



SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

Proposed Development of the 235MW Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province

Draft Environmental Authorisation (EA) Amendment Assessment Report

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SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

PROPOSED DEVELOPMENT OF THE 235MW HARTEBEEST LEEGTE WIND FARM NEAR LOERIESFONTEIN, NORTHERN CAPE PROVINCE

DRAFT ENVIRONMENTAL AUTHORISATION (EA) AMENDMENT ASSESSMENT REPORT

Executive Summary

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as Mainstream) was issued with an Environmental Authorisation (EA) for the proposed construction of the 235MW Hartebeest Leegte Wind Farm, near Loeriesfontein in the Northern Cape Province. Authorisation was granted on 15 March 2018, by way of EA Reference No 14/12/16/3/3/2/1015 (Appendix.A), and subsequently amended on 22 May 2019 (14/12/16/3/3/2/1015/AM1). The proposed wind farm is located approximately 62km north of Loeriesfontein in the Hantam Local Municipality in the Northern Cape Province.

Mainstream is now proposing to submit a Part 2 Amendment application to allow for amendments to the turbine specifications stipulated in the original EA for the Hartebeest Leegte Wind Farm to allow for greater project efficiency and viability. The proposed amendments are as follows:

- Increased turbine hub height: from 160m up to 200m;
- Increased rotor diameter: from 160m up to 200m.

Accordingly, Mainstream has appointed SiVEST to act as the independent Environmental Assessment Practitioner (EAP) to undertake a Part 2 Amendment process as required in terms of Regulation 32 of GN R. 982. This amendment report has thus been compiled in accordance with the provisions of Regulation 32 (1) of the EIA Regulations 2014 (as amended).

As part of the original EIA process for the proposed Hartebeest Leegte Wind Farm undertaken in 2017/2018, the following specialist studies were undertaken:

- Agricultural Potential Assessment
- Avifaunal Assessment
- Bat Assessment
- Biodiversity (including fauna and flora) Assessment
- Geotechnical Assessment
- Heritage and Palaeontology Assessment
- Noise Impact Assessment
- Socio-economic Impact Assessment
- Surface Water Impact Assessment

- Traffic Assessment, and
- Visual Impact Assessment

In addition, a Path Loss and Risk Assessment was undertaken to determine whether the planned windfarm development could have any influence on the Square Kilometre Array (SKA) project.

As these specialist studies considered the impacts of turbines with a maximum hub height of 160m and with a maximum rotor diameter of 160m, it was necessary to determine if further input would be required from any of the specialists in respect of the abovementioned proposed amendments. Accordingly, specialists were commissioned to assess the impacts of the proposed amendments in respect of the following:

- Avifauna;
- Bats;
- Noise;
- Visual.

Although the specialist assessments did not identify any new environmental risks or impacts, it was found that the proposed amendments could result in a potential increase in the significance of negative impacts in respect of avifauna and bats. Specialist studies did however determine that the potential negative impacts resulting from the proposed amendments would remain unchanged with the implementation of specific new mitigation measures. Impacts remain unchanged in respect of noise and visual.

The advantages and disadvantages of the proposed amendment were explored to provide an indication of the potential benefits and drawbacks. Based on the feedback received from the specialists, it is evident that the advantages outweigh the disadvantages, mainly due to the fact that the larger turbines may reduce the total number of turbines required to generate the optimum output capacity.

A Public Participation Process (PPP) as required in terms of Chapter 6 of the EIA Regulations, 2014, (as amended) is being conducted in respect of the Part 2 Amendment application for the Hartebeest Leegte Wind Farm. This includes:

- Notification of affected landowners and Provincial Authority;
- Notification of potential Interested and Affected Parties (I&APs) by way of newspaper advertisements and site notices; and
- The Draft EA Amendment Assessment Report has been made available on SiVEST's website to all I&APs, key stakeholders and Organs of State (OoS) / Authorities for comment and review for a period of 30 days;

All comments received throughout the EA amendment process will also be included in the Comments and Response Report (C&RR).

In light of the above, it is concluded that the EA should be amended in line with the specifications as proposed and that the increased risks and impacts identified can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

**SOUTH AFRICA MAINSTREAM RENEWABLE POWER
DEVELOPMENTS (PTY) LTD**

**PROPOSED DEVELOPMENT OF THE 235MW HARTEBEEST
LEEGTE WIND FARM NEAR LOERIESFONTEIN, NORTHERN CAPE
PROVINCE**

**DRAFT ENVIRONMENTAL AUTHORISATION (EA) AMENDMENT
ASSESSMENT REPORT**

Contents	Page
1 INTRODUCTION	1
1.1 Expertise of Environmental Assessment Practitioner (EAP)	2
2 PROJECT OVERVIEW	3
2.1 Project Location	3
2.2 Authorised Project Components	4
2.3 Listed Activities	4
2.4 Assessment of Environmental Impacts	6
3 PROPOSED AMENDMENTS	10
3.1 Changes to Authorised Elements of the Project	10
3.2 Motivation	11
4 IMPACTS RELATED TO PROPOSED AMENDMENTS	11
4.1 Avifauna Impacts	13
4.2 Bat Impacts	14
4.3 Noise Impacts	18
4.4 Visual Impacts	18
4.5 Summary of Changes in Impact Ratings	19
5 NEW / REVISED MITIGATION MEASURES	21
6 ADVANTAGES / DISADVANTAGES OF THE PROPOSED AMENDMENTS	21

7	PUBLIC PARTICIPATION	22
7.1	Notification of Affected Landowners and Provincial Authority	23
7.2	Notification of Potential Interested and Affected Parties (I&AP's)	23
7.3	Comment and Review of Draft EA Amendment Assessment Report	23
7.4	Stakeholders and I&APs	23
7.5	Announcing the Opportunity to Participate	24
7.6	Proof of Notification	24
7.7	Comments and Response Report (C&RR)	24
7.8	Distribution to Organs of State (OoS) / Authorities	25
8	CONCLUSION AND RECOMMENDATIONS	31
8.1	Details of Amendments being Applied For	31
8.2	Environmental Impact Statement	32
9	REFERENCES	33

List of Tables

Table 1: Project Team	2
Table 2: Expertise of the EAP	2
Table 3: Authorised Listed activities in terms of the NEMA Regulations	4
Table 4: Original Rating of Impacts during construction of the proposed WEF and associated infrastructure	6
Table 5: Original Rating of Impacts during operation of the proposed WEF and associated infrastructure	8
Table 6: Investigation of EIA Phase Specialist Studies	11
Table 7: Wind turbine mitigation schedule	16
Table 8: Summary of changes in impact ratings (Operation Phase)	19
Table 9: New / Revised mitigation measures identified in respect of the proposed amendments	21
Table 10: Advantages / Disadvantages of the Proposed Amendments	22
Table 11: Distribution of Draft EA Amendment Assessment Report to OoS	26

List of Figures

Figure 1: Layout Assessed in FEIAr	3
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Appendices

Appendix A: Environmental Authorisation (EA)

Appendix B: Authority Consultation

Appendix C: Specialist Studies

Appendix C1: Avifauna Impact Assessment

Appendix C2: Bat Impact Assessment

Appendix C3: Noise Impact Assessment

Appendix C4: Visual Impact Assessment

Appendix C5: Other specialist Comments

Appendix D: Public Participation

Appendix D1: Proof of Written Notification

Appendix D2: Proof of Advertisements

Appendix D3: I&AP Database

Appendix D4: Correspondence

Appendix D5: Comments and Response Report

Appendix D6: Landowner and Authority Notifications

Appendix D7: Distribution to Organs of State

Appendix E: Maps

Appendix F: Project Team CV's

Appendix G: Specialist Declarations of Interest

Appendix H: Draft Environmental Management Programme (EMPr)

GLOSSARY OF TERMS

ABBREVIATIONS

ATNS	- Air Traffic Navigation Services
C&RR	- Comments and Response Report
CV	- Curriculum Vitae
DAFF	- Department of Agriculture, Forestry and Fisheries
DEA	- Department of Environmental Affairs
DMR	- Department of Mineral Resources
DoE	- Department of Energy
DWS	- Department of Water & Sanitation
EA	- Environmental Authorisation
EAP	- Environmental Assessment Practitioner
ECP	- Emissions Control Plan
EIA	- Environmental Impact Assessment
EIAr	- Environmental Impact Assessment Report
EMC	- Electromagnetic Compatibility
EMI	- Electromagnetic Interference
EMPr	- Environmental Management Programme
ESA	- Early Stone Age
EWT	- Endangered Wildlife Trust
FEIAr	- Final Environmental Impact Assessment Report
GIS	- Geographic Information System
GN	- Government Notice
GPS	- Global Positioning System
HIA	- Heritage Impact Assessment
I&AP(s)	- Interested and Affected Parties
IPP(s)	- Independent Power Producers
KM	- Kilometre(s)
M	- Metres
MSA	- Middle Stone Age
MW	- Megawatt
NCR	- National Noise Control Regulations
NC DENC	- Northern Cape Department of Environment and Nature Conservation
NEMA	- National Environmental Management Act (Act No. 107 of 1998)
NSD	- Noise Sensitive Development
OoS	- Organs of State
RE	- Renewable Energy
REIPPPP	- Renewable Energy Independent Power Producer Procurement Programme
PPA	- Power Purchase Agreement
PPP	- Public Participation Process
SA	- South Africa
SA CAA	- South African Civil Aviation Authority
SAHRA	- South African Heritage Resources Agency
SANRAL	- South African National Roads Agency SOC Limited

SKA - Square Kilometre Array
VIA - Visual Impact Assessment
WEF - Wind Energy Facility
WESSA - Wildlife & Environment Society of South Africa
WTG - Wind Turbine Generator

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1 INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as Mainstream) was issued with an Environmental Authorisation (EA) for the proposed construction of the 235MW Hartebeest Leegte Wind Farm, near Loeriesfontein in the Northern Cape Province. Authorisation was granted on 15 March 2018, by way of EA Reference No 14/12/16/3/3/2/1015 (**Appendix A**), as amended by 14/12/16/3/3/2/1015/AM1 (**Appendix A**).

