
<tr><td>Battery Storage)</td><td>“Battery Energy Storage System (BESS) adjacent to the substation on the temporary (construction) laydown area, (with a footprint of approximately 1 ha, and a height of approximately 8 m)”</td></tr>
</table></td></tr>
<tr><td>Page 9</td><td>The construction 70MW highlands central wind energy facility and its associated infrastructure with in Blue Crane Local Municipality in the Eastern Cape Province is approved as per 21 SG code cited in the table above, on page 7.</td><td>The construction 72MW Highlands Central wind energy facility and its associated infrastructure with in Blue Crane Local Municipality in the Eastern Cape Province is approved as per 21 SG code cited in the table above, on page 7.</td></tr>
<tr><td>Page 12 Condition 16.1</td><td>16. The EMPr amendment must include the following:
16.1. All recommendations and mitigation measures including those listed and recorded in specialist report attached in the final BAR.</td><td>16. The EMPr amendment must include the following:
16.1. All recommendations and mitigation measures including those listed and recorded in specialist reports attached in the final BAR and subsequent updates to specialist reports (as part of an authorized EA amendment process).</td></tr>
</table>

Highlands Central Turbine Coordinates, Annexure 2, page 21

Highlands Central Turbine Co-Ordinates:

Wind Turbine Number	Latitude(S)	Longitude (E)
T18	32°43'34.72"S	25°19'39.76"E
T17	32°43'6.88"S	25°19'58.07"E
T16	32°43'2.11"S	25°20'25.69"E
T15	32°43'12.21"S	25°21'27.31"E
T21	32°43'53.20"S	25°22'55.72"E
T23	32°44'0.81"S	25°21'16.85"E
T20	32°43'45.06"S	25°20'32.08"E
T22	32°43'57.26"S	25°20'12.26"E
T25	32°44'27.50"S	25°20'37.44"E
T24	32°44'9.36"S	25°20'52.57"E
T19	32°43'38.78"S	25°20'58.63"E
T26	32°44'32.01"S	25°21'41.06"E

Wind Turbine Number	Latitude (S)	Longitude (E)
T18	32°43'35.32"S	25°19'38.33"E
T17	32°43'6.55"S	25°19'59.03"E
T16	32°43'10.02"S	25°20'32.08"E
T15	32°43'13.24"S	25°21'31.25"E
T21	32°43'52.52"S	25°22'55.50"E
T23	32°43'59.38"S	25°21'16.69"E
T20	~~32°43'45.06"S~~ (Removed)	~~25°20'32.08"E~~ (Removed)
T22	32°43'56.94"S	25°20'12.54"E
T25	32°44'26.95"S	25°20'37.80"E
T24	~~32°44'9.36"S~~ (Removed)	~~25°20'52.57"E~~ (Removed)
T19	32°43'41.02"S	25°21'3.13"E
T26	32°44'33.03"S	25°21'40.00"E

2.3 MOTIVATION FOR PROPOSED AMENDMENTS

2.3.1 Proposed Amendments to the project description

- Proposed amendments to turbine specifications:

  The Applicant wishes to increase the maximum dimensions of the Wind Turbine Generators (WTGs) in order to align to current international WTG models. Given ongoing and rapid technological improvements in the wind energy industry, WTG models are evolving on a continual basis. In order to ensure that a WEF has the smallest possible footprint per total installed capacity, the WTGs are evolving in higher yielding and more efficient generating units. The authorised turbine model with specifications of 135 m hub height and 150 m rotor diameter is no longer the preferred wind turbine technology, as new, larger turbines are entering the market (WKN Windcurrent, 2020). The Applicant accordingly wishes to amend the authorised turbine specifications to future proof the project amidst rapid technology developments, whilst also reducing the number of WTGs at the WEF.

- Proposed reduction in the number of turbines:

  In terms of the proposed reduction in the number of turbines at the Highlands Central WEF (from 12 turbines to 10 turbines), for this project, it is the avifaunal specialists' recommendation that the cumulative rotor swept area (RSA) for all three Highlands WEFs (i.e. Highlands North WEF, Highlands Central WEF and Highlands South WEF) should not increase more than up to a maximum of 15% as turbine numbers decrease. The number of turbines being applied for (across the three Highlands WEF phases) is based on this avifaunal specialist recommendation, and the turbines selected to be built for each scenario is based on environmental sensitivities identified in the Basic Assessment and EA amendment process. The cumulative increase in RSA for the proposed amendments for the Highlands North WEF, Highlands Central WEF and Highlands South WEF, is only 11.4%, with a 17% decrease in number of turbines (Albertyn, 2021). It is preferred for avifauna to have fewer larger turbines, rather than more smaller turbines, at the same RSA. Therefore, the reduction in turbine numbers is likely to balance out or even outweigh the increase in RSA (Albertyn, 2021).

- Proposed removal of specified generation capacity per turbine:

  In terms of the proposed removal of the specified generation capacity per turbine from the project description (specified as 6MW in the Revised Final BAR (November 2019), the individual turbine capacity has no bearing on environmental impact. It is the dimensions (size) of the individual turbine, along with its noise output, and the maximum permitted number of turbines, that are directly related to environmental impact (WKN Windcurrent, 2021). Some modern turbines have already increased beyond 6 MW capacity, and this trend is likely to continue in the near future within the validity period of the Environmental Authorisation (WKN Windcurrent, 2021).

- Proposed inclusion of a Battery Energy Storage System (BESS)

  In terms of the proposed inclusion of a Battery Energy Storage System (BESS), battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement,

transmission congestion relief, load following and time of use (WKN Windcurrent, 2020). In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option (WKN Windcurrent, 2020).

The proposed amendments to the project description will not result in an increase in the size of the approved development footprint for the project. In this regard, the Revised Final BAR (November 2019) indicated that: "*Typically in wind energy facilities, the amount of surface area covered by turbines and associated infrastructure such as roads is less than 1% of the total site. The footprint of the facility is estimated at 41.0 ha*" (Arcus Consultancy Services South Africa, 2019). The development footprint with the proposed amendments would be approximately 39 ha[11] (WKN Windcurrent, 2020).

2.3.2 Proposed amendment to the preliminary layout

Amendments to the turbine positions in the preliminary layout are proposed, in order to minimise wake effects between the turbines, as well as to avoid any part of the proposed larger turbine blades extending into areas identified as highly sensitive for birds and bats.

Refinement to the proposed access roads layout is also required, due to the proposed amendments to the turbine positions and the reduction in the number of turbines (from 12 to a maximum of 10). Furthermore, the rotation of the substation yard is proposed for the Highlands Central WEF, to fit the proposed amended road layout.

The proposed BESS would be located and developed immediately adjacent to the authorised substation on the temporary (construction) laydown area footprint, which forms part of the assessed and authorised development footprint of the proposed project.

2.3.3 Correction of editorial error in the Environmental Authorisation

The Revised Final BAR (November 2019) and associated Application Form for Environmental Authorisation for the project indicated that the maximum generation capacity of the WEF would be 72 MW. Whilst the DEA (now DFFE) cover letter for the EA dated 25 January 2020 correctly refers to the generation capacity of the WEF as 72 MW, the project title of the EA (page 1) and Condition 1 of the EA (page 9) incorrectly refer to "*70 MW*" instead of "72 MW". The Applicant therefore proposes the correction of the editorial errors pertaining to the generation capacity of the WEF on pages 1 and 9 of the EA, to ensure the project title and Condition 1 correctly reflect the project, as described in the Revised Final BAR (November 2019) and associated Application Form for Environmental Authorisation (i.e. 72 MW).

2.3.4 Recommended updates to Condition 16.1, should the proposed amendments be authorized

Given that the proposed amendments would require updates to the bat and noise mitigation measures, minor amendments to the text of Condition 16.1, (which refers to mitigation

[11] Note: The estimated 41 ha development footprint for the authorized project includes the access roads that go through Highlands North WEF to reach the Highlands Central WEF. The approximately 39 ha development footprint estimated for the proposed amendment has been estimated on the same principle, i.e. the 39 ha includes the access road that goes through Highlands North WEF to reach the Highlands Central WEF. Therefore, if all three WEFs (i.e. Highlands North, Central and South WEFs) are constructed, the total footprint of the combined WEFs would be smaller than the sum of all three individual WEFs (given that sections of access roads would be shared). To provide a "worst case scenario", however, the entire access road must be included in each WEF's EA.

measures included in the specialist reports included in the BAR) are recommended, should the proposed amendments be authorised, to address the updates to the aforementioned mitigation measures.

2.4 ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

The proposed amendments have a variety of advantages and disadvantages which are outlined in Table 8 below.

Table 8: *Advantages and disadvantages of the proposed amendments*

	ADVANTAGES	**DISADVANTAGES**
General:	Aligning the Highlands WEF to current international WTG models (given advances in WTG technology) would result in improved project efficiency and feasibility, as well as viability to be bid in the REIPPPP.	
	The installation of the proposed Battery Energy Storage System (BESS) would allow the WEF to store the energy generated by the wind turbines, enabling supply of electricity to the grid at all times and improving the efficiency of the WEF's power supply.	
	The correction of the editorial errors pertaining to the generation capacity of the WEF on pages 1 and 9 of the EA would ensure the project title and Condition 1 correctly reflect the project, as described in the Revised Final BAR (November 2019) and associated Application Form for Environmental Authorisation (i.e. 72 MW).	
	There would be a decrease in the number of turbines.	
	There would be a decrease in the overall development footprint of the WEF.	
Fauna and flora (Ecology)	The distribution of turbines and associated infrastructure in relation to the sensitive features of the site are little changed between the original assessment and the amendment. As a result, there do not appear to be any significant advantages.	The distribution of turbines and associated infrastructure in relation to the sensitive features of the site are little changed between the original assessment and the amendment. As a result, there do not appear to be any significant disadvantages.
Avifauna	A decrease in the number of turbines is advantageous to avifauna. It is preferred for avifauna to have fewer larger turbines, rather than more smaller turbines, at the same rotor swept area (RSA). Therefore, the reduction in turbine numbers is likely to balance out or even outweigh the increase in RSA.	A proposed increase in blade length would result in a larger rotor swept area, which increases the collision risk area of a turbine, and would be disadvantageous to avifauna.
Bats	The increase in hub height, increase in rotor diameter, increase in upper tip height and increase in lower tip height may be advantageous for low flying bat species as the proposed	The increased hub height, increased rotor diameter, and increased upper tip height may however be disadvantageous for higher flying

	amendments would likely have positive implications for low flying bat species.	bat species, as the proposed amendments may have negative implications for such species.
Aquatic	There is an overall advantage to the proposed amended layout as the overall number of watercourse crossing has been reduced (although the impact significance would remain Low for all the impacts).	N/A
Visual	The reduction in the number of turbines could result in less visual clutter in the landscape. As there are fewer turbines, the distance between viewpoints and turbines has slightly increased in some cases.	There would be a moderate increase in the zone of visual exposure and a slight increase in the extent of the viewshed (but farmsteads in a view shadow would generally not be affected).
Agriculture/ Soils	N/A (There are no agricultural advantages related to the amendments).	N/A (There are no agricultural disadvantages related to the amendments).
Heritage	There are two minor benefits to the proposed amended layout in that (1) the overall footprint is decreased which means potentially fewer impacts to archaeological and palaeontological resources, and (2) the reduction in turbines would very slightly reduce the visual intrusion of the facility in the cultural landscape.	N/A
Social	The addition of a Battery Energy Storage System (BESS) would represent an advantage by ensuring a more secure and efficient renewable energy-based grid that is more resistant to disruptions.	N/A
Traffic	There will be fewer super-load vehicle trips on the road network transporting wind turbine components to site.	Wind turbine components to be transported to site would have increased mass and spatial dimensions (i.e. longer wind turbine blades).

3 ASSESSMENT OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED AMENDMENTS

The potential environmental impacts associated with the proposed amendments have been assessed and described in the following section of this report. In this regard, during the Basic Assessment process for the Highlands Central WEF (which was concluded in 2020), the following specialist studies were identified and undertaken as part of the Basic Assessment process:

- Flora and fauna;
- Aquatic;
- Avifauna (birds);
- Bats;
- Heritage, archaeology and palaeontology;
- Noise;
- Social;
- Agricultural;
- Traffic; and
- Visual.

All of the above specialist studies have been updated as part of this EA Amendment Application process, to assess and address the proposed amendments to the EA. The findings of the specialist investigations for the proposed amendments are summarised below. Refer to Table 3 for the list of specialists, and to **Appendix C** for the full specialist amendment reports/ statements. Note: An impact summary table, indicating the significance of the potential impacts associated with the authorized Highlands Central WEF (referred to as the "Authorised Project") versus the proposed amendments (referred to as the "Proposed Amended Project", is provided in Table 33 of Section 3.11.

3.1 IMPACTS ON FLORA AND FAUNA

The potential impacts on Flora and Fauna identified during the original Basic Assessment process for the project, and which have been re-assessed by Mr Simon Todd of 3Foxes Biodiversity Solutions in terms of the proposed amendments, include the following:

Construction Phase impacts:
- Impact on vegetation and listed plant species
- Faunal impacts due to construction

Operation Phase impacts:
- Faunal impacts
- Alien plant invasion
- Soil erosion
- Impact on CBAs and broad-scale ecological processes

Decommissioning Phase impacts:

- Faunal impacts
- Alien plant invasion
- Soil erosion

Cumulative Impacts:

- Cumulative impacts on habitat loss and ability to meet conservation targets

The findings of the assessment of the potential impacts associated with the proposed amendments are outlined below. Refer to **Appendix C1** for the Flora and Fauna specialist statement, compiled by Mr Simon Todd of 3Foxes Biodiversity Solutions for the EA amendment application.

a) Potential impacts

In terms of the proposed amendments, the specialist stated that "*Based on the layout as provided for the amendment, no impacts would be increased by the amendment application. Although the number of turbines would be reduced this reduction would be partly offset by the increase in the size of the turbine hardstands. Overall, the difference is not considered significant and impacts would be the same as that assessed for the original approved layout and no changes to the assessed impacts would be required.*"

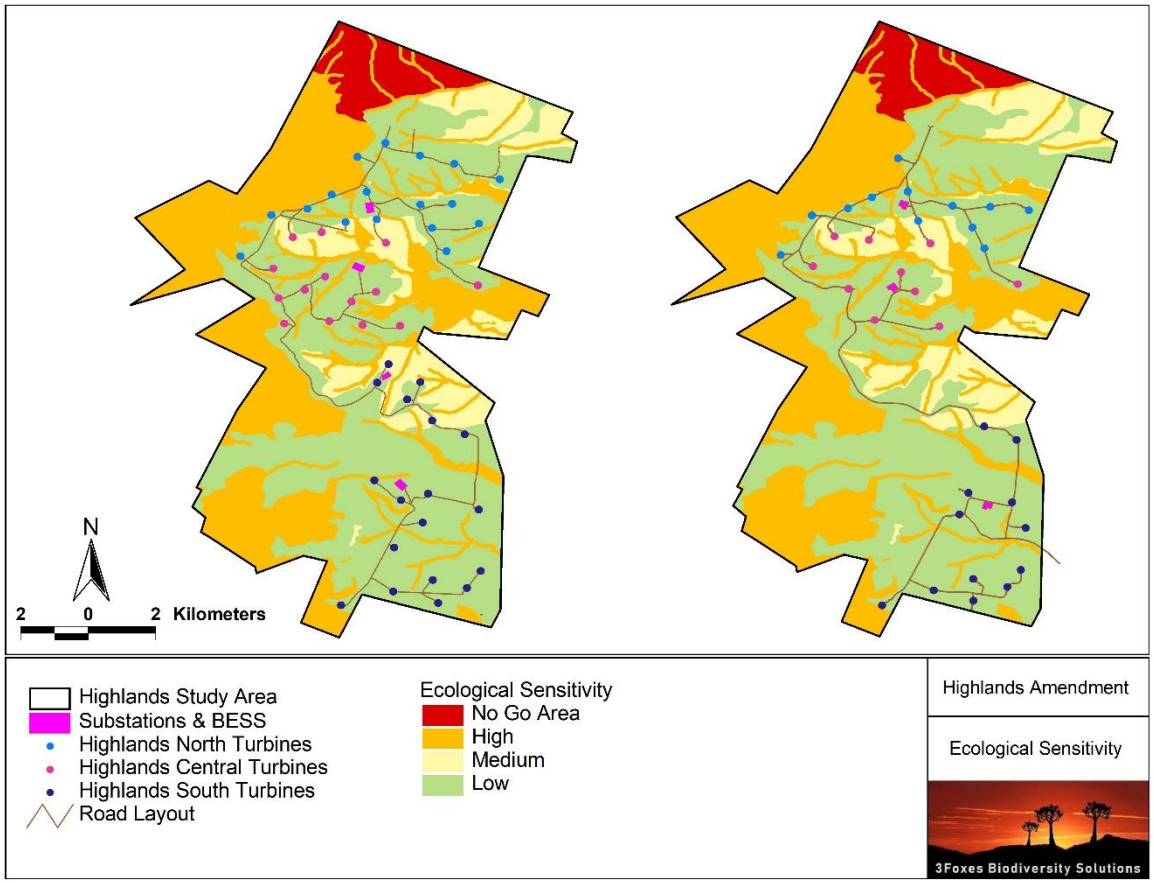

Figure 4: *The sensitivity map for the Highlands Central WEF showing the original layout on the left and the proposed amended layout right in relation to the ecological sensitivity of the site (Todd, 2021).*

The specialist noted that the proposed amended layout of the Highlands Central WEF is located in similar areas to the original footprint and there are no turbines in High or Very High sensitivity areas under either the original or amended layout. In addition, there are no new or

additional impacts associated with the proposed amendments, including the proposed amended layout. The cumulative impacts associated with the amendment are considered to be similar to those as assessed in the Basic Assessment and thus there would be no changes to the overall cumulative impacts associated with the change (Todd, 2021).

