HIGHLANDS NORTH WIND ENERGY FACILITY
EASTERN CAPE PROVINCE
BAT AMENDMENT REPORT FOR THE APPLICATION FOR AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION

On behalf of

Highlands North Wind Energy Facility RF (Pty) Ltd

April 2021

Prepared By:

Arcus Consultancy Services South Africa (Pty) Limited

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1 INTRODUCTION

Highlands North Wind Energy Facility RF (Pty) Ltd ('the applicant') received environmental authorisation (14/12/16/3/3/1/1955) for the Highlands North Wind Energy Facility (WEF) approximately 20 km west of the town of Somerset East in the Eastern Cape Province. The applicant is now submitting an amendment application to the Department of Environment, Forestry and Fisheries to amend several aspects of the project (Table 1).

The aim of this report is to consider how the proposed amendments may influence the impacts to bats previously assessed in the original application. Pre-construction bat monitoring was undertaken between May 2017 and June 2018. Several impacts to bats were identified and of these, bat mortality during commuting and/or foraging, bat mortality during migration and cumulative impacts will pose the greatest risk to bats. Therefore, this report only focuses on these three impacts with respect to the amendment.

Table 1: Proposed Amendment for the Highland North WEF

Component	Approved	Proposed Amendments
Generation Capacity	84 MW	Up to 87 MW
Generation capacity per turbine	Up to 6 MW	Remove generation capacity per turbine
Rotor diameter	Maximum of 150 m	Maximum of 175 m (except T01 with a maximum rotor diameter of 160 m and T12 with a maximum rotor diameter of 150 m)
Hub Height	Up to 135 m	Up to 180 m
Upper tip height	Up to 200 m	Up to 267.5 m
Number of Turbines	14	Up to 12
Turbine Layout		Slight adjustments to the turbine positions in order to maximise wake effects and avoid the proposed new blade lengths extending into areas identified as highly sensitive for bats and birds.
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
Length of internal roads	Approximately 50 km	Approximately 45 km
Battery storage	N/A	Allow for a battery energy storage system (BESS) adjacent to the substation (using the temporary laydown area), with a footprint of approximately 1 ha and a height of approximately 8 m.
Condition 39	'The development footprint must exclude the area identified as a potential target for the protected area expansion (NPAES).'	Removal of this condition

According to the Applicant, the proposed amendments will not result in an increase in the size of the approved development footprint for the project. (In this regard, 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 30.65 ha". The development footprint with the proposed amendments would be approximately 28 ha).

1.1 Assumptions and Limitations

The assessment of the proposed changes to the scale of the Highlands North WEF and the implications of this to bats is carried out based on currently available evidence of the impacts of wind energy facilities on bats in South Africa, and globally. It must be noted that while the understanding of the impacts of wind energy facilities on bats is continually increasing, a fundamental understanding for the reasons why bats collide with turbines is still largely lacking. Thus, the findings do carry an element of uncertainty which has been minimised as much as possible by using the best available information and the specialists experience.

1.2 Specialist Team

Jonathan Aronson has 13 years of experience studying and researching bats and has presented at the International Bat Research Conference and numerous local bat workshops and symposia. He has been at the forefront of bats and wind energy research in South Africa and has worked on more than 45 WEF projects in South Africa, Kenya, Mozambique, Zambia and the UK undertaking pre-construction monitoring, operational monitoring, impact assessments and mitigation strategy design. His work in South Africa extends across five provinces. He is a co-author of the Good Practise Guidelines for Surveying Bats at Wind Energy Facilities in South Africa, is the lead author on the operational monitoring guidelines for bats and is a founding member of the South African Bat Assessment Advisory Panel (SABAAP). He is registered as a Professional Natural Scientist (Ecological Science) with SACNASP.

Michael Brits has been employed at Arcus for over two years as an Ecologist focussing on bat assessments. He has designed and implemented bat pre-construction monitoring studies as per guidelines and is skilled in identifying bat calls and doing the analysis. He has worked on various pre- and post-construction bird and bat monitoring projects for Wind Energy Facilities, he is skilled in various analytical techniques relevant to ecological projects, including four years of GIS experience. He also has a wide range of ecological expertise including experience with insects, amphibians, birds and other mammals. He has developed monitoring plans to assist conservation bodies in adaptively managing wetlands, implemented baseline freshwater ecology monitoring plans and managed urban-wildlife conflicts, specifically with baboons and local residents in the City of Cape Town.