This authorisation made provision for the construction of a total number of 47 wind turbines, each with a hub height of up to 160m and a rotor diameter of 160m. In light of advancements in wind turbine technology, Mainstream is proposing amendments to the turbine specifications stipulated in the original EA for the Hartebeest Leegte Wind Farm to allow for greater project efficiency and viability. The proposed amendments are as follows:

- Increased turbine hub height: from 160m up to 200m;
- Increased rotor diameter: from 160m to up to 200m.

The increased rotor diameter and tower hub height would result in a maximum tip height of 300m. Other authorised elements of the project remain unchanged, including the total output capacity and the number and location of turbines and associated infrastructure. The modified turbine specifications may however be construed as a change in the scope of the EA and may result in changes in the associated impacts, thus requiring an amendment application in terms of Part 2 of Chapter 5 of the EIA Regulations 2014 (as amended).

Accordingly, Mainstream has appointed SiVEST to act as the independent EAP to undertake the Part 2 Amendment process as required in terms of Regulation 32 of GN R. 982. This amendment report has thus been compiled in accordance with the provisions of Regulation 32 (1) of the EIA Regulations 2014, (as amended), and includes:

- an assessment of all impacts related to the proposed change;
- an evaluation of the advantages and disadvantages associated with the proposed change;
- provision of measures to ensure avoidance, management and mitigation of any impacts associated with such proposed change; and
- identification of any changes required to the EMPr;

The report will be made available for public comment for a period of 30 days in terms of the standard requirements by the competent authority (namely the DEA) in-line with legislation (refer to **Appendix B**). Comments received will be addressed and incorporated into the final report for submission to the DEA.

1.1 Expertise of Environmental Assessment Practitioner (EAP)

SiVEST Environmental Division has considerable experience in the undertaking of EIA and Amendment Application processes. Staff and specialists who were involved in this Amendment Application process and contributed to the compilation of this report are detailed in **Table 1** below.

Table 1: Project Team

Name and Organisation	Role
Andrea Gibb – SiVEST SA (Pty) Ltd	Project
Stephan Jacobs – SiVEST SA (Pty) Ltd	Environmental Assessment Practitioner (EAP)
Kerry Schwartz – SiVEST SA (Pty) Ltd	Environmental Consultant / GIS and Mapping
Hlengiwe Ntuli – SiVEST SA (Pty) Ltd	Public Participation Consultant
Chris van Rooyen	Avifaunal Specialist
Stephanie Dippenaar – Stephanie Dippenaar Consulting	Bat Specialist
Morne de Jager – Enviro Acoustic Research	Noise Specialist
Kerry Schwartz & Andrea Gibb - SiVEST SA (Pty) Ltd	Visual Specialist

As per the requirements of the EIA Regulations 2014 (as amended), the details and level of expertise of the persons who prepared the EA Amendment Assessment Report are provided in **Table 2** below.

Table 2: Expertise of the EAP

Environmental Practitioner	Stephan Jacobs
Contact Details	stephanj@sivest.co.za
Qualifications	B.Sc. Environmental Sciences (undergraduate) and B.Sc. (Hons) Environmental Management and Analysis
Professional Affiliations	IAIAsa (International Association for Impact Assessment)
Expertise	Stephan joined SiVEST in May 2015 and holds the position of Environmental Consultant in the Johannesburg and Pretoria offices. Stephan specialises in the field of Environmental Management and has been extensively involved in Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes for various types of projects / developments, particularly energy generation and electrical distribution projects. Stephan thus has vast experience with regards to the compilation of EIAs and BAs. Additionally, Stephan has extensive experience in undertaking public participation and stakeholder engagement processes. Stephan has also assisted extensively in the undertaking of fieldwork and the

compilation of reports for specialist studies such as Surface Water and Visual Impact Assessments. Stephan also has experience in Environmental Compliance and Auditing and has acted as an Environmental Control Officer (ECO) for several infrastructure projects.

CVs for each team member are provided in **Appendix F**.

2 PROJECT OVERVIEW

2.1 Project Location

The proposed wind farm is located approximately 62km north of Loeriesfontein in the Hantam Local Municipality in the Northern Cape Province. The Hartebeest Leegte Wind Farm project is situated on the following farm:

- Remainder of the Farm Hartebeest Leegte No. 216.

The layout assessed in the FEIAR and indicated in the figure below will remain unchanged.

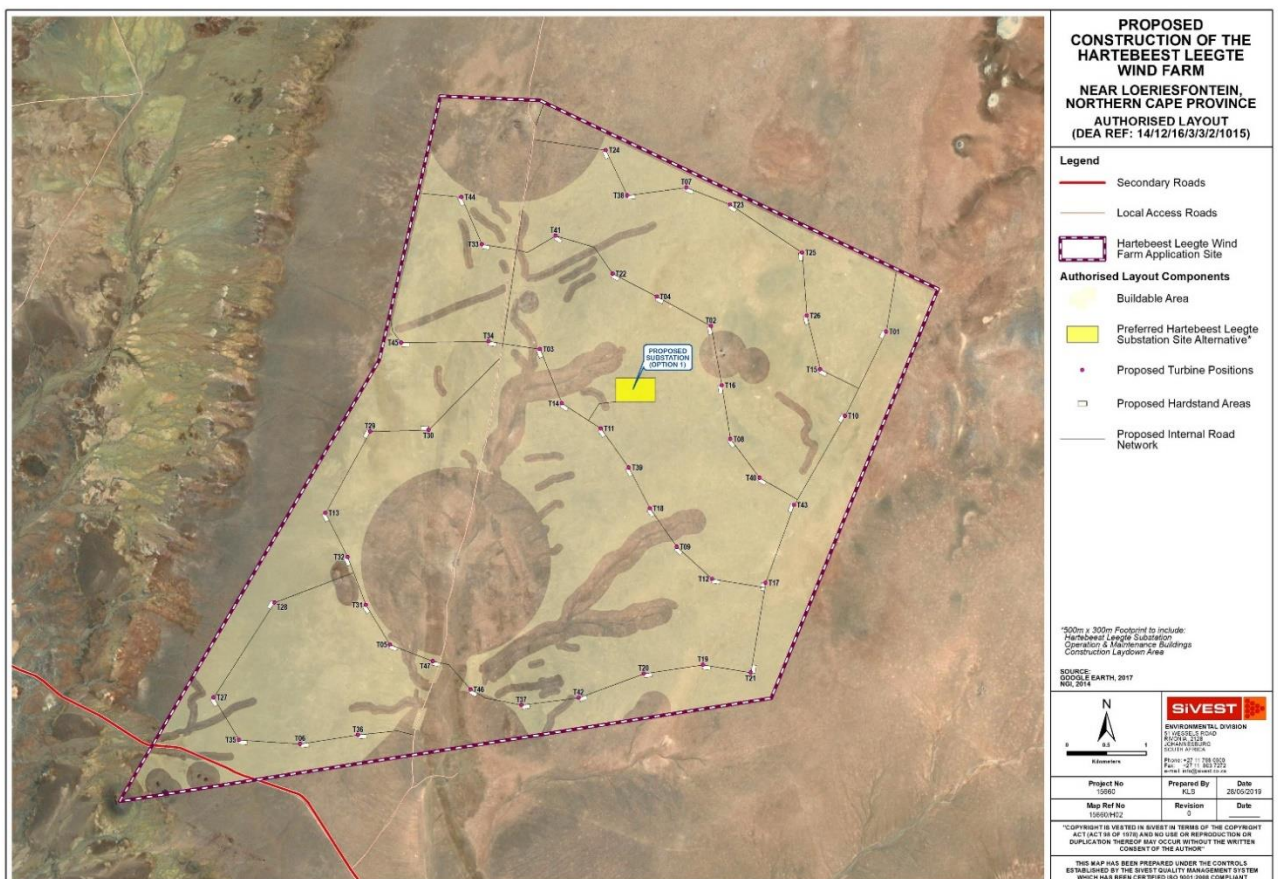


Figure 1: Layout Assessed in FEIAR

As per Condition 16 of the EA dated 15 March 2018, the above layout has not been approved. The final development layout map must be made available for comments and the holder of the EA must consider such comments and thereafter submit the final development layout to the DEA for written approval prior to commencement of the activity. The final development layout will be determined during the detailed design phase once the project has been awarded preferred bidder status. As such, this amendment process does not cover obtaining approval of the development layout.