A summary of the originally assessed impacts (as assessed in the Fauna and Flora specialist report (dated August 2018) together with the re-assessment of impacts for the proposed amendments is provided in the table below (Table 9).

Impact Assessment Summary

Table 9: *Fauna and Flora: Summary of the original pre- and post-mitigation significance of impacts associated with the original assessed layout and proposed amended layout of the Highlands Central WEF (Source: Todd, 2021)*

Impact	Original Assessed Layout		Proposed Amended Layout	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Construction Phase				
Impact on Vegetation and listed plant species	Medium (-)	Medium (-)	Medium (-)	Medium (-)
Faunal Impacts due to construction	Medium (-)	Low (-)	Medium (-)	Low (-)
Operational Phase				
Faunal Impacts	Medium (-)	Low (-)	Medium (-)	Low (-)
Alien plant invasion	Medium (-)	Low (-)	Medium (-)	Low (-)
Soil Erosion	Medium (-)	Low (-)	Medium (-)	Low (-)
Impact on CBAs and broad-scale ecological processes	Medium (-)	Low (-)	Medium (-)	Low (-)
Decommissioning				
Faunal Impacts	Medium (-)	Low (-)	Medium (-)	Low (-)
Alien plant invasion	Medium (-)	Low (-)	Medium (-)	Low (-)
Soil Erosion	High (-)	Low (-)	High (-)	Low (-)
Cumulative Impacts				
Cumulative impacts on habitat loss and ability to meet conservation targets	Medium (-)	Low (-)	Medium (-)	Low (-)

b) Mitigation Measures

There are no recommended changes to the mitigation and avoidance measures that were included in the original Fauna and Flora specialist Basic Assessment study, given that the proposed amended layout is located in similar areas to the original footprint, that there are no wind turbines located within High or Very High sensitivity areas, and that there are no new or additional impacts on fauna and flora associated with the proposed amendments. All of the mitigation and avoidance measures as recommended in the Flora and Fauna specialist Basic Assessment (dated August 2018) are upheld by the current study and should be applicable to the amended layout as well (Todd, 2021).

c) Conclusion

The specialist concluded that the major change associated with the amendment would be an increase in the size of the turbines and a slight reduction in the overall number of turbines, as well as the addition of the BESS to the facility. The changes are however not considered significant from an ecological perspective and the impacts associated with the proposed amendments are considered consistent with the original impacts as assessed in the Fauna and Flora Basic Assessment study. There would therefore be no impacts associated with the proposed amendments, including the amended layout, that would be higher than the original layout as assessed. Furthermore, no additional mitigation or avoidance measures, beyond those already recommended in the Fauna and Flora specialist Basic Assessment study are required for the proposed amendments. As such, there are no reasons to oppose the proposed amendment and it can therefore be supported from an ecological point of view (Todd, 2021).

3.2 IMPACTS ON AVIFAUNA

The original Pre-construction Bird Monitoring: Impact Assessment, undertaken by Arcus Consultancy Services South Africa in 2018 – 2019, assessed the following potential impacts of the Highlands Central WEF on avifauna:

- Habitat destruction
- Disturbance and Displacement (Construction, operational & decommissioning phases)
- Collisions with wind turbines
- Collisions with power lines
- Electrocution
- Disruption of local bird movement patterns
- Cumulative impacts

Ms Anja Albertyn of Holland & Associates was appointed to undertake the assessment of the potential impacts on avifauna associated with the proposed amendments[12]. The findings of the assessment are outlined below. Refer to **Appendix C2** for the full addendum to the Avifaunal Specialist Impact Assessment, compiled by Ms Albertyn.

a) Potential impacts

No additional impacts to those assessed in the original bird impact assessment report were identified for the proposed amendments, and all impacts identified in the original bird impact assessment report were re-assessed for the proposed amendments.

The avifauna specialist noted that the addition of a BESS could result in potential habitat destruction, disturbance and displacement. However, since the BESS is proposed in an approved temporary laydown area, this has already been assessed, and the addition of the BESS would not lead to a change in the development footprint. With this said, the addition of

[12] A three day site visit was conducted on 27 – 29 July 2020 to the project area, in order to identify any changes in land use since the original assessment, confirm avifaunal habitats and priority species nest activity on and surrounding the WEF site. Potential impacts of the proposed amendments were identified and re-assessed using the same impact assessment methodology (Hacking 2001) that was used during the original assessment. A review of the originally recommended mitigation measures was also conducted and updated where necessary in line with current best practice. No change in land use or avifaunal habitats was observed from 2019 conditions when traversing the site, and it was assumed that the avifaunal baseline identified from monitoring and site visits from 2017 to 2019, against which potential impacts were assessed in the 2019 bird impact assessment report, is still applicable.

a BESS could lead to an increase in collision with internal powerlines and electrocutions, which has been re-assessed and is discussed together with the assessed impacts below.

Construction Phase Impacts

- **Habitat destruction:** While the magnitude of habitat destruction is likely to be somewhat reduced with a reduction in the number of turbines, particularly for terrestrial species and passerines, this reduction is not of a magnitude that would change the significance rating of the impact, provided all mitigation measures are implemented. The significance rating for this impact remains as Low (-) with mitigation.

Table 10: *Avifauna: The impact table for habitat destruction during the construction phase. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	L	M	NEG	H	M	M
	With mitigation	L	L	M	NEG	L	L	M
Proposed amendments	Without mitigation	M	L	M	NEG	H	M	M
	With mitigation	L	L	M	NEG	L	L	M
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated, would occur with the proposed amendments versus the authorised project description.								

- **Disturbance and displacement:** While the magnitude and probability of overall disturbance and displacement is likely to be reduced with a reduction in the number of turbines, particularly for terrestrial species and passerines, this change is not of a magnitude that would change the significance rating of the impact, provided all recommended mitigation measures are implemented.

Table 11: *Avifauna: The impact table of disturbance and displacement during construction. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	L	L	NEG	M	M	M
	With mitigation	L	L	L	NEG	L	L	M
Proposed amendments	Without mitigation	M	L	L	NEG	M	M	M
	With mitigation	L	L	L	NEG	L	L	M

Additional mitigation measures: none All mitigation measures in the original assessment must be implemented
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description

Operational Phase Impacts

- **Collision with wind turbines**: The proposed increase in turbine size and reduction in number of turbines results in a 13.4% increase in rotor swept area (RSA) and a 16.7% reduction in turbine numbers. While an increase in RSA does increase the collision risk area, it has been demonstrated that this does not necessarily translate into a direct increase in collision risk, and that other, local factors play a greater role in influencing collision risk and mortality rates. It has also been found that fewer larger turbines are preferable over many smaller turbines for avifauna (Everaet 2014). Provided turbine placement considers avifaunal sensitivity areas and all recommended mitigation measures are implemented, the larger and fewer turbines are not expected to lead to a change in collision risk (Albertyn, 2021).

Table 12: *Avifauna: The impact table of collision risk with turbines during operational phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	H	M	M	NEG	H	M	M
	With mitigation	H	M	M	NEG	M	M	M
Proposed amendments	Without mitigation	H	M	M	NEG	H	M	M
	With mitigation	H	M	M	NEG	M	M	M
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

- **Collisions with power lines:** A reduction in the number of turbines may decrease the length of internal cabling required, and thus potentially decrease the risk of collisions. However, this potential reduction would be too small to change the significance rating of the impacts. With the recommended mitigation measures, such as burying of overhead powerlines wherever practically possible, there would be no change from the original assessment.

Table 13: *Avifauna: The impact table of collision risk with power lines during operational phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	H	L	M	NEG	M	M	M
	With mitigation	M	L	M	NEG	L	L	M
Proposed amendments	Without mitigation	H	L	M	NEG	M	M	M
	With mitigation	M	L	M	NEG	L	L	M
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

- **Electrocutions:** A reduction in the number of turbines may also decrease the length of internal cabling, and thus potentially decrease the risk of electrocutions. However, the potential reduction by two turbines would be too small to change the significance rating of the impacts. With the recommended mitigation measures, such as the insulation of electrical infrastructure and using bird friendly designs wherever burying of cables is not possible, there would be no change in the impact ratings from the original assessment.

Table 14: *Avifauna: The impact table of electrocution risk during operational phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	L	M	NEG	M	M	M
	With mitigation	M	L	M	NEG	L	L	H
Proposed amendments	Without mitigation	M	L	M	NEG	M	M	M
	With mitigation	M	L	M	NEG	L	L	H
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

- **Disturbance and displacement:** While the magnitude and probability of overall disturbance and displacement is likely to be reduced with a reduction in the number of turbines (particularly for terrestrial species and passerines), this change is not of a magnitude that would change the significance rating of the impact, provided all mitigation measures are implemented as recommended.

Table 15: *Avifauna: The impact table of disturbance and displacement during operational phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	M	M	NEG	M	M	L
	With mitigation	M	L	M	NEG	L	L	L
Proposed amendments	Without mitigation	M	M	M	NEG	M	M	L
	With mitigation	M	L	M	NEG	L	L	L
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

- **Disruption of Local Bird Movement Patterns:** As the probability of this impact occurring is already low, the reduction of turbine numbers is unlikely to have any effect on the ratings of this impact and the significance is considered to remain unchanged.

Table 16: *Avifauna: The impact table of local bird movement patterns during operational phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	M	M	NEG	L	L	L
	With mitigation	M	M	M	NEG	L	L	L
Proposed amendments	Without mitigation	M	M	M	NEG	L	L	L
	With mitigation	M	M	M	NEG	L	L	L
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

Decommissioning Phase Impacts

- **Disturbance and Displacement**: While the magnitude and probability of overall disturbance and displacement is likely to be slightly reduced with a reduction in the number of turbines (particularly for terrestrial species and passerines), this change is not of a magnitude that would change the significance rating of the impact.

Table 17: *Avifauna: The impact table of disturbance and displacement during the decommissioning phase of the wind energy facility. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	M	L	L	NEG	M	M	M
	With mitigation	L	L	L	NEG	L	L	M
Proposed amendments	Without mitigation	M	L	L	NEG	M	M	M
	With mitigation	M	L	L	NEG	L	L	M
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequemce, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

Cumulative Impacts

No further developments have been authorised within 35km of the Highlands Wind Energy Facilities (WEFs) (North, South and Central) (DFFE, Q1 2021) (Albertyn, 2021). The proposed amendments to the Highlands WEFs would lower the total turbine number by 17% (to 34 turbines) and increase the total RSA by 11.4%. As mentioned above, from an avifaunal perspective, it is preferred to have fewer, larger turbines, rather than more, small turbines at the same RSA (Albertyn, 2021). Thus, the reduction in turbine numbers is likely to balance out or even outweigh the increase in RSA. However, it is not expected that the level of any change would be significant enough to change any of the impact ratings. Therefore, the significance rating of this impact is not expected to be affected by the proposed amendments.

Table 18: *Avifauna: The cumulative impacts table for the proposed Highlands Wind Energy Facilities. The significance rating does not change as a result of the proposed amendments (Albertyn, 2021).*

		Severity	Extent	Duration	Status	Probability	Significance	Confidence
Original assessment	Without mitigation	H	H	M	NEG	M	H	M
	With mitigation	M	H	M	NEG	L	M	M
Proposed amendments	Without mitigation	H	H	M	NEG	M	H	M

	With mitigation	M	H	M	NEG	L	M	M
Additional mitigation measures: none All mitigation measures in the original assessment must be implemented								
No changes in the consequence, reversibility, irreplaceable loss of resources and if the impact can be avoided, managed or mitigated would occur with the proposed amendments versus the authorised project description.								

Impact Assessment Summary

Table 19: *Avifauna Impacts: Summary of the significance of impacts on avifauna (with and without mitigation) associated with the authorized project, and proposed amended project, for the Highlands Central WEF*

Impact	Authorised project description		Proposed amended project description	
	Significance rating without mitigation	Significance rating with mitigation	Significance rating without mitigation	Significance rating with mitigation
Construction Phase				
Habitat destruction	Medium negative	Low negative	Medium negative	Low negative
Disturbance & Displacement	Medium negative	Low negative	Medium negative	Low negative
Operational Phase				
Collisions with wind turbines	Medium negative	Medium negative	Medium negative	Medium negative
Collisions with power lines	Medium negative	Low negative	Medium negative	Low negative
Electrocution	Medium negative	Low negative	Medium negative	Low negative
Disturbance and Displacement	Medium negative	Low negative	Medium negative	Low negative
Disruption of Local Bird movement patterns	Low negative	Low negative	Low negative	Low negative
Decommissioning Phase				
Disturbance & Displacement	Medium negative	Low negative	Medium negative	Low negative
Cumulative Assessment				
Cumulative impact	High negative	Medium negative	High negative	Medium negative

b) Mitigation Measures

The mitigation measures proposed in the original avifaunal assessment (Arcus 2019) are valid and must be included in the EMPr for the proposed project. No additional mitigation measures are required for the proposed amendments.

c) Conclusion

Overall, the proposed amendments have potentially different impacts on birds. The proposed increase in blade length would result in a larger rotor swept area, which increases the collision risk area of a turbine, and would be disadvantageous to birds. This is however offset by a decrease in the number of turbines, which is advantageous to avifauna. Any potential changes are not significant enough to change any of the impact assessment ratings. Therefore, **the proposed amendments will not result in an increased level or change in the nature of the impact, and the significance of all identified and re-assessed impacts is expected to be the same as those in the original bird impact assessment, with mitigations. There is no reason why the proposed amendments should not be authorised from an avifaunal perspective (Albertyn, 2021).**

3.2.2 Avifaunal Independent Peer Review of the Re-Assessment of Potential Avifaunal Impacts

Mr Jon Smallie of WildSkies Ecological Services (Pty) Ltd was appointed to undertake a review of the re-assessment of the potential impacts on avifauna as a result of the proposed amendments for the Highlands Wind Energy Facilities (North, South and Central), compiled by Ms Anja Albertyn of Holland and Associates Environmental Consultants. The review letter from WildSkies Ecological Services is attached in **Appendix C2d**.

WildSkies was sent the report entitled '*Proposed Highlands Central Wind Energy Facility near Somerset East, Eastern Cape province: Application for Amendment of the Environmental Authorisation (14/12/16/3/3/1/1958): Addendum to the Avifaunal Specialist Impact Assessment*". The report was reviewed and WildSkies concluded that the study and its findings are reasonable and are based on sound data. The proposed amendments, including proposed amendments to the turbine specifications and number of turbines, will not change the original impact assessment findings (Smallie, May 2021).