2 IMPLICATIONS OF THE PROPOSED AMENDMENTS IN TERMS OF THE POTENTIAL IMPACTS

The amendments entail decreasing the number of turbines and using taller turbines with a greater rotor diameter. The implications of these amendments will vary for low-flying bat species and high-flying bat species (Table 2).

The reduction 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. The proposed reduction is minor (only up to five less turbines than originally assessed) and in the United States, the number of turbines at a facility appears to not influence the degree of bat mortality[1]. Thus, this change is neutral (Table 2).

The increase in the hub height will be negative for high flying bats 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

[1] Thompson, M., J. A. Beston, M. Etterson, J. E. Diffendorfer, and S. R. Loss. 2017. Factors associated with bat mortality at wind energy facilities in the United States. Biological Conservation 215:241-245.

bats[2]. However, given the low activity at 90 m for the site, the increased hub height would not change the previous assessments findings. While the increased hub height might be negative for high flying bat species, the proposed amendment might decrease potential impacts to lower flying species (Table 2). 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.

While there are limited data on the relationship between rotor diameter and bat fatality for turbines of the size being proposed for the Highlands North WEF, it is logical to assume that increasing the rotor swept area would likely increase bat fatality, but 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 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 assessments findings.

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 (Table 2). It is unlikely that this increase would result in a significant difference in fatality for this group of bats given the lower activity recorded at height and would not change the previous assessments findings.

Based on the maximum turbine dimensions being applied for, the lower tip height is likely to increase as a result of the 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 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. Turbines with lower tip heights may result in greater fatality and therefore increasing it 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 (Table 2).

Table 2: Summary of the Implications of the Proposed Amendments

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

3 RE-ASSESSMENT OF THE SIGNIFICANCE OF THE IDENTIFIED IMPACTS

This section presents a re-assessment of the impacts of the Highlands North WEF, in light of the proposed amendments, with respect to the following identified impacts: bat mortality during commuting and/or foraging, bat mortality during migration and cumulative impacts. Assessments only consider the operational phase as impacts during the construction and decommission phase would be minor. The original and new impact assessment tables are both included below.

Table 3a: 2018 Risk Assessment for Bat Mortality during Commuting and/or Foraging

Impact Phase: Operational
<u>Possible</u> Impact or Risk: 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). These impacts will be limited to species that make use of the airspace in the rotor-swept zone of the wind

[2] Smallwood, K. S. 2020. USA Wind Energy-Caused Bat Fatalities Increase with Shorter Fatality Search Intervals. Diversity 2000.

turbines. All species of bat that were recorded at the project exhibit behaviour that may bring them into contact with wind turbine blades and so they are potentially at risk of negative impacts.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?	NO						
Will impact cause irreplaceable loss of resources?	YES						
Can impact be avoided, managed or mitigated?	YES						

Mitigation measures to reduce residual risk or enhance opportunities:

1) Designing the layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. Low lying areas, buildings, woodland/thicket and areas near water should be avoided. This has been adhered to as all turbines adhere to buffer zones around these features.
2) The type of turbine used may influence fatality. Taller towers have a positive relationship between the numbers of bats killed at some wind energy facilities in Greece and Canada (Barclay et al. 2007; Georgiakakis et al. 2012). However, there are no published data on this relationship in South Africa but unpublished data from other pre-construction monitoring reports suggest that bat activity at height in South Africa is lower. However, some species in South Africa that are not adapted for flight at height have suffered mortality suggesting that some bats may be killed in the lower edge of the rotor swept zone. Therefore, it is preferable to use taller towers but limit the rotor diameter such that the minimum distance between the blades and the ground is maximised.
3) Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level.
4) If mortality does occur beyond threshold levels as determined based on applicable guidance, mitigation needs to be considered. Mitigation options may include using ultrasonic deterrents, raising the cut-in speeds of turbines and turbine blade feathering. Any operational minimization strategy (i.e. curtailment) should be targeted during specific seasons and time periods for specific turbines coincident with periods of increased bat activity.
5) It is advised that both pre-construction and operational monitoring data are used to confirm the need for above mentioned mitigation measures such as curtailment and to determine at what stage of the development such mitigation needs to be implemented, if at all.

Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.