2.2 Authorised Project Components

In terms of the EA for the Hartebeest Leegte Wind Farm dated 15 March 2018, (DEA Ref No 14/12/16/3/3/2/1015), the following components were authorised:

- A wind farm with
 - an export capacity of up to 235MW;
 - a total of up to 47 wind turbines with a hub height of 160m and a rotor diameter of 160m.
- A 132kV on-site IPP Substation;
- Medium voltage electrical connections;
- Internal roads;
- Site fencing;
- Other infrastructure, including:
 - Operation and maintenance buildings;
 - Temporary construction lay down area;
 - Hardstanding areas/platforms for each turbine.

2.3 Listed Activities

As per the EA for the Hartebeest Leegte Wind Farm (DEA Ref No 14/12/16/3/3/2/1015), the following activities indicated in Listing Notice 1, Listing Notice 2 and Listing Notice 3 (GN R. 983, 984 and 985 as amended) were authorised. These activities were authorised in terms of the National Environmental Management Act (NEMA), 1998 and the Environmental Impact Assessment Regulations, 2014 (as amended), which were applicable at the time of the original EA.

Table 3: Authorised Listed activities in terms of the NEMA Regulations

Listed Activities	Activity / Project description
<p><i>GN R. 983 Activity 11:</i></p> <p><i>“The development of facilities or infrastructure for the transmission and distribution of electricity-</i></p> <p><i>(i) Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.”</i></p>	<p>An on-site IPP substation will be required for the Hartebeest Leegte Wind Farm. The proposed on-site IPP substation will have a capacity of 132kV.</p>
<p><i>GN R. 983 Activity 12:</i></p> <p><i>“The development of -</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 100m² or more;</i></p>	<p>Drainage lines are scattered across the proposed site and road segments are likely to cross these lines or be within 32m thereof.</p>

<p>Where such development occurs –</p> <p>a) within a watercourse; or</p> <p>c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.”</p>	
<p>GN R. 983 Activity 19:</p> <p>“The infilling or depositing of any material of more than 10m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m³ from a watercourse.”</p>	<p>The infilling or depositing of any material of more than 10m³ into a watercourse may be triggered during the construction of internal service roads.</p>
<p>GN R. 983 Activity 24:</p> <p>“The development of -</p> <p>(ii) A road with a reserve wider than 13,5 metres, or where no reserve exists where the road is wider than 8 metres”</p>	<p>Internal access roads with a maximum width of 20m are initially being proposed for the construction phase. This is however only temporary as the width of proposed internal access roads will be reduced to approximately 6 - 8m for maintenance purposes during the operational phase.</p>
<p>GN R. 983 Activity 28:</p> <p>“Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and where such development:</p> <p>(ii) Will occur outside an urban area, where the total land to be developed is bigger than 1 ha.”</p>	<p>The proposed farm on which the project is proposed is still being used for livestock grazing (mostly sheep) and an area of more than 1 hectares will be transformed into an industrial land use.</p>
<p>GN R. 983 Activity 56</p> <p>“The widening of a road by more than 6m, or the lengthening of a road by more than 1km -</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres.”</p>	<p>Existing access roads will need to be upgraded in order to access the site. Internal access roads with a maximum width of 20m are initially being proposed for the construction phase. This is however only temporary as the width of proposed internal access roads will be reduced to approximately 6 - 8m for maintenance purposes during the operational phase.</p>
<p>GN R. 984 Activity 1</p> <p>“The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.</p>	<p>The proposed wind farm would have a maximum generation capacity of up to 235MW.</p>
<p>GN R. 984 Activity 15</p> <p>“The clearance of an area of 20 hectares or more of indigenous vegetation.”</p>	<p>Physical alteration of undeveloped land for industrial use would take place. The total area to be disturbed is expected to be approximately 53.68 hectares.</p>

The proposed amendments will not result in any changes to the authorised activities and will not introduce any new activities.

2.4 Assessment of Environmental Impacts

As part of the original EIA process for the proposed Hartebeest Leegte Wind Farm and associated infrastructure undertaken in 2015, the following specialist studies were undertaken:

- Agricultural Potential Assessment;
- Avifaunal Assessment;
- Bat Assessment;
- Biodiversity Assessment (including fauna and flora);
- Geotechnical Assessment;
- Heritage Assessment;
- Noise Impact Assessment;
- Socio-economic Impact Assessment;
- Surface Water Impact Assessment;
- Traffic Impact Assessment; and
- Visual Impact Assessment;

In addition, a Path Loss and Risk Assessment was undertaken to determine whether the planned wind farm development could have any influence on the Square Kilometre Array (SKA) project.

It should be noted that the EIA process and above-mentioned associated specialist studies considered the impacts of turbines with maximum hub heights of 160m and with maximum rotor diameter of 160m. Impacts identified in the specialist reports are summarised in the tables below.

Table 4: Original Rating of Impacts during construction of the proposed WEF and associated infrastructure

Specialist Study	Impact	Pre-Mitigation Rating	Post Mitigation Rating
Agricultural Potential	Loss of agricultural land (grazing).	Low (-)	N/A
	Farm economic sustainability.	Low (+)	N/A
	Erosion due to alteration of the land surface run-off characteristics.	Low (-)	Low (-)
	Increased security against stock theft due to the presence of the energy facility and its personnel.	Low (-)	N/A
	Loss of topsoil caused by poor topsoil management during construction related soil profile disturbance.	Low (-)	Low (-)
	Degradation of veld vegetation (grazing) beyond the direct footprint caused by trampling due to vehicle passage and deposition of dust.	Low (-)	Low (-)
	Impact on air quality due to dust generation.	Low (-)	Low (-)
	Soil contamination due to hydrocarbon spillages from construction activities.	Low (-)	Low (-)
Avifauna	Displacement of priority species due to disturbance during construction phase.	Medium (-)	Low (-)

	Displacement of priority species due to habitat destruction during construction phase.	Medium (-)	Medium (-)
Bats	Destruction of bat roosts due to earthworks and blasting	Low (-)	Low (-)
	Loss of foraging habitat	Low (-)	Low (-)
Biodiversity	Impacts on vegetation and protected plant species.	Medium (-)	Low (-)
	Impacts on fauna due to construction phase activities.	Medium (-)	Medium (-)
Geotechnical	Foundation excavability - hardpan calcrete / soft rock shale encountered during excavation.	Low (-)	Low (-)
	Foundation Excavability - Dolerite rock / hard rock shale encountered during excavation.	Medium (-)	Low (-)
	Foundation Excavability - Instability of excavation side walls within fractured bedrock.	Low (-)	Low (-)
Heritage and Palaeontology	Impact of the development footprint on the palaeontology heritage (fossils).	Low (-)	Low (-)
	Impacts on archaeological/heritage resources.	Medium (-)	Low (-)
	Impacts on "Chance Finds".	Medium (-)	Low (-)
Noise	Daytime construction (and upgrade) of access roads and other infrastructure.	Medium (-)	Low (-)
	Night-time construction (and upgrade) of access roads and other infrastructure.	Medium (-)	Low (-)
	Daytime construction traffic.	Medium (-)	Low (-)
	Night-time construction traffic.	Medium (-)	Low (-)
	Daytime construction of wind turbines and other infrastructure.	Medium (-)	Low (-)
	Night-time construction of wind turbines and other infrastructure.	Low (-)	Low (-)
	Construction of on-site substations.	Low (-)	Low (-)
Socio-Economic	Impacts on employment.	Medium (+)	High (+)
	Impacts on skills development.	High (+)	High (+)
	Impacts on health.	Medium (-)	Medium (-)
	Impacts on demographics due to migration of labour.	Medium (-)	Medium (-)
	Impacts on social pathologies.	Medium (-)	Medium (-)
	Impacts on investment in the local community.	Medium (+)	Medium (+)
	Impacts on personal safety and security.	Low (-)	Low (-)
	Impacts on sense of place.	Low (-)	Low(-)
	Impacts on regional GDP.	High (+)	High (+)
	Impacts on demand for social facilities.	Low (-)	Low (-)
	Impacts on basic services.	Low (-)	Low (-)

	Impacts on household income and standard of living.	Low (+)	Medium (+)
	Impacts on informal hospitality industry.	Medium (+)	Medium (+)
	Impacts on tax revenue for Government.	Medium (+)	Medium (+)
Surface Water	Degradation of drainage line and wetland habitat.	Medium (-)	Low (-)
	Degradation of the soils associated with the drainage lines and wetlands	Medium (-)	Medium (-)
	Contamination of soils and water associated with drainage lines and wetlands.	Medium (-)	Low (-)
	Impacts on the fauna associated with surface water resources.	Low (-)	Low (-)
Traffic	Impact of site access points on haulage routes and local traffic.	Low (-)	Low (-)
	Impact of abnormally sized vehicles on haulage routes and local traffic.	Medium (-)	Low (-)
	Impact of vehicles and construction equipment on air quality.	Low (-)	Low (-)
	Impacts associated with accidents on surrounding tarred/gravel roads.	High (-)	Medium (-)
	Impacts on the quality of road surface conditions.	Low (-)	Low (-)
Visual	Potential visual impacts from construction activities include: <ul style="list-style-type: none"> ▪ Alteration of the natural character of the study area and exposure of potentially sensitive visual receptors to visual impacts associated with the construction phase. ▪ Perception of the construction activities as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance would expose bare soil which would visually contrast with the surrounding landscape. ▪ Temporary stockpiling of soil could alter the flat landscape and increase dust emissions. 	Low (-)	Low (-)
	Cumulative impacts	Medium (-)	Low (-)