3.3 IMPACTS ON BATS

The potential impacts on bats identified and assessed during the pre-construction bat monitoring specialist study for the Highlands Wind Energy Facilities, undertaken by Arcus Consultancy Services South Africa (Pty) Ltd in 2017 – 2018 as part of the Basic Assessment process for the authorized project, included the following:

- Roost disturbance
- Roost destruction
- Habitat modification
- Habitat creation in high risk locations
- Bat mortality during commuting and /or foraging
- Bat mortality during migration
- Light pollution
- Cumulative impacts

Arcus Consultancy Services South Africa were appointed to undertake the re-assessment of the potential impacts on bats for the proposed amendments. Of the impacts to bats outlined

above, the bat specialist determined that the following potential impacts to bats be re-assessed in light of the proposed amendments:

- Bat mortality during commuting and /or foraging
- Bat mortality during migration
- Cumulative impacts

The findings of the assessment are outlined below. Refer to **Appendix C3** for the full Bat Amendment Report, compiled by Arcus Consultancy Services South Africa (Pty) Ltd for the EA amendment application.

a) Potential impacts

The proposed amendment to use taller turbines with a greater rotor diameter, and a reduction in the number of turbines, will have varying implications for low-flying bat species and high-flying bat species (Table 20). In terms of the proposed decrease in the number of turbines at the WEF, the bat specialist noted that the decrease in the number of turbines is unlikely to change the original significance rating for all impacts considered here, both for low- and high-flying bat species (Arcus, 2021). The bat specialist indicated that the proposed reduction in turbines numbers is minor, and the change is considered to be neutral (refer to Table 20).

The proposed increase in hub height would be negative for high flying bat species, particularly to free-tailed bats, fruit bats and tomb bats which are all present, and have fatally collided with turbines, in the Eastern Cape. This is because taller turbines are predicted to kill more bats[13] (Arcus, 2021). However, given the low activity at 90 m for the Highlands WEF site, the increased hub height would not change the previous bat assessments findings. While the increased hub height may be negative for high flying bat species, the proposed amendment might decrease potential impacts to lower flying species (refer to Table 20). These species would have a reduced likelihood of encountering turbine blades that are higher in the air, which is a positive aspect of the proposed changes (Arcus, 2021).

The bat specialist indicated that, whilst there are limited data on the relationship between rotor diameter and bat fatality for turbines of the size being proposed for the Highlands Central WEF, it is logical to assume that increasing the rotor swept area would likely increase bat fatality, but that this remains untested in South Africa. However, the increased rotor diameter is associated with an increased hub height and would be higher in the air. The increased rotor diameter may therefore also have a differential impact to bat species, with high flying species being impacted more. Given the low activity at 90 m for the Highlands WEF site, and the fact that the total rotor swept area will not increase more than 15 %, the increased rotor swept area would not change the previous bat assessments findings (Arcus, 2021).

The increase in the upper tip height (from up to 200 m to up to 267.5 m) would only negatively impact high flying species (refer to Table 20). It is unlikely that the increase in the upper tip height would result in a significant difference in fatality for high flying species given the lower activity recorded at height and would not change the previous bat assessments findings.

Based on the maximum turbine dimensions being applied for, the lower tip height is likely to increase as a result of the proposed amendment. However, the lower tip heights that will be used is unknown and will depend on the turbines ultimately selected. Fatalities of bats in South

[13] Smallwood, K. S. 2020. USA Wind Energy-Caused Bat Fatalities Increase with Shorter Fatality Search Intervals. Diversity 2000 cited in Arcus Consultancy Services South Africa (2021).

Africa have occurred among species that typically do not use high, open air spaces, suggesting that these species are likely killed in the lower portion of the rotor swept area (Arcus, 2021). Turbines with lower tip heights may result in greater fatality, therefore increasing the lower tip height will be positive for low-flying species. For high flying species, this change would be neutral because these bats would be active across most of the rotor swept area (refer to Table 20) (Arcus, 2021).

Table 20: *Bats: Summary of the Implications of the Proposed Amendments on low-flying and high-flying bat species (Arcus, 2021)*

Proposed Amendment	Impact Implication		
	Positive	Negative	Neutral
↓ Number of turbines	-	-	All bat species
↑ Hub height	For low flying species	For high flying species	-
↑ Rotor diameter	For low flying species	For high flying species	-
↑ Upper tip height	For low flying species	For high flying species	-
↑ Lower tip height	For low flying species	-	For high flying species

Possible Impacts or Risks (Operational Phase):

- **Bat mortality during commuting and /or foraging:** The major potential impact of wind turbines on bats is direct mortality resulting from collisions with turbine blades and/or barotrauma (Grodsky et al. 2011; Horn et al. 2008; Rollins et al. 2012, cited in Arcus, 2021). These impacts would be limited to bat species which make use of the airspace in the rotor-swept zone of the wind turbines. All species of bat that were recorded at the project exhibit behaviour that may bring them into contact with wind turbine blades, therefore they are potentially at risk of negative impacts (Arcus, 2021). The proposed amendments do not change the significance level of this potential impact which remains as Medium (-) without mitigation, and Low (-) with mitigation. In order to maintain the impact significance at Low, additional mitigation measures have been recommended by the bat specialist (refer to sub-section on “mitigation measures” below for further details).

- **Bat mortality during migration:** The Natal long-fingered bat is the only species recorded during the pre-construction monitoring period for the project, known to exhibit long-distance migratory behaviour. Whilst the majority of bat mortalities at WEFs in North America and Europe are migratory species, evidence from the pre-construction monitoring for the project, however, does not suggest migratory behaviour through the site and it is therefore unlikely that mortality will occur during migration periods. It is possible however, that during the operating lifespan of the WEF it may be possible that migration patterns and species distributions may change in response to climactic and/or habitat shifts. There may also be inter-annual variation in bat movement patterns which cannot be observed with a single year of data (Arcus, 2021). The impact significance rating determined in the Pre-construction bat monitoring report was Medium (-) without mitigation and Low (-) with mitigation. The proposed amendments do not change the significance level of this potential impact. In order to maintain the impact significance at Low, additional mitigation measures have been recommended by the bat specialist (refer to sub-section on “mitigation measures” below for further details).

- **Cumulative Impacts**: Cumulative indirect impacts to bats, such as those relating to changes to the physical environment are likely to be low across the cumulative impact

regions. Cumulative direct impacts to bats, specifically those related to bat mortality, are likely to be higher (Arcus, 2021). The 2018 risk assessment for cumulative impacts in the Pre-construction Bat Monitoring Report noted that limited data are available on the actual impacts to bats at the eleven operational facilities in the cumulative impact region. Data from five operational wind farms in the cumulative impact region suggested that impacts to bats ranged from low to high. As there is no current information available to suggest that operational mitigation strategies are being applied at this specific facility, the addition of wind farms in the cumulative impact region may have negative consequences particularly for the north-eastern subpopulation of the migratory Natal long-fingered bat. However, due of a lack of published data on the impact of wind energy facilities on bats in South Africa, and limited baseline data on bat population size and demographics, the confidence in this assessment is low (Arcus, 2021). The impact significance of the proposed amendments does not vary from the original rating of High (-) without mitigation and Medium (-) with mitigation. However, additional mitigation measures have been recommended by the bat specialist to keep the significance of the cumulative impacts at Medium rating (refer to sub-section on "mitigation measures" below for further details).

Impact Assessment Summary

Table 21: *Bats: Summary table for overall impacts of the Authorised Project and proposed amendments (re-assessment) (Source: Arcus, 2021).*

Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Bat Mortality during Commuting and/or Foraging	Medium (-)	Low (-)	Medium (-)	Low (-)
Bat Mortality during Migration	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative Impacts	High (-)	Medium (-)	High (-)	Medium (-)

b) Mitigation Measures

To account for the larger turbines and blades, the buffers of sensitive areas for bats have been increased by 100 m relative to the buffers applied during the Revised Final BAR (November 2019). No turbines of the proposed amended layout are within these buffers and thus the proposed layout is deemed acceptable (Arcus, 2021). In addition, the specialist recommends that the proposed turbines have a minimum lower tip height of at least 40 m.

The implementation of the abovementioned mitigation measures, in addition to the measures recommended in the pre-construction bat monitoring specialist study (September 2018) and Revised Final BAR (November 2019), will ensure the impact significance level does not increase with the proposed amendments.

To reduce residual impacts, more active mitigation measures will be required. These impacts will need to be evaluated during operational monitoring and assessed relative to threshold guidelines applicable at the time. Should thresholds be exceeded, curtailment or deterrents

must be used to reduce bat fatality, and because curtailment is known to be more successful, it must be prioritised (Arcus, 2021). Furthermore, the carcass search data must be assessed by the bat specialist appointed to conduct the operational phase monitoring each month to determine the observed and estimated fatality rate (Arcus, 2021).

In summary, in light of the proposed amendments, the mitigation measures to reduce residual risk or enhance opportunities include:

- To manage the risk of a potentially low tip height and longer turbine blades, additional buffers of 100m have been added to sensitive areas to reduce the likelihood that low flying bats will encounter wind turbine blades. (Note: No turbines are within these recommended buffers therefore the proposed amended layout is acceptable).
- Turbines must have a minimum lower tip height of at least 40m.
- All previous mitigations provided in the pre-construction bat monitoring report and Basic Assessment Report must be adhered to.

c) Conclusion

The proposed amendments will have a differential impact on bat species, with most changes being positive for low flying species but negative for high flying species. **The proposed amendments will not alter the overall impact of the Highlands Central WEF on bats. Provided the recommended mitigation measures are adhered to, including avoiding the placement of turbines in high bat sensitivity areas, maintaining a lower blade sweep of at least 40 m, and using curtailment or deterrents if bat fatality exceeds threshold levels, the proposed development can proceed without unacceptable impacts to bats** (Arcus, 2021).

3.4 IMPACTS ON AQUATIC ECOSYSTEMS (FRESHWATER & WETLANDS)

Dr Brian Colloty of Scherman Colloty and Associates (SC&A) undertook the original Aquatic Impact Assessment for the Highlands Central Wind Energy Facility (WEF) in 2018. The following direct and indirect impacts were assessed with regard to the riparian areas and watercourses:

- Impact 1: Loss of riparian systems and water courses during the construction phase,
- Impact 2: Impact on riparian systems through the possible increase in surface water runoff from hard surfaces and or new road crossings on riparian form and function during the operational phase,
- Impact 3: Increase in sedimentation and erosion within the development footprint during the construction phase and to a lesser degree the operational phase, and
- Impact 4: Impact on localized surface water quality mainly during the construction phase.

All of the above-listed potential aquatic impacts[14] have been re-assessed by Dr Colloty for the EA amendment application. The findings of the assessment are outlined below. Refer to **Appendix C4** for the full Aquatic Assessment statement for the EA amendment application.

a) Potential impacts

- **Loss of riparian systems and water courses:** All important riverine areas have been avoided in the proposed amended layout. There are a limited number (5)[15] crossings, which are all within minor drainage lines and watercourses. The positions and changes to the associated infrastructure still avoid the most sensitive areas of the delineated aquatic zones including their respective buffers. This includes the proposed Battery Energy Storage System (BESS). The ratings of this impact remain unchanged from the original assessment, with the significance impact rating remaining at Low (-) with mitigation.
- **Impact on aquatic systems through the possible increase in surface water runoff on downstream sedimentation and erosion:** The ratings of this impact remain unchanged from the original assessment, with the significance impact rating remaining at Low (-) with mitigation.
- **Potential impact on localised surface water quality:** The ratings of this impact remain unchanged from the original assessment, with the significance impact rating remaining at Low (-) with mitigation.

Cumulative Impacts

The ratings of cumulative impacts remain unchanged from the original assessment, with the significance impact rating remaining at low (-) with and without mitigation for all impacts. The specialist noted that a positive cumulative impact will only occur should river/wetland

[14] Note: The specialist was advised by the Department of Water and Sanitation (DWS) to combine impacts 2 and 3 to avoid the risk of double-counting (Colloty, 2021). The significance impact rating for these two impacts in the original assessment were both "Low (-)" with mitigation and thus combining these two impacts for the purpose of re-assessment is deemed acceptable.

[15] The number of crossings is the cumulative total of new roads that will be required for the WEF, which may include road crossings of the other Highland WEFs to gain access to this site, especially if the adjoining WEFs are not approved and/ or constructed within different timeframes.

rehabilitation occur, however none occur within or will be affected by the proposed footprints (Colloty, 2021).

Table 22: *Aquatic impacts: Impact summary table comparing authorised versus amended layout, with comments (Source: Colloty, 2021)*

Issue & Impact	Authorised layout impact significance rating with mitigation	Amendment Layout impact significance rating with mitigation	Comment
Loss of aquatic species of special concern	Not assessed as not applicable	Not assessed as not applicable	No additional impacts were anticipated as no aquatic species of special concern were observed but as recommended in the authorised project a preconstruction walkdown must be conducted.
Loss of remaining wetlands with High sensitivity	Not assessed as not applicable	Not assessed as not applicable	All important riverine areas have been avoided, with a limited number (5)[16] of crossings within minor drainage lines and watercourses, however to minimise any indirect impacts (e.g. changes to hydrology) a final walkdown should also be conducted post authorisation to assist with the development of the stormwater management plan and Rehabilitation and Monitoring plan. This is already included in the original proposed mitigation.
Loss of riparian systems and water courses	Low - negative	Low - negative	All important riverine areas have been avoided, with a limited number (5) of crossings within minor drainage lines and watercourses, however to minimise any indirect impacts (e.g. changes to hydrology) a final walkdown should also be conducted post authorisation to assist with the development of the stormwater management plan and Rehabilitation and Monitoring plan. This is already included in the original proposed mitigation.
Impact on aquatic systems through the possible increase in surface water runoff on downstream	Low - negative	Low - negative	No additional mitigations are required, although the development of a stormwater management plan is reiterated.

[16] The number of crossings is the cumulative total of new roads that will be required for the WEF, which may include road crossings of the other Highland WEFs to gain access to this site, especially if the adjoining WEFS are not approved and or constructed within different timeframes

sedimentation and erosion			
Potential impact on localised surface water quality	Low - negative	Low - negative	No additional mitigation are required.
Cumulative impacts	Low - negative	Low - negative	The positive cumulative impact will only occur if river/wetland rehabilitation occurs, however none occur within or will be affected by the proposed footprints

Figure 5: *Proposed amended layout (blue lines) when compared to the observed watercourses with 32 m buffer (Source: Colloty, 2021)*

Impact Assessment Summary

Table 23*: Aquatic impacts: Summary table for overall potential impacts of the authorised project and the proposed Amended Project.*

Potential Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Loss of riparian systems and water courses	Medium (-)	Low (-)	Medium (-)	Low (-)

Impact on aquatic systems through the possible increase in surface water runoff on downstream sedimentation and erosion	Medium (-)	Low (-)	Medium (-)	Low (-)
Potential impact on localised surface water quality	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative impacts	Low (-)	Low (-)	Low (-)	Low (-)

b) Mitigation Measures

No additional mitigation measures or changes to the mitigation measures included in the original Aquatic Impact Assessment Report (August 2018) are recommended as a result of the proposed amendments. All mitigation measures recommended within the Aquatic Impact Assessment Report (August 2018) are valid and remain applicable. The aquatic specialist reiterates the importance of a final walkdown post authorisation to assist with the development of the stormwater management plan and rehabilitation and monitoring plan. This mitigation measure is already included in the original list of recommended mitigation measures.

c) Conclusion

The potential impact of the proposed amendments on the aquatic environment will remain unchanged from the original Aquatic Impact Assessment Report (August 2018) provided all the recommended mitigation measures are upheld. Although the impact significance rating will remain Low (-) for all the potential aquatic impacts, there is an overall advantage to the proposed amended layout as the overall number of watercourse crossings has been reduced (Colloty, 2021).

Based on the findings of the assessment of potential aquatic impacts associated with the proposed amendments, the aquatic specialist has no objection to the authorisation of any of the proposed amendments, assuming that all mitigation measures recommended within the original aquatic impact assessment report are carried out (Colloty, 2021).