Table 3b: Amended Risk Assessment for Bat Mortality during Commuting and/or Foraging

Impact Phase: Operational							
Possible Impact or Risk: Bat mortality during commuting and/or foraging							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	Medium	Medium	Medium	Negative	Medium	Medium	Medium
With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium

Can the impact be reversed?	NO
Will impact cause irreplaceable loss of resources?	YES
Can impact be avoided, managed or mitigated?	YES

Mitigation measures to reduce residual risk or enhance opportunities:

1) To manage the risk of a potentially low tip height and longer turbine blades, additional buffers of 100 m (80 m for T01) have been added to sensitive areas to reduce the likelihood that low flying bats will encounter wind turbine blades.
2) Turbines must have a minimum lower tip height of at least 40 m.
3) All previous mitigations provided in the pre-construction bat monitoring report and BA report must be adhered to.

Table 4a: 2018 Risk Assessment for Bat Mortality during Migration

Impact Phase: Operational

<u>Possible</u> Impact or Risk: Bat mortality during migration

It has been suggested that some bats may not echolocate when they migrate (Baerwald and Barclay 2009) which could explain the higher numbers of migratory species suffering mortality in WEF studies in North America and Europe. Therefore, the direct impact of bat mortality may be higher when they migrate compared to when they are commuting or foraging. This is therefore considered here as a separate impact of the WEF on the Natal long-fingered bat, which is the only species recorded during pre-construction monitoring known to exhibit long-distance migratory behaviour.

The majority of bat mortalities at WEFs in North America and Europe are migratory species. However, evidence from the pre-construction monitoring does not suggest migratory behaviour through the site. It is therefore unlikely that mortality will occur during migration periods but during the operating lifespan of the WEFs 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

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	High	Medium	Medium	Negative	Medium	Low	Medium
With Mitigation	Medium	Medium	Medium	Negative	Low	Low	Medium

Can the impact be reversed?	NO
Will impact cause irreplaceable loss of resources?	YES
Can impact be avoided, managed or mitigated?	YES

Mitigation measures to reduce residual risk or enhance opportunities:

1) Designing the layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. Low lying areas, buildings, woodland/thicket and areas near water should be avoided. This has been adhered to as all turbines adhere to buffer zones around these features.
2) The type of turbine used may also influence fatality. Taller towers have a positive relationship between the numbers of bats killed at some wind energy facilities in Greece and Canada (Barclay et al. 2007; Georgiakakis et al. 2012). However, there are no published data on this relationship in South Africa but unpublished data from other pre-construction monitoring reports suggest that bat activity at height in South Africa is lower. However, some species in South Africa that are not adapted for flight at height have suffered mortality suggesting that some bats may be killed in the lower edge of the rotor swept zone. Therefore, it is preferable to use taller towers but limit the rotor diameter such that the minimum distance between the blades and the ground is maximised.
3) Operational acoustic monitoring and carcass searches for bats should be performed to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level. In addition, surveys of the Bloukrans cave should be undertaken in spring and autumn to assess changes in the annual movement patterns of the Natal long-fingered bat.

4) If mortality does occur, the level of mortality should be considered by a bat specialist to determine if this is at a level where further mitigation needs to be considered. Mitigation options may include using ultrasonic deterrents, raising the cut-in speeds of turbines and turbine blade feathering. Any operational minimization strategy (i.e. curtailment) should be targeted during specific seasons and time periods for specific turbines coincident with periods of increased bat activity. 5) It is advised that both pre-construction and operational monitoring data are used to confirm the need for above mentioned mitigation measures such as curtailment and to determine at what stage of the development such mitigation needs to be implemented, if at all.	
Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay & Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented. Impacts may also affect populations over a large geographic area (Lehnert et al. 2014; Voigt et al. 2012) if gene flow is prevented in migratory species.

Table 4b: Amended Risk Assessment for Bat Mortality during Migration

Impact Phase: Operational							
<u>Possible</u> Impact or Risk: Bat mortality during migration							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	High	Medium	Medium	Negative	Medium	Low	Medium
With Mitigation	Medium	Medium	Medium	Negative	Low	Low	Medium
Can the impact be reversed?	NO						
Will impact cause irreplaceable loss of resources?	YES						
Can impact be avoided, managed or mitigated?	YES						
Mitigation measures to reduce residual risk or enhance opportunities: 1) To manage the risk of a potentially low tip height and longer turbine blades, additional buffers of 100 m (80 m for T01) have been added to sensitive areas to reduce the likelihood that low flying bats will encounter wind turbine blades. 2) Turbines must have a minimum lower tip height of at least 40 m. 3) All previous mitigations provided in the pre-construction bat monitoring report and BA report must be adhered to.							