Table 5: Original Rating of Impacts during operation of the proposed WEF and associated infrastructure

Specialist Study	Impact	Pre-Mitigation Rating	Post Mitigation Rating
Agricultural Potential	Loss of agricultural land (grazing).	Low (-)	N/A
	Farm economic sustainability.	Low (+)	N/A

	Erosion due to alteration of the land surface run-off characteristics.	Low (-)	Low (-)
	Increased security against stock theft due to the presence of the energy facility and its personnel.	Low (-)	N/A
	Cumulative impact.	Low (-)	N/A
Avifauna	Displacement of priority species due to disturbance during operational phase.	Low (-)	Low (-)
	Collisions of priority species with the turbines in the operational phase.	Medium (-)	Medium (-)
	Mortality of priority species due to electrocution on the internal MV lines in the operational phase.	Medium (-)	Low (-)
Bats	Bat mortalities due to direct blade impact or barotrauma during foraging activities (not migration).	High (-)	Low (-)
	Impacts of artificial lighting on bat populations and diversity.	High (-)	Low (-)
	Cumulative impacts.	High (-)	Medium (-)
Biodiversity	Impacts on fauna due to operational phase activities.	Medium (-)	Low (-)
	Increased soil erosion risk.	Medium (-)	Low (-)
	Alien plant invasion risk.	Medium (-)	Low (-)
	Cumulative impacts	Medium (-)	Low (-)
Geotechnical	N/A	N/A	N/A
Heritage and Palaeontology	Cumulative impacts	Medium (-)	Low (-)
Noise	Operation of wind farm – daytime.	Low (-)	Low (-)
	Operation of wind farm – night-time.	Low (-)	Low (-)
	Operation of on-site substations.	Low (-)	Low (-)
	Cumulative impacts.	Low (-)	Low (-)
Socio-Economic	Impacts on long-term employment.	Low (+)	Low (+)
	Impacts on skills development.	Low (+)	Low (+)
	Impacts on investment in the local community.	Medium (+)	Medium (+)
	Impacts on sense of place.	Low (-)	Low(-)
	Impacts on regional GDP.	Medium (+)	Medium (+)
	Impacts on basic services.	Low (-)	Low (-)
	Impacts on household income and standard of living.	Low (+)	Low (+)
	Impacts on tax revenue for Government.	High (+)	High (+)
	Cumulative impacts.	Medium (-)	Low (-)
Surface Water	Impacts on geomorphology of drainage lines and wetlands.	Medium (-)	Low (-)
Traffic	Impacts of increased traffic.	Low (-)	Low (-)

	Impacts associated with accidents on surrounding tarred/gravel roads.	High (-)	Medium (-)
	Impact of vehicles and construction equipment on air quality.	Medium (-)	Low (-)
	Impacts on the quality of road surface conditions.	Low (-)	Low (-)
	Cumulative impacts.	Low (-)	Low (-)
Visual	<p>Potential visual impacts from the operational WEF include:</p> <ul style="list-style-type: none"> ▪ Alteration of the natural character of the study area and exposure of potentially sensitive visual receptors to visual impacts. ▪ Perception of the development as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the WEF site may evoke negative sentiments from surrounding viewers. ▪ Alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines. 	Medium (-)	Medium (-)
	Cumulative impacts	Medium (-)	Medium (-)

3 PROPOSED AMENDMENTS

3.1 Changes to Authorised Elements of the Project

As previously mentioned, the EA made provision for the construction of a total number of 47 wind turbines, each with a hub height of up to 160m and a rotor diameter of 160m. Mainstream is now proposing amendments to the turbine specifications stipulated in the original EA for the Hartebeest Leegte Wind Farm to allow for greater project efficiency and viability. The proposed amendments are as follows:

- Increased turbine hub height: from 160m up to 200m;
- Increased rotor diameter: from 160m to up to 200m.

Other authorised elements of the project however remain unchanged, including the total output capacity (235MW) and the number and location of turbines and associated infrastructure.

The increased rotor diameter and tower hub height would result in a maximum tip height of 300m, an increase of some 60m from that which was assessed in the EIA and the associated specialist studies. Hence although the proposed amendments will not result in any changes to the project description, the new turbine specifications could potentially change the impacts previously identified.

Accordingly, where necessary, the specialists have been asked to re-evaluate the findings of their original reports in light of the proposed new turbine specifications.

An additional amendment is included in the application, this being an amendment to the contact details for the holder of the EA. This is however merely an administrative amendment and does not require any further assessment.

3.2 Motivation

The turbines available on the market are constantly improving and as new technology becomes available the turbine specifications often change. These modifications mean that what is perceived as the optimal wind turbine option can change because of the following:

- Improved technology certified and available subsequent to original EA:
The technology behind all renewable energies is currently advancing at an intense pace and new developments are being brought to the market place at very short intervals. Thus, the wind turbine technology has advanced since the undertaking of the EIA for the Hartebeest Leegte Wind Farm and new and improved models are available that the applicant would like to consider in order to optimise the project.
- Better fit for purpose technology is available today to suit the wind resource of the site:
More up-to-date turbine models are more efficient, and some are better suited to the native wind conditions on the site. Being in a position where these turbines can be considered will allow for the optimisation of the project driving improved overall efficiency.
- Larger wind turbine generators require fewer turbines:
Larger turbines have larger generators per turbine, larger generators per turbine result in fewer turbines which can increase the efficiency, higher energy production and profitability of the overall project. This can also benefit the environment.
- Market supply constraints for certain turbines including older technology:
Due to current considerable demand for wind energy across the world the demand for wind turbines is outstripping supply of certain manufacturers and thus waiting times have increased to the degree that projects are having to consider alternative models if their projects are to be implemented timeously.

The main reason for the proposed increase in the hub height and rotor diameter is to ensure that the most efficient wind turbines available on the market can be used at the time of construction. It is however important to note that the final turbine model and specifications will only be determined once the project is selected as a preferred bidder in the Department of Energy's (DoEs) future Renewable Energy Independent Power Producer Procurement Programme's (REIPPPP) bidding rounds.

4 IMPACTS RELATED TO PROPOSED AMENDMENTS

In order to ascertain if further input would be required in relation to the above-mentioned proposed amendments, each of the specialist studies conducted during the EIA phase of the development was investigated in terms of its applicability. The following determinations were made:

Table 6: Investigation of EIA Phase Specialist Studies

Agriculture	As the turbines are still within the assessed footprint, the agricultural specialist was commissioned to comment on whether the changes in turbine dimensions
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	will influence their findings. As per the specialist's comment letter of 20 September 2019 (Appendix C5), no changes in the nature of the impacts were identified.
Avifauna	An avifauna specialist was commissioned to assess the impact of the proposed amendment to the turbine dimensions and the extent to which the amendment will change the level or nature of impacts that were previously assessed and authorised.
Bats	A bat specialist was commissioned to assess the impact of the proposed amendment to the turbine dimensions and the extent to which the amendment will change the level or nature of impacts that were previously assessed and authorised.
Biodiversity (fauna and flora)	As the turbines are still within the assessed footprint, the biodiversity specialist was commissioned to comment on whether the changes in turbine dimensions will influence their findings. As per the specialist's comment letter of 20 September 2019 (Appendix C5), no changes in the nature of the impacts were identified.
Heritage	As the turbines are still within the assessed footprint, the heritage specialist was commissioned to comment on whether the changes in turbine dimensions will influence their findings. As per the specialist's comment letter of 20 September 2019 (Appendix C5), no changes in the nature of the impacts were identified.
Noise	A noise specialist was commissioned to assess the impact of the proposed amendment to the turbine dimensions and the extent to which the amendment will change the level or nature of impacts that were previously assessed and authorised.
SKA	<u>Not applicable</u> - In accordance with the specific conditions in the EA (35-37), during the detailed design the holder of the EA will in consultation with the Square Kilometre Array South Africa (SKA SA) Project office conduct detailed Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) studies in order to evaluate the impact of the facility on the SKA radio telescope. In addition, the EMI and RFI, together with an appropriate Electromagnetic Compatibility (EMC) control plan, will be submitted to the SKA project office for approval prior to construction of the facility. The EMC control plan will therefore address the proven technical and engineering design solutions that will be implemented to fully mitigate the risk of the proposed project. As such no further assessment is required at this stage.
Socio-Economic	As the proposed amendments are not expected to have an impact from a socio-economic perspective, the socio-economic specialist was commissioned to comment on whether the changes in turbine dimensions will influence their findings. As per the specialist's comment letter of 20 September 2019 (Appendix C5), the proposed amendments will not change the nature of the socio-economic impacts identified during the original studies and will not lead to the change in their ratings.
Surface Water	As the turbines are still within the assessed footprint, the surface water specialist was commissioned to comment on whether the changes in turbine dimensions will influence their findings. As per the specialist's comment letter of 20 September 2019 (Appendix C5), no changes in the nature of the impacts were identified.
Visual	A visual specialist was commissioned to assess the impact of the proposed amendment to the turbine dimensions and the extent to which the amendment

will change the level or nature of impacts that were previously assessed and authorised.
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A summary of the Specialist's findings commissioned as part of this amendment process is provided below.