No changes to the original mitigations or EMPr considerations are required (Colloty, 2021).

3.5 NOISE IMPACTS

Mr Morne de Jager of Enviro-Acoustic Research cc was appointed to undertake an assessment[17] of the potential noise impacts associated with the proposed amendments, including the following potential impacts:

Construction Phase:

- Daytime construction activities (WTG construction, road construction and construction traffic)
- Night-time construction activities (WTG construction)

[17] Note: Given that Mr de Jager did not undertake the original Noise Impact Assessment for the Basic Assessment process for the project, he conducted a full Environmental Noise Impact Assessment for the proposed amended project

Operational Phase:
- Daytime Operation
- Night-time Operation

Cumulative Noise Impacts:
- Construction phase
- Operational phase

A brief summary of the findings of the environmental noise impact assessment is provided below. Refer to **Appendix C5** for the full Environmental Noise Impact Assessment Report.

a) Potential impacts

The potential noise impact relating to the proposed amendments of the approved Highlands Central WEF was evaluated using sound propagation models. Conceptual scenarios were developed for the construction and operation phases, considering a sound power emission level of an unmitigated (108.5 dBA re 1 pW) and mitigated (106 dBA re 1 pW) Acciona AW132 wind turbine for the operational phase. With the modelled input data used, the assessment indicated the following (refer to Appendix C5 for the detailed impact assessment):

Construction phase:

- A potential noise impact of a **low** significance (with and without mitigation) relating to activities associated with the development of hardstanding areas, foundations, civil work and erecting the WTG during the day.
- A potential noise impact of a **low** significance (with and without mitigation) relating to activities associated with potential civil works and erecting the WTG at night.
- A potential noise impact of a **low** significance (with and without mitigation) relating to the construction of the access roads.
- A potential noise impact of a **low** significance (with and without mitigation) relating to the use of access roads during the construction phase.

Operational Phase:

- A potential noise impact of a **low** significance (with and without mitigation) for operation of the proposed wind turbines during the day.
- A potential noise impact of a **low** significance (with and without mitigation) for operation of the proposed wind turbines at night.

Decommissioning Phase:

- A potential noise impact of a **low** significance (with and without mitigation) for the decommissioning of the proposed WEF.

Cumulative Impacts:

- The development of the amended Highlands Central WEF will not increase cumulative noises in the area during the construction phase.
- The development of the amended Highlands Central WEF will not increase cumulative noises in the area during the operational phase.

The addition of the proposed BESS:

- The addition of a BESS will not increase noise levels and the significance of the noises from the BESS will be **low** (both construction and operational).

  In terms of the proposed BESS, the noise specialist indicated that, while certain components may generate a slight hum under load, the dominant source of noise is from the fans or climate control system used to manage heat in the system and/or to maintain the BESS within its optimal operating temperature range. These BESSs however generate low noise levels, with any potential noise impact generally limited to areas within 200m of the BESS. This is an insignificant noise level and the significance of this noise will be low (De Jager, 2021).

Impact Assessment Summary

Table 24: *Noise: Summary table for overall (combined direct and indirect) impacts of the Authorised Project and proposed Amended Project*

Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Daytime Construction Activities (relating to development of hardstanding areas, foundations, civil works and erecting the WTGs) In original assessment, referred to as: *Construction Phase: Tracks and Hardstanding;* *Construction Phase: Excavation and concreting foundations; and* *Construction Phase: turbine erection*	Medium (-)	Low (-)	Low (-)	Low (-)
Night-time Construction Activities (potential civil works and erecting the WTGs) In original assessment, referred to as: *Construction Phase: Generator (night-time use)*	Low (-)	Low (-)	Low (-)	Low (-)
Daytime Construction Activities (access road construction) Not assessed in original assessment	-	-	Low (-)	Low (-)
Daytime Construction Activities (use of access roads) Not assessed in original assessment	-	-	Low (-)	Low (-)
Daytime Operational Activities (operation of wind turbines) In original assessment, referred to as: *Operational Phase: Daytime operation*	Low (-)	Low (-)	Low (-)	Low (-)
Night-time Operational Activities (operation of wind turbines) In original assessment, referred to as: *Operational Phase: Night-time operation*	Medium (-)	Medium (-)	Low (-)	Low (-)

Cumulative Impact: Construction Phase In original assessment, referred to as: *Construction Phase: Tracks and Hard standing, Cumulative Impact* *Construction Phase: Excavation and concreting foundations, Cumulative Impact* *Construction Phase: turbine erection, Cumulative impact*	Medium (-)	Low (-)	Low (-)	Low (-)
Cumulative Impact: Operational Phase In original assessment, referred to as: *Operational Phase: Daytime operation, Cumulative Impact*	Low (-)	Low (-)	Low (-)	Low (-)
Operational Phase: Night-time operation, Cumulative impact	High (-)	Medium (-)		

b) Mitigation Measures

Updates to the mitigation measures (from the original mitigation measures included in the Basic Assessment) were included in the Environmental Noise Impact Assessment (refer to Appendix C5), to clarify statements and prevent ambiguity when considering the mitigation measures. Mr de Jager has recommended that the updated mitigation measures replace the original mitigation measures in the updated Environmental Management Programme (EMPr). The recommended mitigation measures include the following:

The developer must know that community involvement needs to continue throughout the project. Annoyance is a complicated psychological phenomenon, as with many industrial operations, expressed annoyance with sound can reflect an overall annoyance with the project, rather than a rational reaction to the sound itself. At all stages, surrounding receptors should be informed about the project, providing them with factual information without setting unrealistic expectations. It is counterproductive to suggest that the activities (or facility) will be inaudible due to existing high ambient sound levels. The magnitude of the sound levels will depend on a multitude of variables and will vary from day to day and from place to place with environmental and operational conditions. Audibility is distinct from the sound level, because it depends on the relationship between the sound level from the activities, the spectral character and that of the surrounding soundscape (both level and spectral character).

The developer must implement a line of communication (i.e. a help line where complaints could be lodged). All potential sensitive receptors should be made aware of these contact numbers. The proposed WEF should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion. Sporadic and legitimate noise complaints could be raised. For example, sudden and sharp increases in sound levels could result from mechanical malfunctions or perforations or slits in the blades. Problems of this nature can be corrected quickly and it is in the developer's interest to do so.

Continuing management objectives would be:

- Ensure that total noise levels due to operational activities are less than 45 dBA at all potential NSDs (dwellings used for residential purposes); and

- Prevent the generation of nuisance noises.

Mitigation options available to reduce noise impact during the construction phase:

The significance of noise during the construction of the WTG's (hard standing, digging of foundations, civil works, erection of turbine) phase, the development of the access road (for all NSDs) and construction traffic will have a noise impact of a **low** significance. No additional noise mitigation measures are required.

It is recommended that the following mitigation measures replace the previous mitigation measures (as proposed by Reid, 2018) in the updated EMPr:

- *With regard to unavoidable noisy construction activities in the vicinity of noise sensitive areas (closer than 500 m from any identified NSD), the contractor and ECO must liaise with local residents on how best to minimise impact and they must be kept informed of the nature and duration of intended activities;*
- *Blasting operations are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day must be limited, blasting must be undertaken at the same times each day and no blasting must be allowed at night;*
- *Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order;*
- *Where practicable, mobile equipment should be fitted with broadband (white-noise generators), rather than tonal reverse alarms;*
- *The use of vehicle horns should be limited to emergency use only;*
- *Road trucks should slow down well before the turn onto the project site to prevent the use of air brakes; and*
- *Public relations should be maintained with local residents that may be affected by noise from site operations.*

Mitigation options available to reduce noise impact during operation:
*The significance of noise during the operation phase is **low** and additional mitigation measures are not required. It is recommended that the mitigation measures defined in the original noise study (Reid, 2018) be removed for the updated EMPr. It is however recommended that:*

- The developer should implement a noise monitoring programme at NSD06 if the developer uses a wind turbine with a sound power emission level of 108.5 dBA (re 1 pW) at turbine location T26. If the developer selects to use a wind turbine with a sound power emission level of 106.0 dBA (re 1 pW) at turbine location T26, no noise monitoring will be required.

Mitigation options available to reduce noise impact during decommissioning:
The potential significance of the noise impact would be similar as the construction phase (low significance) and no further mitigation is recommended or required for the decommissioning phase.

Special Conditions:

- *Mitigation options that should be included in the updated Environmental Management Programme (EMPr)*
  - *The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where*

construction or decommissioning activities are taking place, or an operational wind turbine is present. A complaints register must be kept on site.;

- *The potential noise impact must be evaluated again should the layout be revised where any wind turbines are located closer than 1,000 m from a confirmed NSD.*
- *The potential noise impact must be evaluated again should the developer make use of a wind turbine with a maximum sound power emission level exceeding 110.0 dBA re 1 pW.*
- *The developer should implement a noise monitoring programme at NSD06 if the developer uses a wind turbine with a sound power emission level of 108.5 dBA (re 1 pW) at turbine location T26. If the developer selects to use a wind turbine with a sound power emission level of 106.0 dBA (re 1 pW) at turbine location T26, no noise monitoring will be required.*

c) Conclusion

Considering the outcome of the modelling, based on the conceptual scenarios as envisaged and input parameters used, the noise specialist concluded the following:

- *The proposed amendments to the project will not result in an increased level or significance of the noise impact, nor result in a change in the nature of potential noise impacts.*
- *The proposed amendments to the project have the advantage that it will decrease the projected noise levels as well as the significance of the noise impact during the operational phase;*
- *The proposed amendments to the project, due to the slightly lower noise levels, will require less mitigation measures and management as recommended in the original noise study (Reid, 2018)* (de Jager, 2021)*. Updates to the mitigation measures were included to clarify statements and prevent ambiguity when considering the mitigation measures. The mitigation measures include:*
  - *With regard to unavoidable noisy construction activities in the vicinity of noise sensitive areas (closer than 500 m from any identified NSD), the contractor and ECO must liaise with local residents on how best to minimise impact and they must be kept informed of the nature and duration of intended activities;*
  - *Blasting operations are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day must be limited, blasting must be undertaken at the same times each day and no blasting must be allowed at night;*
  - *Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order;*
  - *Where practicable, mobile equipment should be fitted with broadband (white-noise generators), rather than tonal reverse alarms;*
  - *The use of vehicle horns should be limited to emergency use only;*
  - *Road trucks should slow down well before the turn onto the project site to prevent the use of air brakes; and*
  - *Public relations should be maintained with local residents that may be affected by noise from site operations;*
  - *The developer should implement a noise monitoring programme at NSD06 if the developer uses a wind turbine with a sound power emission level of 108.5 dBA (re 1 pW) at turbine location T26. If the developer selects to use a wind turbine with a sound power emission level of 106.0 dBA (re 1 pW) at turbine location T26, no noise monitoring will be required.*

- *The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from the location where construction or decommissioning activities are taking place, or an operational wind turbine is present. A complaints register must be kept on site.*
- *The potential noise impact must be evaluated again should the layout be revised where any wind turbines are located closer than 1,000 m from a confirmed NSD.*
- *The potential noise impact must be evaluated again should the developer make use of a wind turbine with a maximum sound power emission level exceeding 110.0 dBA re 1 pW.*

The noise specialist recommended that the proposed amendments to the approved Highlands Central WEF be authorized.

3.6 VISUAL IMPACTS

Quinton Lawson and Bernard Oberholzer, who undertook the Visual Impact Assessment for the Basic Assessment process for the Highlands WEF project in November 2018, have been appointed to undertake the re-assessment of potential visual impacts for the proposed amendments to the EA. Refer to **Appendix C6** for the full Visual Impact Assessment Amendment report. A summary of the findings is provided below.

a) Potential impacts

Physical layout:

The changes to the layout of the proposed Highlands Central wind turbines (with fewer turbines) have avoided areas of visual sensitivity (as indicated on Map 2 in Appendix C6). A benefit of the amended layout from a visual perspective is that the turbines are further away from a number of farmsteads in some cases (refer to Table 25 below). Minor changes to the internal road layout and orientation of the substation would not have any significant visual implications, while the addition of the battery storage would only have marginal visual implications (Lawson & Oberholzer, 2021).

Table 25: *Distances and Visibility: Highlands Central WEF (Source: Lawson & Oberholzer, 2021)*

View-point	Location	Coordinates	Distance to WEF: Authorized layout	Distance to WEF: amended layout	Visibility of WEF
VP1	Goedehoop Road	32.706490S 25.445065E	6.5km	6.5km	Moderate-high visibility.
VP2	Opposite Lekkerwater on R63	32.700113S 25.412498E	4.5km	4.5km	High visibility.
VP3	Viewsite on Bruintjieshoogte Pass	32.681138S 25.340371E	4.1km	4.4km	High visibility.
VP3a	Crest of Bruintjieshoogte Pass	32.687757S 25.351308E	3.4km	3.6km	High visibility.
VP4	Allemansfontein Farm	32.667288S 25.265467E	8.5km	8.4km	Moderate visibility.
VP4a	Toekoms farm	32.696542S 25.270453E	6.5km	6.1km	Partly in view shadow, facing west away from proposed wind farms.
VP5	Boschfontein Farm	32.714650S	6.0km	5.9km	Moderate-high visibility.

View-point	Location	Coordinates	Distance to WEF: Authorized layout	Distance to WEF: amended layout	Visibility of WEF
		25.265360E			
VP5a	Woodcliffe farm	32.743777S 25.234579E	8.9km	8.9km	Derelict farmstead, surrounded by trees and facing south away from proposed wind farms.
VP6	Intersection with Pearston District Road	32.750674S 25.209773E	11.4km	11.3km	Marginal visibility.
VP6a	Blaaukrantz farm	32.775372S 25.213988E	11.3km	11.6km	Partly in view shadow, surrounded by trees, facing south away from proposed wind farms.
VP7	Vaalklip Farm Gate (game farm)	32.786705S 25.232462E	10.4km	11.1km	Partly in view shadow.
VP8	District road near Coetzenburg and Wentworth farms	32.750093S 25.510084E	Road: 12.1km Farms: ±10.7km	Road: 12.2km Farms: ±10km	Marginal visibility.
VP9	District road near Kaalplaas (East Cape Safaris Game Farm)	32.818506S 25.458107E	Road: 12.0km Farm: 10.3km	Road: 12.4km Farm: 10.3km	Marginal visibility.
VP10	District road near Uitkomst farm	32.838857S 25.430732E	Road: 12.5km Farm: 11.4km	Road: 12.5km Farm: 11.4km	Marginal visibility.
VPx1	Goedehoop (Kamala Private Game Reserve)	32.697722S 25.446527E	7.1km	7.1km	Moderate-high visibility.
VPx2	Side by Side Game Reserve	32.853317S 25.357474E	12.3km	12.3km	Marginal visibility.

Viewshed analysis (refer to Maps 7 and 8 in the attached Visual Impact Assessment report in **Appendix C6**):

The proposed 45m increase in hub height has been taken into account in the comparison between the viewsheds of the previously assessed and amended layouts. The comparison indicates that there would be some increase in the zone of visual exposure, and the viewshed would extend for a slightly greater distance, although the visibility of the turbines becomes less significant with distance (Lawson & Oberholzer, 2021). Farmsteads in a view shadow would generally not be affected by the increased height of the proposed turbines (Lawson & Oberholzer, 2021).

Photomontages from selected viewpoints (refer to Figures 3 and 4 in the Visual Impact Assessment Amendment report attached in **Appendix C6**):

Comparative photomontages of the proposed wind turbines from two additional viewpoints, Kamala 'Viewpoint x1' and Side by Side 'Viewpoint x2', indicate the potential effect on visual receptors. The distance from the Kamala Private Game Reserve in the north to the nearest Highlands Central turbine would be 7,1km. The visual effect of the increased height of the turbines would be marginal at this distance (Lawson & Oberholzer, 2021).

The distance from the Side by Side Safaris Viewpoint to the nearest Highlands Central turbine would be 12,3km. Based on the photomontage (refer to Figure 4 in the attached Visual Impact

Assessment Amendment report), Highlands Central WEF would only be marginally visible from this viewpoint (Lawson & Oberholzer, 2021).