Table 5a: 2018 Risk Assessment for Cumulative Impacts

<u>Possible</u> Impact or Risk: Cumulative Impacts
Cumulative indirect impacts to bats, such as those relating to changes to the physical environment (e.g. roost and habitat destruction) 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. For non-migratory species cumulative direct impacts could have a medium or high significance before mitigation but could reduce to medium or low with appropriate turbine siting and operational mitigation if determined as being necessary based on operational monitoring. Direct impacts on migratory species (i.e. the Natal long-fingered bat) may be high before mitigation but could also reduce to medium with appropriate turbine siting and operational mitigation. However, these ratings would be dependent on all other surrounding wind energy facilities also adopting similar mitigation strategies to reduce impacts to bats. Limited data are available on the actual impacts to bats at the eleven operational facilities in the cumulative impact region. In addition, pre-construction monitoring data of bat activity are not a good predictor of the impacts that may be expected at operational wind farms (Hein et al. 2013), limiting their use in understanding and predicting cumulative impacts. Data from five operational wind farms in the cumulative impact region which we were able to access suggested that impacts to bats ranged from low to high. No current information is 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 therefore have negative consequences particularly for the north-eastern subpopulation of the migratory Natal long-fingered bat. However, because 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.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	High	Medium	High	Negative	High	Medium	Low
With Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium
Can the impact be reversed?	NO						
Will impact cause irreplaceable loss of resources?	YES						
Can impact be avoided, managed or mitigated?	YES						

Mitigation measures to reduce residual risk or enhance opportunities:

1) At operational wind energy facilities where impacts to bats are high, or exceed threshold values[3], mitigation strategies such as curtailment or deterrents must be used.
2) The operation of lights at substations should be limited to avoid attracting bats to the area. Where lights need to be used such as at the substation and switching station and elsewhere, these should have low attractiveness for insects such as low pressure sodium and warm white LED lights (Rydell 1992; Stone 2012). High pressure sodium and white mercury lighting is attractive to insects (Blake et al. 1994; Rydell 1992; Svensson & Rydell 1998) and should not be used as far as possible.

Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.

Table 5b: Amended Risk Assessment for Cumulative Impacts

Possible Impact or Risk: Cumulative Impacts							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	High	Medium	High	Negative	High	Medium	Low
With Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium
Can the impact be reversed?	NO						
Will impact cause irreplaceable loss of resources?	YES						
Can impact be avoided, managed or mitigated?	YES						

Mitigation measures to reduce residual risk or enhance opportunities:

1) To manage the risk of a potentially low tip height and longer turbine blades, additional buffers of 100 m (80 m for T01) have been added to sensitive areas to reduce the likelihood that low flying bats will encounter wind turbine blades.
2) Turbines must have a minimum lower tip height of at least 40 m.
3) All previous mitigations provided in the pre-construction bat monitoring report and BA report must be adhered to.

Table 6: Impact Assessment Summary

Impact	**Original Assessment**		**Re-Assessment**	
	Significance		**Significance**	
	Without Mitigation	**With Mitigation**	**Without Mitigation**	**With Mitigation**

[3] MacEwan, K., Aronson, J., Richardson, E., Taylor, P., Coverdale, B., Jacobs, D., Leeuwner, L., Marais, W., Richards, L. 2018. South African Bat Fatality Threshold Guidelines for Operational Wind Energy Facilities – ed 2. South African Bat Assessment Association.

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

4 EFFECT ON MITIGATION MEASURES

Because bat activity is more intense next to vegetation structures and water and tends to be associated with fine scale vegetation structure patterns, buffer zones to exclude wind turbines around these landscape features are hypothesized to reduce impacts. To account for the larger turbines and blades, the buffers of sensitive areas for bats have been increased by 100 m (80 m for T01) relative to the buffers applied during the BA. No turbines are within these buffers thus the proposed layout is acceptable. In addition, it is recommended that turbines have a minimum lower tip height of at least 40 m.

However, species differ in their degree of association with vegetation structures, including seasonally. Further, some bat species are attracted to and investigate turbines[4]. Therefore, even though turbines are spatially distanced from key habitat features, bats may still collide with turbine blades resulting in residual impacts.