4.1 Avifauna Impacts

Chris van Rooyen *et al.* of Chris van Rooyen Consulting were requested to revisit their avifaunal impact assessments of 2016 and 2017 for the proposed Hartebeest Leegte Wind Farm considering the proposed amendments. The impact which is specifically relevant in this instance is the risk of priority species mortality due to collisions with the turbines in the operational phase. The assessment report is attached as **Appendix C1**.

4.1.1 Re-assessment of Collision Mortality Impact

The avifaunal specialists conducted a re-assessment of the potential collision impact in order to establish if the original pre-mitigation assessments of by Van Rooyen *et al.* (2016 & 2017) should be revised in light of the proposed new turbine specifications. The increase of 56.2% in rotor swept area per turbine is significant, and unless the number of turbines is reduced, it will result in an increase in the overall collision risk for priority species.

The original impact ratings in respect of bird collision risks were identified as:

- Rating prior to mitigation: -45 (medium negative)
- Rating post mitigation: -30 (medium negative)

Although the impact rating methodology returns a “medium negative” rating for both pre and post mitigation, the avifaunal specialist refers to the post mitigation rating as “low-medium” due to the significantly lower score. On the basis of this rating, it was concluded that the proposed changes in turbine dimensions will increase the post-mitigation risk from “low- medium” to “medium”. However, should the number of turbines be reduced, it will result in the collision rating remaining unchanged, or even reducing, depending on the extent of the reduction in the number of turbines (see also **Section 4.1.2** below).

4.1.2 Revised Mitigation Measures

An assessment was undertaken to determine if the mitigation measures originally proposed for the Hartebeest Leegte WEF by Van Rooyen *et al.* (2016) would need to be revisited considering two (2) factors:

- The proposed increase in the rotor diameter will result in an increased risk of collisions for priority species (see **Section 4.1.1** above).
- The “Best Practice Guidelines for Avian Monitoring and Impact Mitigation at Proposed Wind Energy Development Sites in Southern Africa”, (Jenkins et al. 2011) revised in 2015, requires that either all, or part of the pre-construction monitoring is repeated if there is a time period of

three (3) years or more between the data collection and the construction of the wind farm. This re-assessment is necessary in order to take cognisance of any changes in the environment which may affect the risk to avifauna, and to incorporate the latest available knowledge into the assessment of the risks. In order to give effect to this requirement, nest searches were repeated in June 2019 to ensure up to date information on the breeding status of priority species at the proposed Hartebeest Leegte WEF.

No new nests of priority species were recorded during the nest searches performed in June 2019.

It is concluded that the original mitigation measures listed in the Bird Specialist Study (Van Rooyen *et al.* 2016) remain valid and do not need to be revised in view of the proposed changes to the turbine dimensions.

4.2 Bat Impacts

The original bat impact assessment, and Bat Monitoring Assessment for the proposed Hartebeest Leegte Wind Farm was undertaken by Animalia Consultants (Pty) Ltd in 2017. As these specialists are no longer undertaking bat assessments, Stephanie Dippenaar Consulting was appointed to undertake an assessment of the project amendments with regard to the potential impacts to bats. The assessment report is attached as **Appendix C2**.

The main negative impact of turbines on bats is the encroachment into air space where bats forage or commute. As the proposed increased turbine dimensions will result in a larger rotor swept area and greater overall height per turbine, the bat impact relevant to this amendment is the change in risk of mortality due to direct collision of bats in flight with moving turbine blades or barotrauma during foraging activities.

4.2.1 Literature Review

Current scientific literature was reviewed to gain insight into the relationship between turbine size and bat mortalities to aid in the assessment of the impacts of greater turbine hub height and rotor diameter. The literature was also reviewed with a view to identifying effective mitigation measures for the relevant impacts.

Given that a greater turbine hub height would increase the height of the lower blade tip from the ground, it was concluded that the risks for lower flying bat species would be reduced. The increased height of the upper-most blade tip and the greater rotor swept area of the larger turbines would however result in an increased mortality risk for open-air high-flying species such as the Molossidae family (Free-tailed bats).

4.2.2 Species Richness and Activity Trends

A critical assessment was undertaken of the bat species richness and activity levels identified in the original bat impact assessment report. It was concluded that the final bat monitoring report sufficiently mitigates for the higher activity periods and higher risk species (Animalia, 2017).

4.2.3 Sensitivity Map

In assessing the Sensitivity Map presented in the original bat impact report, it was noted that the WEF layout had been previously amended by the proponent (during the bat monitoring phase) to ensure that no turbines are located within high or moderate sensitivity areas or their buffers. The sensitivity map identified areas of moderate and high bat sensitivity with designated buffers of 100m and 200 m respectively. Bat sensitive areas are 'no-go' areas for turbine placement and according to the guidelines (Sowler, *et al.*, 2017) no part of the turbines is allowed in the sensitive areas or the buffers; thus, also turbine blade tips are excluded from entering the buffer or sensitivity areas.

Buffer distances, as indicated above, stay the same as that approved during in the Final Bat Monitoring report (Animalia, 2017), but the placement of turbines may have to be adapted in order to avoid encroachment of the larger turbine components, particularly the 100 m blades, into the buffers.

The Applicant must ensure that turbines are placed at an appropriate distance away from bat sensitivity areas, based on the finalised turbine dimensions. The turbine layout should be approved by a bat specialist upon finalisation of turbine specifications.

4.2.4 Impact Assessment

Of the impacts identified in the original EIA and subsequent turbine amendment assessment, only bat mortalities due to direct blade impact or barotrauma during foraging activities (Animalia, 2017), is relevant to this amendment. In the most recent amendment assessment, the impact was identified as high (score of -57) without mitigation, and reduced to low (score of -28) with mitigations as follows:

- Adhere to the bat sensitivity map (Animalia, 2017) to avoid development in the demarcated sensitivity areas and their buffers);
- Adhere to the mitigation recommendations of the **Section 1** of the Amendment report, dated October 2017;
- Implement an operational bat monitoring study immediately after construction of turbines.

Considering the greater turbine dimensions proposed in the amendment application, and the increased affected airspace, the impact would remain high (score of -57) without mitigation but would be reduced to low (score of -28) with implementation of the existing mitigation measures in conjunction with the additional recommended mitigation measures as outlined below.

- Adhere to the original bat sensitivity map (Animalia, 2017) to avoid development in the demarcated sensitivity areas and their buffers as described in **Section 4.2.3** above;
- The final layout should be approved by a bat specialist upon finalisation of turbine specifications;

- All turbines must be feathered below cut in speed and not allow for freewheeling during construction and from the start of operation. Bat activity is markedly higher over low wind speed periods. Preventing freewheeling should not affect energy production significantly but will be a substantial bat conservation mitigation measure.
- A maximum number of 47 turbines, with a hub height of 200 m and a rotor diameter of 200 m, is proposed with a total output of 200 MW. If the total output of the wind farm should exceed 200 MW, the curtailment programme as indicated in **Table 7** is recommended at the onset of the wind development facility. Should smaller turbines be deployed, more turbines may be installed, but with agreement of a bat specialist.
- An operational bat monitoring study should already be in place at the start of the wind farm operation and should be implemented immediately at the onset of wind turbine operation. Mitigation measures outlined by the Bat Specialist during the operational monitoring study should be applied with due diligence;
- To refine mitigation measures and to account for the lack of data within the sweep of the amended turbine specifications, the appropriate turbines, as indicated by the post-construction bat specialist, should be installed with bat monitoring equipment at height and bat monitoring should start at the onset of turbine operation.

Table 7: Wind turbine mitigation schedule

Terms of mitigation implementation	
Peak activity (times to implement curtailment/mitigation)	Met Mast (10m): 15 – 25 January from the time of sunset to 04:00
Environmental conditions in which to implement curtailment/mitigation	Met Mast (10m): Wind speed below 8.5m/s <i>and</i> Temperature above 20°C
Peak activity (times to implement curtailment/mitigation)	Met Mast (80m): 15 – 25 January over the time of sunset – 01:00
Environmental conditions in which to implement curtailment/mitigation	Met Mast (80m): Wind speed below 7m/s <i>and</i> Temperature above 18°C
Peak activity (times to implement curtailment/mitigation)	Met Mast (10m): 15 February – 31 March over the time of sunset – 04:00
Environmental conditions in which to implement curtailment/mitigation -	Met Mast (10m): Wind speed below 8.0m/s <i>and</i> Temperature above 16.0°C
Peak activity (times to implement curtailment/mitigation)	Met Mast (10m): 10 April – 10 June over the time of sunset – 04:00

Environmental conditions in which to implement curtailment/mitigation	Met Mast (10m): Wind speed below 6m/s <i>and</i> Temperature above 17°C
Peak activity (times to implement curtailment/mitigation)	Met Mast (10m): 25 August – 30 November over the time of sunset – 03:00
Environmental conditions in which to implement curtailment/mitigation	Met Mast (10m): Wind speed below 8m/s <i>and</i> Temperature above 14°C
Peak activity (times to implement curtailment/mitigation)	Met Mast (80m): 25 August – 30 November over the time of sunset – 00:00
Environmental conditions in which to implement curtailment/mitigation	Met Mast (80m): Wind speed below 8m/s <i>and</i> Temperature above 13°C

4.2.5 Conclusion

After review of relevant scientific literature and the long-term preconstruction bat monitoring report (Animalia, 2017), it is concluded that the requested amendments to the turbine dimensions proposed for the Hartebeest Leegte wind energy facility may decrease the risk for lower flying species detected on site, due to the increased height of the lower blade tip from the ground. However, the increased height of the upper-most blade tip and the increased rotor swept area of the larger turbines would result in increased risks for high-flying species which are also the most abundant on site. To account for this and to avoid curtailment at the start of wind farm operation, mitigation measures outlined in **Section 4.2.4** of this report must be implemented upon construction and the turbine layout must adhere to the sensitivity areas and buffers. If these mitigations are adhered to, the impact assessment ratings for the Hartebeest Leegte WEF will remain the same as previously assessed, namely high negative without mitigation (score of -57) and reduced to low negative with mitigation (score of -28).