Construction Phase Impacts:

The potential visual effect of construction activities, including cranes, construction traffic, dust and noise which could affect the rural sense of place was identified in the original visual impact assessment in 2018. This potential impact was assigned a Moderate (-) impact significance rating with and without mitigation. The proposed amendments do not change the impact significance rating of the potential construction phase visual impacts, and thus the impact ratings within the original Visual Impact Assessment remains valid and applicable to the EA amendment application (Lawson & Oberholzer, 2021).

Operational Phase Impacts:

The potential visual intrusion of wind turbines, assembly pads, access roads, substation, and operations/maintenance buildings on the rural landscape was identified as a potential impact in the original Visual Impact Assessment. This included the potential impact of navigation lights on the turbines and security lighting at the substation on the rural landscape at night. The potential impact was rated with a Moderate (-) significance with and without mitigation. The visual specialists are of the opinion that the proposed amendments do not change the overall visual impact significance rating assigned in the original Visual Impact Assessment for the operational phase of the WEF and thus the impact ratings within the original Visual Impact Assessment remain valid and applicable to the proposed amendments (Lawson & Oberholzer, 2021).

Decommissioning Phase Impacts:

The potential intrusion of remaining structures, platform earthworks and access roads on the rural landscape was identified in the original Visual Impact Assessment in 2018. This potential impact was allocated a Moderate (-) impact significance rating without mitigation and a Low (-) impact significance rating with mitigation. The proposed amendments do not change the impact significance rating of the potential decommissioning phase visual impacts, and thus the impact ratings within the original Visual Impact Assessment remain valid and applicable to the EA amendment application.

Cumulative Impacts

The combined viewshed of the three Highlands Wind Energy Facilities (North, South and Central) provides an indication of the cumulative zone of visual influence (refer to Map 11 in Appendix C6). Lower lying areas to the west and east of the proposed WEFs have the greatest exposure, while areas to the north tend to fall within a view shadow, screened by the Bruintjieshoogte Mountain (Lawson & Oberholzer, 2021). The fact that the three Highlands WEFs fall within the gazetted Cookhouse Renewable Energy Development Zone (REDZ) means that these projects would form part of a renewable energy node (Lawson & Oberholzer, 2021).

Given that other renewable energy projects mentioned in the VIA (2018) are not within viewing distance of each other and that they form part of the REDZ, the cumulative visual impact significance is considered to be Low (-) (and therefore remains unchanged from the significance rating in the original Visual Impact Assessment (November 2018)).

Impact Assessment Summary

Table 26: *Visual: Summary table for overall potential impacts of the authorised project and the proposed amendments.*

Potential Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Construction Phase	Moderate (-)	Moderate (-)	Moderate (-)	Moderate (-)
Operational Phase	Moderate (-)	Moderate (-)	Moderate (-)	Moderate (-)
Decommissioning Phase	Moderate (-)	Low (-)	Moderate (-)	Low (-)
Cumulative Impacts	Low (-)	Low (-)	Low (-)	Low (-)

b) Mitigation Measures

As indicated in the VIA (November 2018) of the previous (currently) authorised wind farm, the layout of the WEF has already been through a number of iterations based on the specialist studies and engineering considerations (Lawson & Oberholzer, 2021). No additional mitigation measures are required for the proposed amendments. The visual mitigation measures contained in the original Visual Impact Assessment of 2018 remain relevant.

In particular, where the substations, battery storage and O&M buildings, or the construction camps are located close to existing roads or dwellings, these should be screened by means of earth berms and/or planting (Lawson & Oberholzer, 2021).

c) Conclusion

The increased hub height, rotor diameter and blade tip height would result in increased visibility of the 3 phases of the Highlands wind farm project (i.e. Highlands North, Central and South WEFs), particularly when viewed from the R63.

Given that the visual significance of the increased height is generally limited to within 5km of the turbines, and that there will be fewer turbines, **the overall visual impact significance rating for the turbines is not expected to change from that of the originally assessed layout or authorised layout. The impact significance rating would thus remain moderate (-) before and after mitigation**[18].

Amendments to the related infrastructure, such as internal access roads and powerlines, would result in no change in the overall visual impact significance ratings in relation to those of the previously assessed proposals, and would remain low (-) before and after mitigation. Minor changes to substations and internal roads would have marginal visual implications and therefore their visual impact significance rating also remains unchanged at low (-). The addition of the battery storage facility adjacent to the substation would not have any major visual significance, given its maximum height of 8m and distance from visual receptors (Lawson & Oberholzer, 2021).

[18] As contained within the visual impact Tables 9- 15 and Table 20 of the original VIA dated November 2018.

Provided that the visual mitigations listed in the original Visual Impact Assessment Report (dated November 2018) (including post-construction rehabilitation of the site) are adhered to, the findings of the original Visual Impact Assessment for the 3 phases of the Highlands Wind Farm Project (including the subject Highlands Central WEF) would still be valid for the proposed amendments, and it is the opinion of the visual specialists that the proposed amendments could be approved (Lawson & Oberholzer, 2021).

3.7 IMPACTS ON AGRICULTURE

Mr Johann Lanz, who undertook the original Agricultural Impact Assessment in 2018 for the Highlands Central WEF Basic Assessment process, has been appointed to undertake the re-assessment of the potential agricultural impacts for the proposed amendments to the EA. Refer to **Appendix C7** for the full addendum to the Agricultural Impact Assessment report for the EA amendment application. A summary of the findings is provided below.

a) Potential impacts

The specialist assessed the following potential impacts in the original Agricultural Impact Assessment:

- Loss of agricultural land use;
- Soil degradation;
- Generation of additional land use income, and
- Regional loss of agricultural land use (cumulative impacts).

The specialist stated that there are no additional agricultural impacts related to any of the proposed amendments, and that all impacts identified in the original Agricultural assessment (dated 2018) are still valid for the proposed amendments. The amendments, including the amended layout, will not change the nature or significance of any of the impacts assessed in the original Agricultural assessment (dated 2018) (refer to Table 27 below for ease of reference). The agricultural impacts of the proposed amendments will therefore be identical to the impacts identified in the original agricultural impact assessment (Lanz, 2021).

Impact Assessment Summary

All potential agricultural impacts, as assessed within the original BAR remain as they are for the proposed amendment. There are no new impacts and no changes to the significance ratings of the identified impacts.

***Table 27:** Agricultural Impacts: Summary table for overall potential impacts of the authorised project and the proposed amendment*

Potential Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation

Loss of agricultural land use (Construction, Operation & Decommissioning)	Low (-)	Low (-)	Low (-)	Low (-)
Soil degradation (Construction, Operation & Decommissioning)	Medium (-)	Low (-)	Medium (-)	Low (-)
Generation of additional land use income (Operation)	Medium (+)	Medium (+)	Medium (+)	Medium (+)
Cumulative Impacts/ Regional loss of agricultural land use (Construction, Operation & Decommissioning)	Low (-)	Low (-)	Low (-)	Low (-)

b) Mitigation Measures

The proposed amendments do not require any changes or additions to the mitigation measures for agricultural impacts that were recommended for the authorised project (within the original Agricultural Impact Assessment (dated August 2018)), and there are therefore no required changes to the draft EMPr (Lanz, 2021).

c) Conclusion

The proposed amendments will result in no changes to the projects agricultural impacts (Lanz, 2021). The specialist therefore concluded that, "*from an agricultural impact point of view, the amendments and final layout should be authorised*" (Lanz, 2021).

3.8 IMPACTS ON HERITAGE RESOURCES

Dr Jayson Orton of ASHA Consulting (Pty) Ltd, who undertook the original Heritage Impact Assessment[19] in 2018 for the Highlands Central WEF Basic Assessment process, was appointed to undertake a re-assessment of the potential heritage impacts as a result of the proposed amendments to the EA. A summary of the findings is provided below. Refer to **Appendix C8** for the specialist Heritage Comment for the EA amendment application.

a) Potential impacts

As per the original Heritage Impact Assessment (dated August 2018), the potential impacts on heritage resources include:

- Impacts on palaeontological resources,
- Impacts on archaeological resources,
- Impacts on graves, and
- Impacts to the cultural landscape.

The heritage specialist noted the following with regards to the proposed amendments:

- Turbine size and location

  Larger turbines will result in a greater visual impact to the cultural landscape and to any scenic routes in the vicinity of the site. The R63, which passes some 3.4 km north

[19] The Heritage Impact Assessment (HIA) included a palaeontological study carried out by Dr John Almond of Natura Viva cc.

of the northernmost turbine of the proposed facility, is considered to be a route with aesthetic/scenic value. Although the potential visual impacts to this scenic route would increase, the total number of turbines would be reduced by two, which reduces visual clutter (Orton, 2021). Overall, it is concluded that the scenic/visual impacts to the landscape will be slightly reduced, as the number of turbines likely affects this assessment more than their size does (Orton, 2021). The slightly lesser impacts will not affect the impact assessment, and all ratings (both with and without mitigation) from the original assessment remain valid. By comparison, the visual impact assessors note that the reduction in turbines does partially offset their increase in height and state that no change in their assessment ratings is required (Lawson & Oberholzer 2021, in Orton, 2021.

- Hard stands and turbine foundations:

The proposed increase in the size of the hard stands and turbine foundations could theoretically result in a higher likelihood of archaeological and palaeontological impacts occurring. However, it is noted that the original survey found very few significant sites, and all of these have been avoided by the proposed amended layout. Although a pre-construction survey is still required (because the locations of archaeological and palaeontological sites is not fully predictable), the chances of impacts occurring are little different to what they were before (Orton 2021). All impact assessment ratings for both archaeology and palaeontology remain valid for the proposed amendment, including the potential impacts on graves.

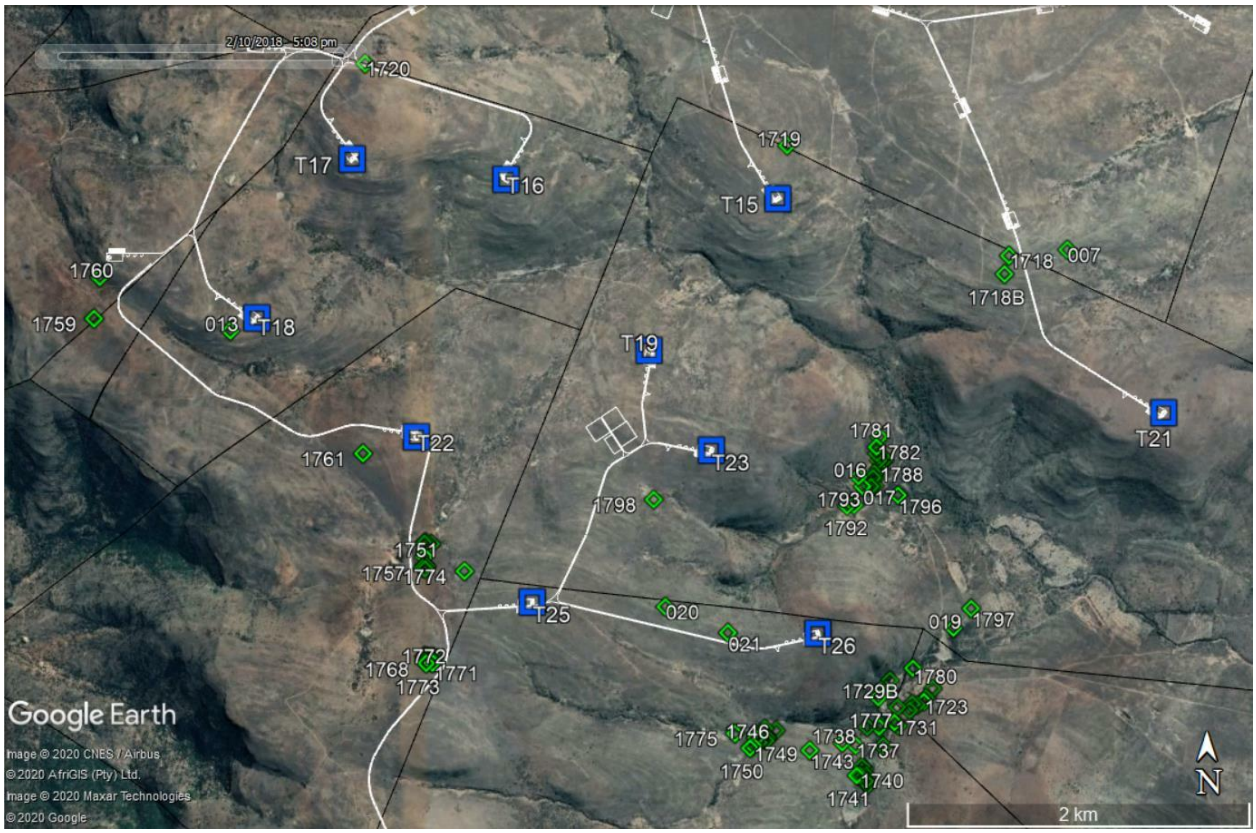

Figure 6: *Aerial view of the proposed Highlands Central WEF showing the turbine locations (blue numbered squares), facility layout (white lines (note that the adjoining Highlands North WEF is also included but its turbines are not shown)), and heritage resources (numbered green diamonds – excluding fossils) (ASHA Consulting (Pty) Ltd).*

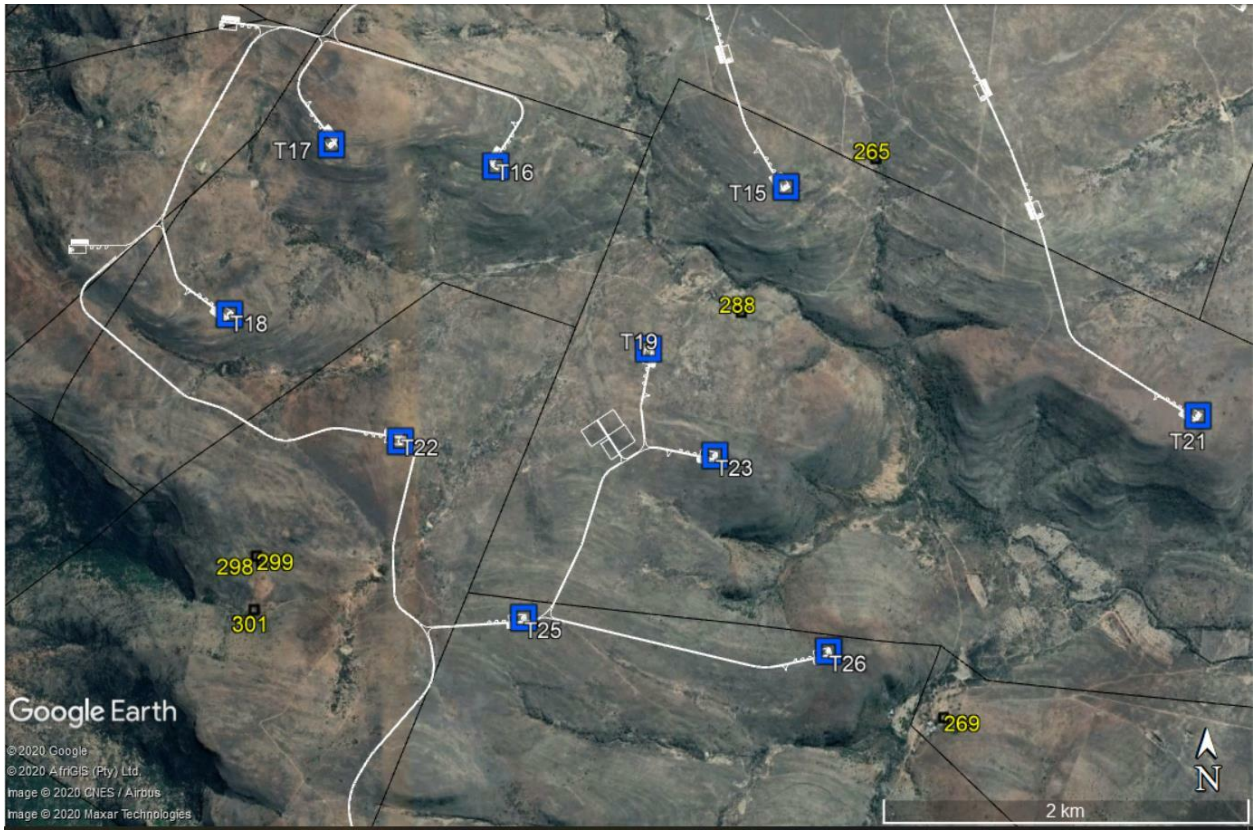

Figure 7: *Aerial view of the proposed Highlands Central WEF showing turbine locations (blue numbered squares), facility layout (white lines (note that the adjoining Highlands North WEF is also included but its turbines are not shown)), and palaeontological resources (numbered black squares) (ASHA Consulting (Pty) Ltd).*

- Road length

  With the proposed reduction in the number of turbines, the access road length has been reduced. The roads generally have the greatest chance of disturbing archaeological and palaeontological resources because of their large overall footprint (Orton, 2021). The decreased footprint will serve to offset the increased turbine footprint (hard stand and turbine foundation), but not to the degree that the assessed significance of potential impacts to archaeology and palaeontology would be reduced. The visual impact of the roads to the landscape is minimal because they are low to the ground and the facility is largely lower in elevation than the R63 which further reduces their visibility (Orton, 2021).