Assuming the buffer zones and lower tip height of 40 m or greater will provide protection to some species of bat, and because the magnitude of bat activity was rated medium overall, residual impacts might be low. These residual impacts may be larger given the bigger turbines, primarily for high flying bat species. To reduce these residual impacts, more active mitigation measures are needed.

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. Curtailment and deterrents are known to reduce bat fatality[5,6] and because curtailment is known to be more successful, it must be prioritised. 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.

5 CONCLUSION

The proposed amendments will have a differential impact on bat species. Most of the changes will be positive for low flying species but negative for high flying species. The amendment will not alter the overall impact of the Highlands North WEF.

Provided the mitigation measures are adhered to, including avoiding the placement of turbines in high 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.

[4] Horn, J. W., E. B. Arnett, and T. H. Kunz. 2008. Behavioral responses of bats to operating wind turbines. The Journal of Wildlife Management 72:123-132.

[5] Arnett, E. B. and R. F. May. 2016. Mitigating Wind Energy Impacts on Wildlife: Approaches for Multiple Taxa. Human–Wildlife Interactions: Vol. 10: Iss. 1, Article 5.

[6] Weaver, S. P., C. D. Hein, T. R. Simpson, J. W. Evans, and I. Castro-Arellano. 2020. Ultrasonic acoustic deterrents significantly reduce bat fatalities at wind turbines. Global Ecology and Conservation:e01099.

CURRICULUM VITAE JONATHAN ARONSON

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1 BACKGROUND

Jonathan is an ecologist with 10 years of experience working on bat and wind energy interactions. He has been at the forefront of bats and wind energy research in South Africa and has worked on more than 85 WEF projects in South Africa, Kenya, Ethiopia, Mozambique, Zambia, Uzbekistan, Azerbaijan and the UK. Jonathan has presented his research at the International Bat Research Conference, the Conference on Wind Energy and Wildlife Impacts, and at numerous local bat workshops and symposia.

He is experienced in undertaking pre-construction and operational monitoring projects for bats, impact assessments, mitigation strategy design including the design of curtailment programs, due diligence exercises, ecological surveys, GIS screening studies and providing strategic advice. He has delivered training to local search teams at wind farms in South Africa on bat and bird carcass search methodologies, including providing on-going support and mentoring.

He is a co-author of the Good Practise Guidelines for Surveying Bats at Wind Energy Facilities in South Africa, is the lead author on the operational monitoring guidelines for bats and is a founding member of the South African Bat Assessment Advisory Panel (SABAAP). He is registered as a Professional Natural Scientist (Ecological Science) with SACNASP.

2 PROFESSIONAL HISTORY

Director/Founder, Camissa Sustainability Consulting (2020 – current)
IFC Short Term Consultant (2020 – current)
Senior Ecologist, Arcus Consultancy Services South Africa (Pty) Ltd (2019 - 2020)
Ecology Specialist, Arcus Consultancy Services South Africa (Pty) Ltd (2013 – 2019)
Director/Founder, Gaia Environmental Services Pty (Ltd) (2011 - 2013)

3 QUALIFICATIONS

MSc (Environment and Resource Management; Energy and Climate Specialization)
Vrije Universiteit Amsterdam (2020 – 2021)

MSc (Zoology)
University of Cape Town (2009 – 2011)

BSc - Honours (Freshwater Biology)
University of Cape Town (2007)

BSc (Zoology)
University of Cape Town (2003 – 2006)

4 AFFILIATIONS

South African Bat Assessment Advisory Panel (2013 to 2020)
Professional Natural Scientist (Ecological Science) – SACNASP Registration #400238/14

5 PROJECT EXPERIENCE

Research Projects

- Current State of Knowledge of Wind Energy Impacts on Bats in South Africa
- Darling National Demonstration Wind Farm Project. Designed and implemented a research project investigating bat fatality in the Western Cape

Strategic Advice

- Risk screening for five wind farms in Uzbekistan and Azerbaijan (International Finance Corporation)