To reduce bat mortality risk, a three-pronged consideration must be used when selecting the appropriate turbine technology for the wind farm:

- Turbine dimensions with a greater hub height (to increase lower blade tip height and reduce collision risk with lower flying species);
- Turbine dimensions with the smallest rotor diameter (to decrease total tip height and reduce collision risk with high flying species); and
- Least number of turbines required to generate the total megawatt output of the facility.

An operational monitoring study must be in place before the Hartebeest Leegte Wind Energy Facility commences operation and must be implemented when the turbines start to operate. A bat specialist must approve the final layout and mitigation measures before the construction phase commences. All applicable mitigation measures should be incorporated into the EMPr and mitigation measures

recommended by the Bat Specialist during the operational monitoring study must be implemented immediately and in real time.

4.3 Noise Impacts

Morné de Jager of Enviro Acoustic Research (EAR) was requested to revisit his Environmental Noise Impact Assessment (ENIA) conducted in 2017 for the proposed Hartebeest Leegte Wind Farm in light of the proposed amendments. The assessment report is attached as **Appendix C3**.

The revised assessment is based on an increase in the hub height and rotor diameter from 160m up to 200m, and in the absence of any other turbine specifications, assumes a turbine with a sound power emission level of 108.5dBA, this being a worst-case scenario.

The Noise Specialist noted that sound power emissions are dependent on the model and make of the wind turbine and are not related to turbine hub height and rotor diameter. As such, changing the specifications of the turbine will have no advantage or disadvantage in terms of acoustics. This is however subject to the condition that the developer does not use a wind turbine with a sound power emission level exceeding 108.5 dBA,

The ENIA conducted for Hartebeest Leegte in 2017 indicated that the proposed wind farm would have a noise impact of a medium significance. Considering the location of the wind turbines and the potential noise impact, it is the opinion of the Noise Specialist that the changes as proposed will not increase the significance of the noise impact. A full noise impact assessment with new modeling will not be required and the findings and recommendations as contained in the previous document (report MRPDSA-LBHWF/ENIA/201708-Rev 1) will still be valid.

4.4 Visual Impacts

SiVEST's in-house visual specialist team has revisited their Visual Impact Assessment (VIA) conducted in 2017 for the proposed Hartebeest Leegte Wind Farm in light of the proposed amendments. The assessment report is attached as **Appendix C4**.

In assessing the proposed amendments, the visual specialist found that the increased height as proposed will increase the visibility of the turbines and extend the area from which the turbines will be visible (viewshed). This will be exacerbated by the lack of natural screening elements in the broader study area resulting from the relatively flat terrain and the prevalence of low shrubland vegetation cover. It is however important to note that visual impacts are only experienced when there are receptors present to experience this impact. The original VIA for this development found that the broader study area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. In light of this and given the relatively remote location of the proposed Hartebeest Leegte Wind Farm, the extended viewshed does not incorporate any additional receptors within the 8km assessment zone.

Visual impacts resulting from the larger turbines would be greatest within a 1km to 2km radius, from where the increased height of the structure would be most noticeable. The VIA identified three (3) potentially sensitive receptors within the visual assessment zone, all of which are farmsteads. Two (2)

of the identified receptors are located less than 2km from the buildable area and are thus in a zone of high potential visual impact. One of these receptors is however inside the Hartebeest Leegte Wind Farm application site and as such, it was assumed that the owner of this property would have a vested interest in the wind farm development and would not perceive the proposed development in a negative light. Hence the larger turbines as proposed would not increase the impacts experienced by this receptor.

The farmstead on Portion 2 of Zuur Fontein No 224 is approximately 1km from the buildable area, just south of the Hartebeest Leegte application site and as such this receptor will experience increased visual impacts as a result of the larger turbines. It was however noted in the VIA that it was not possible to determine the occupancy or level of use of this receptor and as such the likely degree of visual impact is uncertain. In addition, no concerns were raised by the owner of this property during the Public Participation Process conducted for the Hartebeest Leegte Wind Farm EIA and it is therefore possible that the proposed development is not perceived in a negative light.

The remaining receptor is more than 4km from the buildable area and, while the increased turbine height would make the turbines more visible from this receptor, the overall impact is expected to remain largely unchanged from this distance. It should be noted that although the larger turbines may be visible from some farmhouses outside the 8km assessment zone, at this distance it is likely that the turbines will merge to some degree with the surrounding landscape and as such impacts resulting from the increased turbine height will be minimal.

It should be noted that two (2) wind farms, namely Khobab and Loeriesfontein 2 have recently been developed in the broader area. Each of these developments includes some 61 wind turbines with associated infrastructure as well as 132kV grid connections to Helios Substation. All of this development in combination is resulting in a significant level of transformation of the natural environment in this area which will reduce the significance of visual impacts resulting from the proposed amendments.

The overall impact rating conducted for the Hartebeest Leegte Wind Farm VIA revealed that the proposed wind farm is expected to have a low negative visual impact rating during construction and a medium negative visual impact rating during operation, with relatively few mitigation measures available. In light of the above comments, the increase in the proposed turbine height will not change this impact rating. Furthermore, no additional recommendations or mitigation measures will be required, and all of the mitigation measures set out in the VIA remain valid.

4.5 Summary of Changes in Impact Ratings

Table 8: Summary of changes in impact ratings (Operation Phase)

Specialist Study	Impact	Original Pre-Mitigation Rating	Original Post Mitigation Rating	Revised Pre-Mitigation Rating	Revised Post-Mitigation Rating
Avifauna	Displacement of priority species due to disturbance during operational phase.	Low (-)	Low (-)	No change	No change

	Collisions of priority species with the turbines in the operational phase.	Medium (-)	Medium (-)	Medium (-)	Medium (-)
	Mortality of priority species due to electrocution on the internal MV lines in the operational phase.	Medium (-)	Low (-)	N/A	N/A
Bats	Bat mortalities due to direct blade impact or barotrauma during foraging activities (not migration).	High (-)	Low (-)	High (-)	Low (-)
	Impacts of artificial lighting on bat populations and diversity.	High (-)	Low (-)	No change	No change
	Cumulative impacts.	High (-)	Medium (-)	No change	No change
Noise	Operation of wind farm – daytime.	Low (-)	Low (-)	No change	No change
	Operation of wind farm – night-time.	Low (-)	Low (-)	No change	No change
	Operation of on-site substations.	Low (-)	Low (-)	N/A	N/A
	Cumulative impacts.	Low (-)	Low (-)	N/A	N/A
Visual	Potential visual impacts from the operational WEF include: <ul style="list-style-type: none"> Alteration of the natural character of the study area and exposure of potentially sensitive visual receptors to visual impacts. Perception of the development as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on the gravel roads serving the WEF site may evoke negative sentiments from surrounding viewers. Alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines. 	Medium (-)	Medium (-)	No change	No change
	Cumulative impacts	Medium (-)	Medium (-)	No change	No change

5 NEW / REVISED MITIGATION MEASURES

In addition to assessing the impact of the proposed amendment to the turbine dimensions, Specialists were requested to provide measures to ensure avoidance, management and mitigation of any impacts associated with such proposed change and identify any changes required to the EMP. New and/or revised mitigation measures provided by the specialists are outlined in **Table 9** below.

Table 9: New / Revised mitigation measures identified in respect of the proposed amendments.

Specialist Study	New Mitigation Measures
Avifauna	N/A
Bats	Adhere to the original bat sensitivity map (Animalia, 2017) to avoid development in the demarcated sensitivity areas and their buffers as described in Section 4.2.3 above.
	The final layout should be approved by a bat specialist upon finalisation of turbine specifications.
	All turbines must be feathered below cut in speed and not allow for freewheeling during construction and from the start of operation.
	If the total output of the wind farm should exceed 200 MW¹ , the curtailment programme as indicated in Table 7 is recommended at the onset of wind farm operation.
	An operational bat monitoring study should already be in place at the start of the wind farm operation and should be implemented immediately at the onset of wind turbine operation. Mitigation measures outlined by the Bat Specialist during the operational monitoring study should be applied with due diligence.
To refine mitigation measures and to account for the lack of data within the sweep of the amended turbine specifications, the appropriate turbines, as indicated by the post-construction bat specialist, should be installed with bat monitoring equipment at height and bat monitoring should start at the onset of turbine operation.	
Noise	Wind turbine sound power emission levels should not exceed 108.5 dBA,
Visual	N/A

6 ADVANTAGES / DISADVANTAGES OF THE PROPOSED AMENDMENTS

As required in terms of Section 32(1)(a)(ii) of the 2014 EIA Regulations, (as amended), the advantages and disadvantages of the proposed amendments are outlined in **Table 10** below.