- New Infrastructure: BESS

  The addition of the proposed Battery Energy Storage System (BESS) to the facility could result in further archaeological and palaeontological impacts as well as increased visual impacts. The significance of potential impacts to archaeology and palaeontology would not change because the BESS is proposed to be located on the temporary laydown area. Therefore, there would not be any new footprint to be disturbed. With regards to visual impacts, the BESS will be placed alongside the substation and operations/office area, thus there would not be a new area with buildings. It is also relevant to note that the BESS would be located some 4.8 km away from that road and is unlikely to be openly visible.

Due to (1) the relatively minor nature of the proposed changes from the heritage perspective, (2) the nature of the cultural landscape and (3) the nature and distribution (both known and expected) of heritage resources found on site, the heritage specialist stated that all existing impact assessment ratings as shown in Tables 5, 6 and 7 of Orton (2018) and Table 7.1 of Almond (2018) (in the original HIA) must continue to apply. (Note: A summary of the impact significance ratings of the originally assessed project (Orton and Almond, 2018) and the proposed amended project, are provided below for ease of reference). No changes to any of the impact assessment ratings are needed (Orton, 2021).

Cumulative Impacts:

As the proposed changes are relatively minor, they do not have any bearing on the expected cumulative impacts which, for all heritage aspects, are still expected to be as shown in Tables 14, 15 and 16 of Orton (2018) and described in Section 7.3 of Almond (2018) (Orton, 2021), i.e. in the original HIA dated August 2018. (Note: A summary of the impact significance ratings of the originally assessed project (Orton and Almond, 2018) and the proposed amended project, are provided below for ease of reference.

Impact Assessment Summary

Table 28: *Heritage (including archaeological and palaeontological impacts): Summary table for overall potential impacts of the authorised project and the proposed amendments.*

Potential Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Archaeological impacts	Medium (-)	Low (-)	Medium (-)	Low (-)
Impacts to graves	Medium (-)	Low (-)	Medium (-)	Low (-)
Impacts to the cultural landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)
Cumulative archaeological impacts	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative impacts to graves	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative impacts to the cultural landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)
Impacts on palaeontological heritage resources	Medium (-)	Low (-)	Medium (-)	Low (-)

b) Mitigation Measures

No additions or changes to the proposed mitigation measures are required. The existing measures (stipulated in the original Heritage Impact Assessment (August 2018)) must continue to apply. The heritage specialist noted that it is worth emphasising that the archaeological pre-construction survey should be conducted as early as possible in order to facilitate planning of potential required mitigation and the construction phase of the project (Orton, 2021).

c) Conclusion

The Heritage specialist concluded the following:

- **It is the opinion of the heritage specialist that the proposed amendments will not result in any new or increased level of negative impacts to heritage resources and that there will be no change in the nature of impacts.**
- **There are no disadvantages to the proposed amended layout. In fact, there are two minor benefits in that (1) the overall footprint is decreased which means potentially fewer impacts to archaeological and palaeontological resources and (2) the reduction in turbines will very slightly reduce the visual intrusion of the facility in the cultural landscape.**
- **No changes to the proposed mitigation measures are required. The existing measures must continue to apply. It is worth emphasizing that the archaeological pre-construction survey should be conducted as early as possible in order to facilitate planning of both any required mitigation and the construction phase of the project (Orton, 2021).**

The heritage specialist therefore concluded that "*the proposed amended project should, therefore, be authorized in full*" (Orton, 2021).

3.9 IMPACTS ON SOCIAL ENVIRONMENT

Tony Barbour, who undertook the Social Impact Assessment (SIA) (dated September 2018) for the Basic Assessment process for the Highlands WEF project, was appointed to undertake the re-assessment of the potential social impacts associated with the proposed amendments to the EA. A summary of the findings is provided below. Refer to **Appendix C9** for the full Social Statement relating to the proposed amendments.

a) Potential impacts

The key findings of the SIA (2018) were summarised under the following sections: Fit with policy and planning; Construction phase impacts; Operational phase impacts; Cumulative Impacts; Decommissioning phase impacts; and the "No-development option".

The potential construction phase impacts include the following:

- Potential positive impacts:
  - Creation of employment and business opportunities, and the opportunity for skills development and on-site training
- Potential negative impacts:
  - Impacts associated with the presence of construction workers on site and in the area, and potential impacts on family structures and social networks.
  - Influx of job seekers to the area.
  - Increased safety risk to farmers, risk of stock theft and damage to farm infrastructure associated with the presence of construction workers on the site.
  - Increased risk of fires.
  - Impact of heavy vehicles, including damage to roads, safety and dust.
  - Impact on farming activities.

The potential operational phase impacts include the following:

- Potential positive impacts:
  - The establishment of renewable energy infrastructure.
  - Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training.
  - Benefits associated with the establishment of Community Trust.
  - Benefits for affected landowners.
- Potential negative impacts:
  - The visual impacts and associated impact on sense of place.
  - Impact on property values and adjacent operations.
  - Potential impact on tourism.

Based on the findings of the 2018 SIA, the key negative social issues are associated with the potential visual impacts associated with the wind turbines. In this regard, a key concern identified during the SIA (2018) related to the visual impacts associated with the wind turbines and the potential impact on existing, established game farming and hunting operations in the area (Barbour, 2021). The focus of the Social Statement for the proposed amendments was therefore on the visual impacts associated with the proposed amendments, specifically the increase in the size of the wind turbines. The Social Statement for the EA amendment application was therefore informed by the findings of the Visual Impact Assessment (VIA) for the Part 2 Amendment (June 2021) undertaken by Quinton Lawson and Bernard Oberholzer.

The social specialist noted that the changes in foundation size, hardstand area, and length of internal roads will not have any material impact on the findings of the SIA undertaken in 2018. Furthermore, the reduction of the number of wind turbines and increase in the hub height and rotor diameter of the wind turbines associated with the Part 2 Amendment will not change the nature or significance of any of the social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs (Barbour, 2021).

Due to the relatively small footprint associated with the proposed BESS (1ha), the potential negative social impacts associated with the establishment and operation of the proposed BESS will be limited. The establishment of the BESS would also create additional employment opportunities during the operational phase. The significance rating for the creation of employment opportunities during the construction and operational phase will however remain unchanged, namely Medium (+) with enhancement. The social specialist concluded that the construction and operation of the proposed BESS will not result in any material social impacts that were not previously assessed as part of the SIA (2018) for the Highlands WEFs, and that the addition of a BESS also represents an advantage by ensuring a more secure and efficient renewable energy-based grid that is more resistant to disruptions (Barbour, 2021).

The impact significance ratings for the construction phase, operational phase, decommissioning phase, and cumulative impacts indicated in the Social Statement for the EA amendment application are outlined below for ease of reference.

Construction Phase Impacts:

The proposed amendments will not change the nature or significance of any of the potential construction phase social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs. The nature and significance of the potential construction phase social impacts thus remain as follows:

Table 29: *Social Impacts: Summary of potential social impacts associated with the construction phase (Barbour, 2021).*

Impact	Significance No Mitigation/ Enhancement	Significance With Mitigation/ Enhancement
Creation of employment and business opportunities	Medium (+)	Medium (+)
Presence of construction workers and potential impacts on family structures and social networks	Medium (-)	Low (-)
Influx of job seekers	Low (-)	Low (-)
Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site	Medium (-)	Low (-)
Increased fire risk	Medium (-)	Low (-)
Impact of heavy vehicles and construction activities	Medium (-)	Low (-)
Impact on farming activities	Medium (-)	Low (-)

Operational Phase Impacts:

The proposed amendments will not change the nature or significance of any of the potential operational phase social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs. The nature and significance of any potential operational phase social impacts thus remain as follows:

Table 30: *Social Impacts: Summary of potential social impacts associated with the operational phase: Highlands Central WEF (Barbour, 2021)*

Impact	Significance No Mitigation/ Enhancement	Significance With Mitigation/ Enhancement
Promotion of renewable energy projects	High (-)[20]	High (+)
Creation of employment and business opportunities	Medium (+)	Moderate (+)
Establishment of Community Trust	Medium (+)	High (+)
Benefits for local affected landowners	Low (+)	Medium (+)
Visual impact and impact on sense of place[21]	Medium (-) Low (-)	Medium (-) Low (-)
Impact on property values and adjacent operations	Medium (-)	Medium (-)
Impact on tourism[22]	Low (-) Medium (-)	Low (-) Medium (-)

Decommissioning phase:

The specialist confirmed that the findings of the original SIA (2018) relating to the decommissioning phase remain applicable with the proposed amendments, i.e. Low (-).

[20] Assumes development does not proceed.

[21] Ratings reflect findings of 2021 VIA (Moderate or Medium) and findings of stakeholders interviewed that do not regard wind farms as having a negative visual impact (Low Negative).

[22] The rating applies to the impact on tourism in the broader area (Low Negative) and adjacent game farming and hunting operations (Medium).

Cumulative Impacts:

The specialist confirmed that the findings of the SIA (2018) relating to cumulative impacts on sense of place (Low (-)), services (Low (-)) and local economy (High (+)) also apply to the proposed amendments.

Impact Assessment Summary:

No changes to any of the original impact assessment ratings are required as a result of the proposed amendments and thus the nature and significance ratings of all identified potential impacts remain the same, as previously assessed as part of the SIA (2018) for the Highlands WEFs (as detailed in Tables 29 and 30 above).

Table 31: *Social Impacts: Summary table for overall potential impacts of the authorised project and the proposed amendments*

Potential Impact	Original Assessment (Authorised Project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Construction Phase				
Creation of employment and business opportunities	Medium (+)	Medium (+)	Medium (+)	Medium (+)
Presence of construction workers and potential impacts on family structures and social networks	Medium (-)	Low (-)	Medium (-)	Low (-)
Influx of job seekers	Low (-)	Low (-)	Low (-)	Low (-)
Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site	Medium (-)	Low (-)	Medium (-)	Low (-)
Increased fire risk	Medium (-)	Low (-)	Medium (-)	Low (-)
Impact of heavy vehicles and construction activities	Medium (-)	Low (-)	Medium (-)	Low (-)
Impact on farming activities	Medium (-)	Low (-)	Medium (-)	Low (-)
Operational phase				
Promotion of renewable energy projects	High (-)[23]	High (+)	High (-)[24]	High (+)
Creation of employment and business opportunities	Medium (+)	Moderate (+)	Medium (+)	Moderate (+)
Establishment of Community Trust	Medium (+)	High (+)	Medium (+)	High (+)

[23] Assumes development does not proceed.

[24] Assumes development does not proceed.

Benefits for local affected landowners	Low (+)	Medium (+)	Low (+)	Medium (+)
Visual impact and impact on sense of place[25]	Medium (-) Low (-)	Medium (-) Low (-)	Medium (-) Low (-)	Medium (-) Low (-)
Impact on property values and adjacent operations	Medium (-)	Medium (-)	Medium (-)	Medium (-)
Impact on tourism[26]	Low (-) Medium (-)	Low (-) Medium (-)	Low (-) Medium (-)	Low (-) Medium (-)
Decommissioning Phase				
Impact associated with decommissioning	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative				
Cumulative impact on sense of place	Low (-)	Low (-)	Low (-)	Low (-)
Cumulative impact on services	Low (-)	Low (-)	Low (-)	Low (-)
Cumulative impact on local economies	Medium (+)	High (+)	Medium (+)	High (+)

b) Mitigation Measures

The social specialist stated that the mitigation measures for the construction of the Highlands Central WEF listed in the Social Impact Assessment (2018) are appropriate for the Part 2 Amendment (i.e. the proposed amendments), including the establishment of the proposed BESS[27]. No additional management outcomes or mitigation measures in terms of social impacts are therefore required for the Highlands Central WEF (Barbour, 2021).

c) Conclusion

The social specialist concluded the following:

- **The reduction of the number of wind turbines and increase in the hub height and rotor diameter of the wind turbines associated with the Part 2 Amendment will not change the nature or significance of any of the social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs.**
- **The construction and operation of the proposed BESS will not result in any material social impacts that were not previously assessed as part of the SIA (2018) for the Highlands WEFs. The addition of a BESS also represents an advantage by ensuring a more secure and efficient renewable energy-based grid that is more resistant to disruptions.**
- **The mitigation measures for the construction of the Highlands WEFs listed in the SIA (2018) are appropriate for the Part 2 Amendment, including the establishment**

[25] Ratings reflect findings of 2021 VIA (Moderate or Medium) and findings of stakeholders interviewed that do not regard wind farms as having a negative visual impact (Low Negative).

[26] The rating applies to the impact on tourism in the broader area (Low Negative) and adjacent game farming and hunting operations (Medium).

[27] The Applicant has met with the affected landowners to discuss the location of the proposed wind turbines in relation to their properties. This recommendation has therefore already been met.

of the BESS[28]. No additional management outcomes or mitigation measures in terms of social impacts are therefore required for the Highlands Central WEF.

The social specialist concluded that the Part 2 Amendment for the Highlands Central WEF, including the establishment of the BESS, is therefore supported (Barbour, 2021).

3.10 IMPACTS ON TRAFFIC

Mr Stephen Fautley of Techso (Pty) Ltd, who undertook the Traffic Impact Assessment in 2018 for the Highlands Central WEF Basic Assessment process, was appointed to undertake the re-assessment of the potential traffic impacts as a result of the proposed amendments to the EA. A summary of the findings of the re-assessment is provided below. Refer to **Appendix C10** for the full addendum to the Traffic Impact Assessment, compiled for the EA amendment application process.

a) Potential impacts

The potential impacts on traffic identified during the Traffic Impact Assessment for the project (dated 4 September 2018), and which have been re-assessed by Mr Fautley of Techso in terms of the proposed amendments, include the following:

- Construction
  - Traffic flow
  - Route constraints
  - Minor road degradation
  - Minor road dust
  - Intersection safety
- Operation:
  - Route constraints
- Decommissioning:
  - Minor road degradation
  - Minor road dust
- Cumulative:
  - Route constraints

The traffic specialist stated that the proposed amended layout that differs from the Assessed Layout (dated 2018/05/25) as considered in the Traffic Assessment of 4 September 2018 is noted and is acceptable from a traffic impact perspective.

The proposed amended Highlands Central WEF with 10 Wind Turbines and associated infrastructure would generate an insignificant increase in the average number of trips per day on the road network than the originally proposed WEF comprising 14 Wind Turbines for Highlands Central WEF as evaluated in the 2018 Traffic Specialist Report, and likewise compared to the approved WEF with 12 Wind Turbines, due to increase in turbine size with larger foundations and inclusion of a Battery Energy Storage System (Fautley, 2021).

The traffic specialist indicated however that the proposed amendments to the EA for the Highlands Central WEF do not impact on the 4 September 2018 Traffic Specialist Report findings and recommendations. Accordingly, the proposed impact assessment ratings for the

[28] The applicant has met with the affected landowners to discuss the location of the proposed wind turbines in relation to their properties. This recommendation has therefore already been met.

proposed amended Highlands Central WEF are unchanged from the original Traffic Assessment (and are shown in the tables in Section 3 of Appendix C10 for completeness, and summarised in Table 32 below).