¹ Although the EA dated 15 March 2018 authorised an output capacity of up to 235MW, the final capacity for the Hartebeest Leegte Wind Farm has not yet been determined.

Table 10: Advantages / Disadvantages of the Proposed Amendments.

	Advantages	Disadvantages
GENERAL	The proposed increase in hub height and rotor diameter will ensure that the most efficient wind turbines available on the market can be used at the time of construction.	Changes in turbine dimensions may increase environmental impacts (see below).
	Better fit for purpose technology is available today to suit the wind resource of the site, thus allowing for the optimisation of the project, driving improved overall efficiency.	
	Larger turbines have larger generators per turbine and resulting in the need for fewer turbines. This can increase the efficiency, energy production and profitability of the overall project while also benefiting the environment.	
AVIFAUNA	The proposed amendment would be advantageous from a bird impact perspective if the number of turbines is reduced as a result of the amendment, and the revised buffer zone and associated mitigation are implemented.	Should the turbine dimensions increase as proposed, and the number of turbines remain unchanged at 47, it would increase the risk of collisions and it would then be a disadvantage from the bird impact perspective.
BATS	The risk of bat mortality may be decreased for lower flying bat species as the greater turbine hub height associated with the larger turbines would increase the height of the lower blade tip from the ground. .	The increased height of the upper-most blade tip and the greater rotor swept area of the larger turbines would result in an increased mortality risk for open-air high-flying species.
NOISE	N/A	N/A
VISUAL	N/A	N/A

7 PUBLIC PARTICIPATION

In terms of Chapter 6 of the EIA Regulations, 2014, (as amended), a part 2 Amendment application requires a 30-day Public Participation Process (PPP). Accordingly, the following PPP process has been undertaken in respect of the Hartebeest Leegte Wind Farm:

7.1 Notification of Affected Landowners and Provincial Authority

All affected landowners, as well as the relevant provincial authority, namely the Northern Cape Department of Environment and Nature Conservation (NC DENC), were notified about the EA Amendment Application via email prior to submission of the application to the DEA on the 6th of August 2019. Proof of these notifications is provided in **Appendix D6**.

7.2 Notification of Potential Interested and Affected Parties (I&AP's)

The advertising process was followed in compliance with Regulation 41 of the EIA Regulations, 2014 (as amended).

Advertisements (in English and Afrikaans) were placed in the “Noordwester” local newspaper on Friday the 13th of September 2019. Proof that the above-mentioned advertisements were placed is provided in **Appendix D2**.

In addition, site notices (in English and Afrikaans) were erected on the boundary of the application site on 28 August 2019. A copy of the site notices is provided in **Appendix D1**. Proof of the site notices (including GPS coordinates) which were erected is also included in **Appendix D1**.

I&APs and stakeholders who responded to these advertisements were registered on the project database and sent all relevant information as the amendment process progressed.

7.3 Comment and Review of Draft EA Amendment Assessment Report

The Draft EA Amendment Assessment Report is being made available on SiVEST's website² to all I&APs, key stakeholders and OoS / Authorities for comment and review for a period of 30 days, from **Friday the 27th of September 2019 to Monday the 28th of October 2019**, excluding public holidays. In addition, the key stakeholders / OoS / authorities will be sent electronic copies (on CD) of the Draft Report (including all appendices) during the 30-day comment and review period (see **Section 7.8**).

Written notice was given to all I&APs, key stakeholders and OoS / Authorities registered on the database that the Draft EA Amendment Assessment Report was available for comment and review (**Appendix D1**). Electronic copies (CD) of the report were also distributed on written request. All comments received throughout the EA amendment process (including comments received during the Report's commenting period) will be incorporated into the Final EA Amendment Assessment Report, which will then be submitted to the competent authority (namely the DEA) for decision-making. Additionally, all comments received throughout the EA amendment process will also be included in the Comments and Response Report (C&RR) (**Appendix D5**).

7.4 Stakeholders and I&APs

I&APs, key stakeholder and/or OoS / Authorities were identified using:

² <http://www.sivest.co.za/>, click on Downloads, then browse to the folder '15660 Hartebeest Leegte Amendment'

- Email, sms, fax and post notifications to all I&APs key stakeholder and OoS / Authorities on the project database (Proofs included in **Appendix D1**).
- Referrals.

A full database list of registered I&APs, key stakeholder and OoS / Authorities was compiled and is included in **Appendix D3**.

7.5 Announcing the Opportunity to Participate

The opportunity for I&APs, key stakeholder and OoS / Authorities to participate in the EA amendment process was communicated in the following manner:

- All affected landowners, as well as the relevant provincial authority (NC DENC), were notified about the EA Amendment Application via email prior to the application being submitted to the DEA on 6 August 2019 (**Appendix D6**);
- Notification letters, advising of the EA amendment process and comment period were distributed (via email, fax, post and sms) on Friday the 27th of September 2019 (Notification letter included in **Appendix D1**. Remaining notification proof will be included in Final EA Amendment Assessment Report); and
- The Draft EA Amendment Assessment was made available to the public for review on SiVEST's website for a period of 30 days from **Friday the 27th of September 2019 to Monday the 28th of October 2019**, excluding public holidays (Proof to be included in Final EA Amendment Assessment Report).

7.6 Proof of Notification

Proof of notification of the I&APs is included in **Appendix D**. More specifically, the types of proofs will be as follows:

- Proof of notification of affected landowners and relevant provincial authority (namely NC DENC) about the EA Amendment Application (**Appendix D6**);
- Site notice text (**Appendix D1**);
- Photographs and GPS Coordinates of site notices (Proof to be included in Final EA Amendment Assessment Report);
- Proof of advertisements (namely tear-sheets) in the "Noordwester" local newspaper (**Appendix D2**); and
- Correspondence to and from registered I&APs and key stakeholders (**Appendix D4**).

7.7 Comments and Response Report (C&RR)

Issues, comments and concerns raised throughout the EA amendment process (including comments received during the commenting period for the Draft EA Amendment Assessment Report) will be captured in the Comments and Response Report (CRR) (**Appendix D5**), as and when they are received. The C&RR provides a summary of the issues raised, as well as the responses provided to I&APs, key stakeholders and OoS / Authorities. This information will be used to feed into the evaluation of environmental and social impacts and will also be taken into consideration when finalising the EA Amendment Assessment Report. All comments received to date have been included in the C&RR.

7.8 Distribution to Organs of State (OoS) / Authorities

Table 11 below includes all the key stakeholders / OoS / authorities who will be sent electronic copies (on CD) of the Draft EA Amendment Assessment Report (including all appendices) at the start of the 30-day comment and review period. The report will be accompanied by a cover letter, a copy of which is included in **Appendix D7**. The remaining proofs of distribution (i.e. email notification) will be included in the Final EA Amendment Assessment Report.

It should be noted that all key stakeholders / organs of state / authorities will be contacted near the end of the 30-day comment and review period and will be reminded to submit comments before this period closes. Comments received from key stakeholders / OoS / authorities during the 30-day comment and review period will be incorporated into the Final EA Amendment Assessment Report, which will then be submitted to the competent authority (namely the DEA) for decision-making.

Table 11: Distribution of Draft EA Amendment Assessment Report to OoS

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF THE HARTEBEEST LEEGTE WIND FARM NEAR LOERIESFONTEIN, NORTHERN CAPE PROVINCE						
DISTRIBUTION OF THE DRAFT EA AMENDMENT REPORT TO ORGANS OF STATE FOR COMMENT						
TITLE	SURNAME	NAME	POSITION	POSTAL ADDRESS	EMAIL ADDRESS	DATE OF DISTRIBUTION
HANTAM LOCAL MUNICIPALITY						
Mr	Van Wyk	Riaan	Environmental Officer	Private Bag X14 CALVINIA 8190	municipalmanager@hantam.gov.za vanwykjr@hantam.gov.za	Friday 27 September 2019
NAMAKWA DISTRICT MUNICIPALITY						
Mr	Loubser	Jannie	Manager: Planning	Private Bag X20 SPRINGBOK 8240	jannie@namakwa-dm.gov.za	Friday 27 September 2019
DEPARTMENT OF WATER AND SANITATION (DWS)						
Ms	Makungo	Ester	Environmental Officer	Private Bag X6101 KIMBERLEY 8300	makungoe@dws.gov.za	Friday 27 September 2019
Mr	Mahunonyane	Moses	Director: Institutional Establishment	Private Bag X6101 KIMBERLEY 8300	MahunonyaneM@dws.gov.za	Friday 27 September 2019
NORTHERN CAPE DEPARTMENT AGRICULTURE, LAND REFORM & RURAL DEVELOPMENT						
Mr	Cloete	Alexander		P.O.Box 65 CALVINIA 8190	alexander@hantam.co.za	Friday 27 September 2019
NORTHERN CAPE DEPARTMENT OF TRANSPORT, SAFETY AND LIAISON						
Ms	Vilakazi	Ntobeko	MEC	Private Bag X1368 KIMBERLEY 8300	NEVilakazi@ncpg.gov.za	Friday 27 September 2019