Impact Assessment Summary:

Table 32: *Traffic Impacts***:** *Summary table for overall impacts of the Authorised project and proposed Amended project*

Potential Impact	Original Assessment (Authorised project)		Re-Assessment (Proposed Amended Project)	
	Significance		Significance	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Construction Phase – Traffic flow	Medium (-)	Low (-)	Medium (-)	Low (-)
Construction Phase – Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)
Construction Phase – Minor road degradation	Medium (-)	Low (-)	Medium (-)	Low (-)
Construction Phase – Minor road dust	Medium (-)	Low (-)	Medium (-)	Low (-)
Construction Phase – Intersection road safety	Medium (-)	Low (-)	Medium (-)	Low (-)
Operational Phase – Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)
Decommissioning Phase – Minor road degradation	Medium (-)	Low (-)	Medium (-)	Low (-)
Decommissioning Phase – Minor road dust	Medium (-)	Low (-)	Medium (-)	Low (-)
Cumulative – Route Constraints	Medium (-)	Low (-)	Medium (-)	Low (-)

b) Mitigation Measures

No additional recommendations or mitigation measures to those outlined in the Traffic Assessment dated 4 September 2018 are required for the proposed amendments (Fautley, 2021)

c) Conclusion

The traffic specialist concluded the following: *"**The proposed amendments to the Environmental Authorisation do not trigger any new impact to the traffic and transportation on site and to and from, and no further recommendations or mitigation measures to those outlined in the Traffic Assessment dated 4 September 2018 are required. The proposed amendments therefore will not result in any significant increased level or change in the nature of traffic impacts. Based on the further assessment and original Traffic Specialist Report, the amendment can be granted to the applicant**" (Fautley, 2021).*

3.11 SUMMARY OF IMPACTS ASSOCIATED WITH THE PROPOSED AMENDMENTS

A summary of the potential impacts and their associated impact significance ratings for the construction, operational and decommissioning phases associated with the authorized Highlands Central WEF (referred to herein as "the Authorised Project") versus the proposed amendments (referred to herein as "the Proposed Amended Project" i.e. the proposed amendments as outlined in Section 2) is provided in Table 33 below. Note that this table only includes the potential impacts re-assessed by the specialists for the EA amendment application. The last column of the table provides an indication of whether or not a change in significance rating of the impacts is apparent between the Authorized Project -and the Proposed Amended Project, for ease of reference.

Table 33: *Summary of the potential impacts and their associated impact significance ratings associated with the authorized Highlands Central WEF (referred to as the "Authorised Project") in comparison to the proposed amendments (referred to as the "Proposed Amended Project"), for the construction, operational and decommissioning phases, as well as cumulative impacts.*

Impact	***Authorised Project (Authorised WEF)***		***Proposed Amended Project (as outlined in Section 2)***		***Changes to impact significance rating as a result of the proposed amendments***
	Without Mitigation	***With mitigation***	***Without Mitigation***	***With mitigation***	
CONSTRUCTION PHASE					
Flora and Fauna (Terrestrial Ecological Impacts):					
Impact on vegetation and listed plant species	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Faunal impacts due to construction	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Avifauna (Birds):					
Habitat destruction	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Disturbance and displacement	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Aquatic (Wetlands and freshwater):					
Loss of riparian systems and watercourse	Low (-)	Low (-)	Low (-)	Low (-)	No change
Impact on aquatic systems through the possible increase in surface water runoff on downstream	Low (-)	Low (-)	Low (-)	Low (-)	No change

sedimentation and erosion.					
Potential impact on localized surface water quality.	Low (-)	Low (-)	Low (-)	Low (-)	No change
Noise:					
Daytime construction activities (WTG construction)	Medium (-)	Low (-)	Low (-)	Low (-)	Yes (without mitigation)
Night-time construction activities (WTG construction)	Low (-)	Low (-)	Low (-)	Low (-)	None
Daytime construction activities (road construction)	-	-	Low (-)	Low (-)	N/A
Daytime construction activities (construction traffic)	-	-	Low (-)	Low (-)	N/A
Cumulative (construction)	Medium (-)	Low (-)	Low (-)	Low (-)	Yes (without mitigation)
Visual:					
Visual effect on sense of place	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Traffic:					
Traffic flow	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Minor road degradation	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Minor road dust	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Intersection road safety	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Agriculture:					
Loss of agricultural land use	Low (-)	Low (-)	Low (-)	Low (-)	No change
Soil degradation	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Heritage and Paleontology:					
Impacts on archaeological resources	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Impacts on graves	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

Impacts to the cultural landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Palaeontological heritage resources	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Social:					
Creation of employment and business opportunities	Medium (+)	Medium (+)	Medium (+)	Medium (+)	No change
Presence of construction workers& potential impacts on family structures & social networks	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Influx of job seekers	Low (-)	Low (-)	Low (-)	Low (-)	No change
Increased risks to livestock & farming infrastructure associated with construction related activities & presence of construction workers on site	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Increased fire risk	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Impact of heavy vehicles & construction activities	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Impact on farming activities	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

Impact	***Authorised Project (Authorised WEF)***		***Proposed Amended Project (as outlined in Section 2)***		***Changes to impact significance rating as a result of the proposed amendments***
	Without Mitigation	***With mitigation***	***Without Mitigation***	***With mitigation***	
OPERATIONAL PHASE					
Flora and Fauna (Terrestrial Ecological Impacts):					
Faunal impacts	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Alien plant invasion	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Soil Erosion	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

Impact on CBAs and broad-scale ecological processes	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Avifauna (Birds):					
Collisions with turbines	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Collisions with power lines	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Electrocutions	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Disturbance and displacement	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Disruption of local bird movement patterns	Low (-)	Low (-)	Low (-)	Low (-)	No change
Bats:					
Bat mortalities during commuting and/or foraging	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Bat mortality during migration	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Aquatic (Wetlands and Freshwater):					
Loss of riparian systems and watercourse	Low (-)	Low (-)	Low (-)	Low (-)	No change
Impact on aquatic systems through the possible increase in surface water runoff on downstream sedimentation and erosion.	Low (-)	Low (-)	Low (-)	Low (-)	No change
Potential impact on localized surface water quality.	Low (-)	Low (-)	Low (-)	Low (-)	No change
Noise:					
Daytime operation	Low (-)	Low (-)	Low (-)	Low (-)	None

Night-time operation	Medium (-)	Medium (-)	Low (-)	Low (-)	Yes (with & without mitigation)
Visual:					
Visual intrusion of wind turbines, assembly pads, access roads, substation and O&M buildings on the rural landscape.	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Traffic:					
Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Agriculture:					
Loss of agricultural land use	Low (-)	Low (-)	Low (-)	Low (-)	No change
Soil degradation	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Generation of additional land us income	Medium (+)	Medium (+)	Medium (+)	Medium (+)	No change
Heritage (including Archaeology & Paleontology):					
Impacts to the Cultural Landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Social:					
Promotion of renewable energy projects (Clean renewable energy infrastructure)	High (-)[29]	High (+)	High (-)[30]	High (+)	No change
Creation of employment and business opportunities	Medium (+)	Moderate (+)	Medium (+)	Moderate (+)	No change
Establishment of Community Trust	Medium (+)	High (+)	Medium (+)	High (+)	No change
Benefits for local affected landowners	Low (+)	Medium (+)	Low (+)	Medium (+)	No change

[29] Assumes development does not proceed.

[30] Assumes development does not proceed.

Visual impact and impact on sense of place31	Medium (-) Low (-)	Medium (-) Low (-)	Medium (-) Low (-)	Medium (-) Low (-)	No change
Impact on property values and adjacent operations	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Impact on tourism[32]	Low (-) Medium (-)	Low (-) Medium (-)	Low (-) Medium (-)	Low (-) Medium (-)	No change
Traffic:					
Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

Impact	***Authorised Project (Authorised WEF)***		***Proposed Amended Project (as outlined in Section 2)***		***Changes to impact significance rating as a result of the proposed amendments***
	Without Mitigation	***With mitigation***	***Without Mitigation***	***With mitigation***	
DECOMMISSIONING PHASE					
Flora and Fauna (Terrestrial Ecological Impacts):					
Faunal impacts	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Alien plant invasion	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Soil erosion	High (-)	Low (-)	High (-)	Low (-)	No change
Avifauna (Birds):					
Disturbance and displacement	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Noise:					
Decommissioning and closure activities	N/A	N/A	Low (-)	Low (-)	N/A
Visual:					
Visual intrusion of remaining structures, platform earthworks and	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

[31] Ratings reflect findings of 2021 VIA (Moderate or Medium) and findings of stakeholders interviewed that do not regard wind farms as having a negative visual impact (Low (-)).

[32] The rating applies to the impact on tourism in the broader area (Low (-)) and adjacent game farming and hunting operations (Medium).

access roads on the rural landscape.					
Traffic:					
Minor road degradation	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Minor road dust	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Agriculture:					
Loss of agricultural land use	Low (-)	Low (-)	Low (-)	Low (-)	No change
Soil degradation	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Heritage (including Archaeology & Palaeontology):					
Impacts to the Cultural Landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Social:					
Impact associated with decommissioning	Medium (-)	Low (-)	Medium (-)	Low (-)	No change

Impact	***Authorised Project (Authorised WEF)***		***Proposed Amended Project (as outlined in Section 2)***		***Changes to impact significance rating as a result of the proposed amendments***
	Without Mitigation	***With mitigation***	***Without Mitigation***	***With mitigation***	
CUMULATIVE IMPACTS					
Flora and Fauna (Terrestrial Ecological Impacts):					
Cumulative impacts on habitat loss & ability to meet conservation targets	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Avifauna (Birds):					
Cumulative impacts	High (-)	Medium (-)	High (-)	Medium (-)	No change
Bats:					
Cumulative impacts	High (-)	Medium (-)	High (-)	Medium (-)	No change
Aquatic (Wetlands and Freshwater):					
Cumulative	Low (-)	Low (-)	Low (-)	Low (-)	No change
Noise:					

Construction Phase	Medium (-)	Low (-)	Low (-)	Low (-)	Yes (without mitigation)
Operational Phase: Day time	Low (-)	Low (-)	Low (-)	Low (-)	Yes (with & without mitigation)
Operational Phase: Night-time	High (-)	Medium (-)			
Visual:					
Cumulative	Low (-)	Low (-)	Low (-)	Low (-)	No change
Traffic:					
Route constraints	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Agriculture:					
Cumulative Impacts/ Regional loss of agricultural land use	Low (-)	Low (-)	Low (-)	Low (-)	No change
Heritage (including Archaeology & Palaeontology):					
Cumulative archaeological impacts	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Cumulative impacts to graves	Medium (-)	Low (-)	Medium (-)	Low (-)	No change
Cumulative impacts to the cultural landscape	Medium (-)	Medium (-)	Medium (-)	Medium (-)	No change
Social:					
Cumulative impact on sense of place	Low (-)	Low (-)	Low (-)	Low (-)	No change
Cumulative impact on services	Low (-)	Low (-)	Low (-)	Low (-)	No change
Cumulative impact on local economies	Medium (+)	High (+)	Medium (+)	High (+)	No change

In light of the above, the proposed amendments will not result in an increased level or significance of the potential environmental impacts associated with the project, nor result in a change in the nature of potential impacts. The only change in the significance ratings relates to potential noise impacts, where in some instances (e.g. operational phase and cumulative operational phase night time activities) the significance of the noise impacts has reduced to Low (-) for the proposed amendments, compared to the authorized project.

Refer to Figure 8 for an updated environmental sensitivity map for the proposed amended layout. The proposed amended layout avoids the “no turbine blade area” (for bird, bat and visual buffers) and environmental “No Go” areas identified by the specialists during the Basic Assessment Process, and/or EA amendment process, and is deemed to be acceptable by all of the specialists.

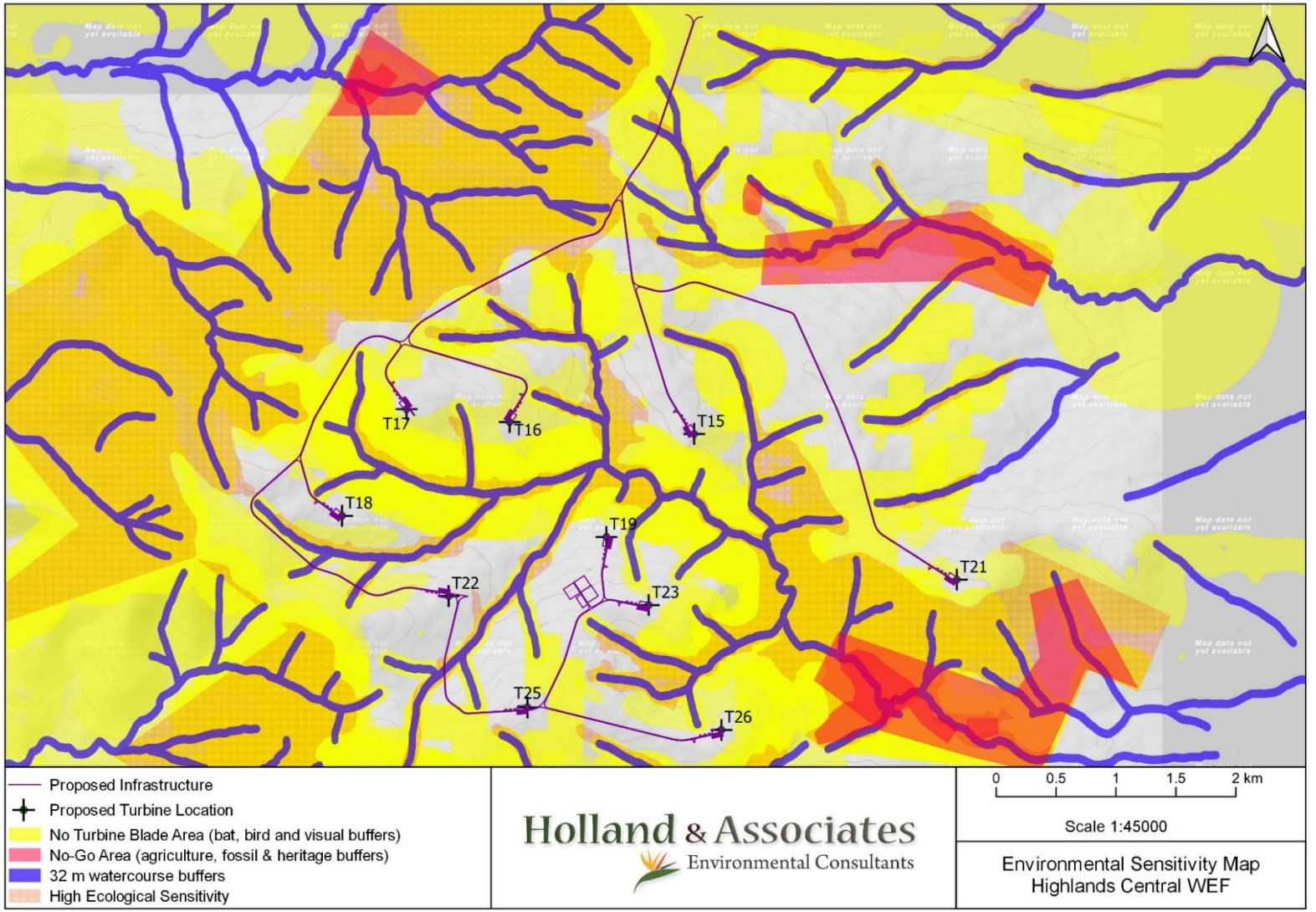

***Figure 8**: Updated Environmental Sensitivity Map with proposed amended layout*

4 CHANGES TO THE EMPr

The draft Environmental Management Programme (EMPr) for the project, dated November 2019, has been updated to include the proposed amendments to the project description, the High Level Risk Assessment for the proposed BESS, as well as the updated mitigation measures recommended by the bat and noise specialists in light of the proposed amendments. The mitigations measures associated with the fauna and flora, avifauna, agricultural, aquatic, heritage, traffic, social and visual specialist studies have not required any changes or additions to their respective mitigation measures as a result of the proposed amendments, therefore no update to the EMPr for the aforementioned specialist studies was required.

Refer to **Appendix G** for the amended Draft EMPr. (Substantive changes made to the draft EMPr are underlined in the text for ease of reference).

Note: As legally required, the EMPr will still be finalised (and made available for public review) and submitted to DFFE for approval, together with the Final Layout, in due course (before commencement of the construction phase), as required in terms of Conditions of Authorisation 15 of the EA. It is recommended that the updated EMPr includes an updated Risk Assessment for the BESS (once the technology type has been confirmed), as well as technology specific mitigation measures for the BESS (including all safety requirements recommended and required by the supplier of the BESS systems as well as by the most up-to-date national, provincial and local legislation regarding health and safety).

5 PUBLIC PARTICIPATION PROCESS

A Public Participation Process (PPP) is being undertaken to ensure that potential and registered Interested and Affected Parties (I&APs) are given an opportunity to comment on the proposed amendments to the Environmental Authorisation (EA), as required in terms of Part 2 of Chapter 5 of the EIA Regulations, 2014, as amended.

Prior to the commencement of the PPP, a Public Participation (PP) Plan was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) for review and approval, in accordance with Regulation 32(1)(a)(aa) of GN R982, as amended, and the Disaster Management Act (57/2002) and associated Directions issued by the Minister of Forestry, Fisheries and the Environment regarding *Measures to Address, Prevent and Combat the Spread of COVID-19 relating to National Environmental Management permits and licences*. The PP Plan for the EA amendment process was approved by DFFE on 25 October 2021. Refer to Appendix F1 for the approved PP Plan.

Note: A **combined Public Participation Process** for the three Applications for Amendment of the Environmental Authorisations for the three Highlands WEFs, i.e. Highlands North WEF (DFFE REF: 14/12/16/3/3/1/1955), Highlands Central WEF (DFFE Ref: 14/12/16/3/3/1/1958) and Highlands South WEF (DFFE Ref: 14/12/16/3/3/1/1960) is being conducted, as was conducted for the Basic Assessment processes for the Highlands WEF projects in 2018 - 2020.

The Public Participation Process includes, amongst others, the following (refer to Appendix F1 for the full PP Plan):

- **Advertisements** in English and Afrikaans, placed in *The Herald* newspaper, as well as in the local *Hartland News* newspaper.
- **Site Notices** in English and Afrikaans, placed at visible locations within the site and/or at the boundary of the site.
- **Notification posters** (in English and Afrikaans) placed in the towns of Pearston and Somerset East at venues such as the Post Office, local municipal offices, police station, public library, and local supermarket.
- Written notifications (sent via email, post and/or sms) to registered I&APs (in the **existing registered I&AP database**[33] provided by the Applicant for the Basic Assessment Processes that were concluded for the Highlands WEF projects in 2020), notifying registered I&APs of the EA Amendment Application and the availability of the associated Draft Amendment Assessment Report for review and comment.
- Potential and registered I&AP's (including relevant Organs of State and State Departments) will be given an opportunity to review and comment on the Draft Amendment Assessment Report for a **30 day comment period (excluding the period 15 December – 5 January)[34], i.e. from 6 December 2021 – 27 January 2022**.
- Copies of the Draft Amendment Assessment Report are available as follows:
    - A hard copy of the Draft Amendment Assessment Report has been lodged at the following public libraries for the 30 day I&AP comment period:

[33] Note: The existing registered I&AP database has been updated subsequent to the Basic Assessment process, to include updated State Department's details.

[34] As per the EIA Regulations, 2014, as amended, Regulation 3(2) of GN R. 982, as amended, states that "*For any action contemplated in terms of these Regulations for which a timeframe is prescribed, the period of 15 December to 5 January must be excluded in the reckoning of days*".

        - Ernst van Heerden Library in Pearston
        - Langenhoven Public Library in Somerset East
    - An electronic copy of the Draft Amendment Assessment Report has been made available for download on the Holland & Associates Environmental Consultants website (www.hollandandassociates.net) for the duration of the 30 day I&AP comment period. Furthermore, a copy of the Executive Summary for the Amendment Assessment Report has been made available for download as a separate document on the Holland & Associates website, in order to accommodate I&APs with data restrictions and/or who may not want to download the full report.
    - Upon request, the report will be made available to I&APs via electronic file transfer or Dropbox link.
    - Electronic copies of the report on CD or USB are available on request.
- Any additional I&APs who register during the Part 2 EA Amendment Application process will be added to the registered I&AP database.
- All comments submitted by I&APs during the 30 day I&AP comment period will be collated and responded to in a Comments and Response Report (CRR), which will be submitted to DFFE, together with the Final Amendment Assessment Report, for decision-making.
- Registered I&APs will be notified, in writing, of DFFE's decision.

6 CONCLUSION AND RECOMMENDATIONS

This Amendment Assessment Report has considered the proposed amendments to the EA for the Highlands Central WEF, including:

- Amendments to the project description (including amendments to the turbine specifications, a reduction in the number of turbines, slight increase in overall generation capacity of the WEF, removing the specified generation capacity for individual turbines, as well as the addition of a Battery Energy Storage System (BESS)[35] (within the authorized footprint of the WEF));
- Amendment to the preliminary layout of the project; and
- The correction of an editorial error in the EA.

All of the specialist studies that were identified and undertaken as part of the Basic Assessment process for the project in 2018 - 2020 have been updated as part of this EA Amendment Application process, to assess and address the proposed amendments to the EA. The conclusions of the specialists' assessments for the proposed amendments are summarised below:

- Flora and Fauna: The proposed amendments are not considered significant from an ecological perspective and the impacts associated with the proposed amendments are considered consistent with the original impacts as assessed in the Fauna and Flora Basic Assessment study. There would therefore be no impacts associated with the proposed amendments, including the amended layout, that would be higher than the original layout as assessed. Furthermore, no additional mitigation or avoidance measures beyond those already recommended in the original Fauna and Flora specialist Basic Assessment study are required for the proposed amendments.

- Aquatic: The potential impact of the proposed amendments on the aquatic environment will remain unchanged from the original Aquatic Impact Assessment Report (August 2018) provided all the recommended mitigation measures are upheld. Although the impact significance rating will remain low (-) for all the potential aquatic impacts, there is an overall advantage to the proposed amended layout as the overall number of watercourse crossings has been reduced. Based on the findings of the assessment of potential aquatic impacts associated with the proposed amendments, the aquatic specialist has no objection to the authorisation of any of the proposed amendments, assuming that all mitigation measures recommended within the original aquatic impact assessment report are carried out. No changes to the original mitigations or EMPr considerations are required (Colloty, 2021).

- Avifauna: Overall, the proposed amendments have potentially different impacts on birds. The proposed increase in blade length would result in a larger rotor swept area, which increases the collision risk area of a turbine, and would be disadvantageous to birds. This is however offset by a decrease in the number of turbines, which is advantageous to avifauna. Any potential changes are not significant enough to change any of the impact assessment ratings. Therefore, the proposed amendments will not result in an increased level or change in the nature of the impact, and the significance of all identified and re-assessed impacts is expected to be the same as those in the

[35] Due to rapidly changing preferences and improvements to battery technology, the selection of the type of battery technology (i.e. Solid State (e.g. Lithium Ion) or Flow Technologies) would only take place during the detailed design process and after the appointment of the battery supplier.

original bird impact assessment, with mitigations. There is no reason why the proposed amendments should not be authorised from an avifaunal perspective (Albertyn, 2021).

- Bats: The proposed amendments will have a differential impact on bat species, with most changes being positive for low flying species but negative for high flying species. The proposed amendments will not alter the overall impact of the Highlands Central WEF on bats. Provided the recommended mitigation measures are adhered to, including avoiding the placement of turbines in high bat sensitivity areas, maintaining a lower blade sweep of at least 40m, and using curtailment or deterrents if bat fatality exceeds threshold levels, the proposed development can proceed without unacceptable impacts to bats (Arcus, 2021).

- Heritage, archaeology and palaeontology: It is the opinion of the heritage specialist that the proposed amendments will not result in any new or increased level of negative impacts to heritage resources and that there will be no change in the nature of impacts. There are no disadvantages to the proposed amended layout. In fact, there are two minor benefits in that (1) the overall footprint is decreased which means potentially fewer impacts to archaeological and palaeontological resources and (2) the reduction in turbines will very slightly reduce the visual intrusion of the facility in the cultural landscape. No changes to the proposed mitigation measures are required. The existing measures must continue to apply. It is worth emphasizing that the archaeological pre-construction survey should be conducted as early as possible in order to facilitate planning of both any required mitigation and the construction phase of the project (Orton, 2021).

- Noise: Considering the outcome of the modelling, based on the conceptual scenarios as envisaged and input parameters used, the noise specialist concluded the following: (a) The proposed amendments to the project will not result in an increased level or significance of the noise impact, nor result in a change in the nature of potential noise impacts; (b) The proposed amendments to the project have the advantage that it will decrease the projected noise levels as well as the significance of the noise impact during the operational phase; (c) The proposed amendments to the project, due to the slightly lower noise levels, will require less mitigation measures and management as recommended in the original noise study (Reid, 2018) (de Jager, 2021).

- Visual: The increased hub height, rotor diameter and blade tip height would result in increased visibility of the 3 phases of the Highlands wind farm project (i.e. Highlands North, Central and South WEFs), particularly when viewed from the R63. Given that the visual significance of the increased height is generally limited to within 5km of the turbines, and that there will be fewer turbines, the overall visual impact significance rating for the turbines is not expected to change from that of the originally assessed layout or authorised layout. The impact significance rating would thus remain moderate (-) before and after mitigation. Amendments to the related infrastructure, such as internal access roads and powerlines, would result in no change in the overall visual impact significance ratings in relation to those of the previously assessed proposals, and would remain low (-) before and after mitigation. Minor changes to substations and internal roads would have marginal visual implications and therefore their visual impact significance rating also remains unchanged at low (-). The addition of the battery storage facility adjacent to the substation would not have any major visual significance, given its maximum height of 8m and distance from visual receptors. Provided that the

visual mitigations listed in the original Visual Impact Assessment Report (dated November 2018) (including post-construction rehabilitation of the site) are adhered to, the findings of the Visual Impact Assessment for the 3 phases of the Highlands Wind Farm Project (including the subject Highlands Central WEF) would still be valid for the proposed amendments, and it is the opinion of the visual specialists that the proposed amendments could be approved (Lawson & Oberholzer, 2021).

- Social: The reduction of the number of wind turbines and increase in the hub height and rotor diameter of the wind turbines associated with the Part 2 Amendment will not change the nature or significance of any of the social impacts previously assessed as part of the SIA (2018) for the Highlands WEFs. The construction and operation of the proposed BESS will not result in any material social impacts that were not previously assessed as part of the SIA (2018) for the Highlands WEFs. The addition of a BESS also represents an advantage by ensuring a more secure and efficient renewable energy-based grid that is more resistant to disruptions. The mitigation measures for the construction of the Highlands WEFs listed in the SIA (2018) are appropriate for the Part 2 Amendment, including the establishment of the BESS. No additional management outcomes or mitigation measures in terms of social impacts are therefore required for the Highlands Central WEF. The social specialist concluded that the Part 2 Amendment for the Highlands Central WEF, including the establishment of the BESS, is therefore supported (Barbour, 2021).

- Agriculture: The proposed amendments will result in no changes to the projects agricultural impacts. The specialist therefore concluded that, "*from an agricultural impact point of view, the amendments and final layout should be authorised*" (Lanz, 2021).

- Traffic: The proposed amendments to the Environmental Authorisation do not trigger any new impact to the traffic and transportation on site and to and from, and no further recommendations or mitigation measures to those outlined in the Traffic Assessment dated 4 September 2018 are required. The proposed amendments therefore will not result in any significant increased level or change in the nature of traffic impacts. Based on the further assessment and original Traffic Specialist Report, the amendment can be granted to the applicant (Fautley, 2021).

In light of the findings of the specialist assessments, it is evident that no significant additional impacts are anticipated due to the proposed amendments. Furthermore, the proposed amendments are not anticipated to change the nature of impacts or result in an increased level of impact. The impact significance ratings as contained in the Revised Final BAR (November 2019) are accordingly still applicable for all assessed impacts, except for potential noise impacts, where a reduction in the significance ratings (for operational phase activities) has occurred due to the proposed amendments, which is advantageous.

Given that no significant additional impacts are associated with the proposed amendments and that the significance of the potential environmental impacts are not expected to be higher than originally determined for the authorised project, the EAP is of the opinion that the proposed amendments to the Highlands Central WEF, as described in Section 2, be considered for approval. The proposed amendments are considered acceptable to the specialists and EAP, provided that the recommended mitigation measures, as outlined in Section 3 (and in the associated specialist amendment reports) are implemented.

The draft Environmental Management Programme (EMPr) for the project, dated November 2019, has been updated to include the proposed amendments to the project description, the High-Level Risk Assessment for the proposed BESS, as well as the updated mitigation measures recommended by the bat and noise specialists in light of the proposed amendments. The recommended mitigation measures included in the fauna and flora, avifauna, agricultural, aquatic, heritage, traffic, social and visual specialist studies that were included in the Revised Final BAR (November 2019) have not required any changes or additions to their respective recommended mitigation measures as a result of the proposed amendments, and therefore remain valid.

In terms of the proposed BESS, the Applicant has indicated that, due to rapidly changing preferences and improvements to battery technology, the selection of the type of battery technology (i.e. either Solid State (e.g. Lithium-Ion) or Flow technologies) will only take place during the detailed design process and after the appointment of the battery supplier. It is therefore recommended that an updated Risk Assessment be submitted to DFFE once the technology type has been determined, and that technology specific mitigation measures for the BESS must be included in the final EMPr that will be made available for public review and submitted to DFFE for approval in due course, i.e. prior to commencement of the activity, as required in terms of Condition of Authorisation 15 of the EA.

Appendix A:

Preliminary layout included in "Revised Final BAR" (November 2019) for the Highlands Central WEF (Source: Arcus Consultancy Services South Africa (Pty) Ltd)

Appendix B:

Application for Amendment of the EA Form

Appendix C:

Specialist Studies

Appendix C1a:

Flora and Fauna Amendment Statement

Appendix C1b:

CV of specialist

Appendix C1c:

Specialist declaration

Appendix C2a:

Avifauna amendment report (Addendum to avifaunal specialist impact assessment)

Appendix C2b:

CV of specialist

Appendix C2c:

Specialist declaration

Appendix C2d:

Avifaunal independent peer review (including specialist declaration)

Appendix C3a:

Bat amendment report

Appendix C3b:

CV of specialist

Appendix C3c:

Specialist declaration

Appendix C4a:

Aquatic amendment statement

Appendix C4b:

CV of specialist

Appendix C4c:

Specialist declaration

Appendix C5a:

Environmental noise impact assessment report

Appendix C5b:

CV of specialist

Appendix C5c:

Specialist declaration

Appendix C6a:

Visual impact assessment amendment report

Appendix C6b:

CV of specialist

Appendix C6c:

Specialist declaration

Appendix C7a:

Addendum to agricultural impact assessment

Appendix C7b:

CV of specialist

Appendix C7c:

Specialist declaration

Appendix C8a:

Heritage amendment statement

Appendix C8b:

CV of specialist

Appendix C8c:

Specialist declaration

Appendix C9a:

Social amendment statement

Appendix C9b:

CV of specialist

Appendix C9c:

Specialist declaration

Appendix C10a:

Traffic amendment statement (addendum to the traffic impact assessment)

Appendix C10b:

CV of specialist

Appendix C10c:

Specialist declaration

Appendix D:

EAP CV & Declaration of Interest

Appendix E:

Environmental Authorisation

Appendix F:

Public Participation Process

Appendix F1:

Approved public participation (PP) plan & DFFE approval

Appendix F2:

Registered I&AP database (updated)

Appendix F3:

Advertisements

Appendix F4:

Site notices

Appendix F5:

Notification posters

Appendix G:

Amended Draft Environmental Management Programme (EMPr)

Appendix H:

Battery Energy Storage System (BESS) High Level Risk Assessment