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD prepared by: SiVEST

Proposed Development of the Hartebeest Leegte 235MW Wind Farm – Draft EA Amendment Report

Version No: 1

27 September 2019

Page 26

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES (DAFF)						
<i>Northern Cape Department</i>						
Ms	Mans	Jacoline	Chief Forester	Koelenhof 306 Schroder Street UPINGTON, 8800	jacolinema@daff.gov.za	Friday 27 September 2019
<i>Provincial Department</i>						
Ms	Marubini	Mashudu	Delegate of the Minister	Private Bag X120 PRETORIA 0001	MashuduMa@daff.gov.za	Friday 27 September 2019
Ms	Buthelezi	Thoko	Directorate Land-use & Soil Management - AgriLand Liaison office	Private Bag X120 PRETORIA 0001	Thokob@nda.agric.za	Friday 27 September 2019
NORTHERN CAPE DEPT OF ENVIRONMENT AND NATURE CONSERVATION (NCDENC)						
Mr	Fisher	Brian	Director Environmental Impact Management	Private Bag X86102 KIMBERLEY 8300	bfisher@ncpg.gov.za	Friday 27 September 2019
Mr	Mthombeni	Thulani		Private Bag X86102 KIMBERLEY 8300	tmtho@webmail.co.za	Friday 27 September 2019
DEPARTMENT OF SPORT, ARTS & CULTURE: HERITAGE RESOURCE UNIT						
<i>Provincial - Northern Cape Department</i>						
Mr	Lenyibi	Patrick	Manager: Heritage Resources	Private Bag X5004 KIMBERLEY 8300	plenyibi@ncpg.gov.za	Friday 27 September 2019
SOUTH AFRICAN NATIONAL ROADS AGENCY SOC Ltd (SANRAL) - WESTERN REGION						
Ms	Abrahams	Nicole	Environmental Coordinator	Private Bag X19 BELLVILLE 7535	abrahamsn@nra.co.za	Friday 27 September 2019

NORTHERN CAPE DEPARTMENT OF ROADS AND PUBLIC WORKS						
Mr	Roelofse	Jaco	Director: Planning & Design	PO Box 3132 Kimberley 8300	roelofse.j@vodamail.co.za	Friday 27 September 2019
SOUTH AFRICA HERITAGE RESOURCE AGENCY (SAHRA)						
Ms	Higgitt	Natasha	Heritage Officer: Northern Cape	PO Box 4637 CAPE TOWN 8000	nhiggitt@sahra.org.za	Friday 27 September 2019
DEPARTMENT OF MINERAL RESOURCES (DMR)						
Mr	Ravhogoni	Ntsundeni	Regional Manager	Private Bag x6093 KIMBERLEY 8300	Ntsundeni.Ravhogoni@dmr.gov.za	Friday 27 September 2019
ESKOM						
Mr	Geeringh	John	Chief Planner: Eskom Transmission	PO Box 1091 JOHANNESBURG 2000	GeerinJH@eskom.co.za John.Gheeringh@eskom.co.za	Friday 27 September 2019
SQUARE KILOMETRE ARRAY (SKA)						
Dr	Tiplady	Adriaan	Manager: Site Categorisation	PO Box 522 SAXONWOLD 2132	atiplady@ska.ac.za	Friday 27 September 2019
SA CIVIL AVIATION AUTHORITY (SA CAA)						
Ms	Stoh	Lizell	Obstacle Specialist	Private Bag X73 HALFWAY HOUSE 1685	strohl@caa.co.za	Friday 27 September 2019
AIR TRAFFIC AND NAVIGATION SERVICES (ATNS)						

Ms	Morobane	Johanna	Manager: Corporate Sustainability and Environment	Private Bag X15 KEMPTON PARK 1620	JohannaM@atns.co.za	Friday 27 September 2019
Ms	Masilela	Simphiwe	Obstacle Evaluator	Private Bag X15 KEMPTON PARK 1620	SimphiweM@atns.co.za	Friday 27 September 2019
TRANSNET FREIGHT RAIL						
Mr	Fiff	Sam	Environmental Manager: Freight Rail	PO Box 255 BLOEMFONTEIN 9300	sam.fiff@transnet.net	Friday 27 September 2019
TELKOM						
Ms	Bester	Amanda	Wayleave Officer	Private Bag X20700 BLOEMFONTEIN 9300	WayleaCR@telkom.co.za BesterAD@telkom.co.za	Friday 27 September 2019
Ms	van den Heever	Heleen	Wayleave Officer	Private Bag X20700 BLOEMFONTEIN 9300	WayleaCR@telkom.co.za	Friday 27 September 2019
SENTECH						
Mr	Koegelenberg	Johan	Renewable Projects	Private Bag X06 Honeydew 2040	koegelenbergj@sentech.co.za	Friday 27 September 2019
ENDANGERED WILDLIFE TRUST (EWT)						
Mr	Leeuwner	Lourens	Renewable Energy Project Manager	Private Bag X11, Modderfontein, 1609, Johannesburg	lourensl@ewt.org.za	Friday 27 September 2019
WILDLIFE & ENVIRONMENT SOCIETY OF SOUTH AFRICA (WESSA)						
Mr	Griffiths	Morgan	Environmental Governance Programme Manager	PO Box 12444, Centrahil, Port Elizabeth, 6006, South Africa	morgan.griffiths@wessa.co.za	Friday 27 September 2019
BIRDLIFE SOUTH AFRICA (BLSA)						

Mr	Booth	Jonathan	Policy Manager	Private Bag X16 PINEGOWRIE 2123	advocacy@birdlife.org.za	Friday 27 September 2019
Ms	Ralston	Samantha		Private Bag X16 PINEGOWRIE 21223	energy@birdlife.org.za	Friday 27 September 2019

8 CONCLUSION AND RECOMMENDATIONS

The aforementioned and associated specialist comments and revised reports provide an assessment of the potential impacts, advantages and disadvantages associated with the proposed amendments to the turbine specifications to allow for an increase in the wind turbine hub height and blade length. In light of the fact that the proposed turbines would still be within the development footprint already assessed for the Hartebeest Leegte Wind Farm, it was determined that the proposed amendments would only require further assessment from avifaunal, bat, noise and visual specialists. While the proposed amendments would not result in any new environmental risks or impacts, negative impacts could potentially increase in significance in respect of avifauna and bats. Avifaunal and Bat Specialist studies did however determine that potential negative impacts resulting from the proposed amendments would remain unchanged with the implementation of specific new mitigation measures. Impacts remain unchanged in respect of noise and visual.

Having received feedback from the various specialists, the advantages and disadvantages were explored providing an indication of the potential benefits and drawbacks of the proposed EA changes. From the assessment, the advantages outweigh the disadvantages mainly due to the fact that the larger turbines will reduce the number of turbines required.

A public participation process is being undertaken to obtain any comments received by I&APs on the proposed amendments for the 235MW Hartebeest Leegte Wind Farm. The public review and comment period will be undertaken from **Friday the 27th of September 2019 to Monday the 28th of October 2019**, over a 30-day period (excluding public holidays). Any comments raised and responses to these comments and concerns will be integrated into the Final Amendment Assessment Report.

8.1 Details of Amendments being Applied For

In light of the above, details of the amendments being applied for are outlined below.

8.1.1 Amendment to Authorised Turbine Dimensions

Technical Details (Page 5)

From:

Hub height from ground level	Up to 160m.
Rotor diameter	Up to 160m.

To:

Hub height from ground level	Up to 200m.
Rotor diameter	Up to 200m.

8.1.2 Amendment to Contact Details for the Holder of the EA

Due to a typing error, the name of the holder of the EA and contact person should be amended as follows:

Page 1 of the EA dated 15 March 2018

From:

Holder of the authorisation	South African Mainstream Renewable Power Developments (Pty) Ltd
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To:

Holder of the authorisation	South Africa Mainstream Renewable Power Developments (Pty) Ltd
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Page 3 of the Amendment of the EA dated 22 May 2019

From:

Mr Eugene Marias

To:

Mr Eugene Marais

8.2 Environmental Impact Statement

SiVEST Environmental Division, as the EAP, is therefore of the opinion that:

- The magnitude and rating of the majority of the environmental impacts of the proposed amendments are expected to remain the same as those already identified in the original EIA Report.
- Although the proposed amendments are expected to result in increased negative impacts in respect of Avifauna and Bats, new mitigation measures have been provided to ensure that these impacts are reduced to their original level of significance.
- The EA should be amended in line with the specifications as proposed.
- The increased risks and impacts identified can be mitigated to acceptable levels provided the revised / additional mitigation measures recommended by the specialists (see **Table 9**) are implemented.

It is trusted that this Draft EA Amendment Assessment Report provides the reviewing authority with sufficient information to make an informed decision regarding the requested amendments.

9 REFERENCES

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- De Jager, M. 2017: "Environmental Noise Impact Assessment for the proposed Hartebeest Leegte Wind Farm North of Loeriesfontein, Northern Cape". Enviro-Acoustic Research, Pretoria.
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- Van Rooyen, C., 2019: Addendum To The Avifaunal Impact Assessment Conducted For The Proposed Hartebeest Leegte Wind Energy Facility (WEF): Application For Amendment Of Environmental Authorisation. Chris van Rooyen Consulting.



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