- Review of Terms of Reference for Bat Pre-construction Monitoring projects in India (International Finance Corporation)
- Stakeholder Advisory Committee for Good Practices Handbook Post-Construction Monitoring of Bird and Bat Fatalities at Onshore Wind Energy Facilities (International Finance Corporation)
- Review of Bird Fatality data from De Aar 1 and De Aar 2 Wind Farms (Mulilo)
- Management and mitigation recommendations for bats at three proposed wind farms (Rainmaker Energy)
- Peer Review for Three Bat Monitoring Reports for the Bokpoort II Solar Developments (Golder Associates)
- Peer Review of Operational Monitoring at the Jeffreys Bay Wind Farm, including updating the operational mitigation strategy for bats (Globeleq South Africa Management Services)
- Oyster Bay Wind Energy Facility. Reviewing a pre-construction bat monitoring study and providing input into a stand-alone study (RES Southern Africa)
- Review and design mitigation strategies for bats at the Kinangop Wind Park, Kenya (African Infrastructure Investment Managers)

Operational Monitoring Projects for Bats and Birds

- Darling Wind Farm (ENERTRAG)
- Eskom Sere Wind Farm (Endangered Wildlife Trust)
- West Coast One Wind Energy Facility (Aurora Wind Power)
- Fazakerly Waste Water Treatment Works (United Utilities)
- Beck Burn Wind Farm (EDF Energy)
- Gouda Wind Energy Facility (Blue Falcon 140)
- Hopefield Wind Farm (Umoya Energy)

Pre-Construction Monitoring and Environmental Impact Assessments for Bats

- Klipfontein & Zoute Kloof Solar PV Projects (Resource Management Services)
- Swellendam Wind Energy Facility (The Energy Team/Calidris)
- Swellendam Wind Energy Facility (Veld Renewables)
- Ingwe Wind Energy Facility (ABO Wind renewable energies)
- Duiker Wind Energy Facility (ABO Wind renewable energies)
- Pienaarspoort Wind Energy Facility (ABO Wind renewable energies)
- Choje Wind and Solar Energy Facility (Wind Relic)
- Wobben WEC Wind Project (Integrated Wind Power)
- Nuweveld Wind Energy Facility (Red Cap Energy)
- Banna Ba Phifu Wind Energy Facility (WKN Windcurrent SA)
- Kwagga Wind Energy Facility (ABO Wind renewable energies)
- Unika 1 Wind Farm in Zambia (SLR Consulting)
- Namaacha Wind Farm (Consultec)
- Paulputs Wind Energy Facility (WKN Windcurrent SA)
- Putsonderwater Wind Energy Facility (WKN Windcurrent SA)
- Zingesele Wind Energy Facility (juwi Renewable Energies)
- Highlands Wind Energy Facility (WKN Windcurrent SA)
- Kap Vley Wind Energy Facility (juwi Renewable Energies)
- Universal and Sonop Wind Energy Faculties (JG Afrika)
- Kolkies and Karee Wind Energy Facility (Mainstream Renewable Power South Africa)
- Komsberg East and West Wind Energy Facility (African Clean Energy Developments)
- Spitskop West Wind Energy Facility (RES Southern Africa/Gestamp)
- Spitskop East Wind Energy Facility (RES Southern Africa)
- Patryshoogte Wind Energy Facility (RES Southern Africa)
- Elliot Wind Energy Facility (Rainmaker Energy)
- Pofadder Wind Energy Facility (Mainstream Renewable Power South Africa)
- Swartberg Wind Energy Facility (CSIR)

- Clover Valley and Groene Kloof Wing Energy Facility (Western Wind Energy)

Ecological Surveys

- Mokolo Bat Cave Assessment for water pipeline development (GIBB)
- Killean Wind Farm Bat acoustic surveys for this proposed site in Scotland, UK. (Renewable Energy Systems)
- Maple Road, Tankersely. Bat acoustic surveys including a walked transect for this proposed site near Barnsley, UK (Rula Developments).
- Wild Bird Global Avian Influenza Network for Surveillance (Percy Fitzpatrick Institute of African Ornithology)
- Tree-Grass Dynamics Research Project (University of Cape Town)
- Zululand Tree Project (University of Cape Town)

Environmental Due Diligence Projects

- Klawer Wind Farm (SLR Consulting)
- Excelsior Wind Farm (IBIS Consulting)
- Golden Valley Wind Farm (IBIS Consulting)
- Perdekraal Wind Farm (IBIS Consulting)
- Copperton Wind Energy Facility (SLR Consulting)
- Roggeveld Wind Farm (IBIS Consulting)
- Kangas Wind Farms (ERM)
- Excelsior Wind Farms (ERM)
- Golden Valley Wind Farms (ERM)

Amendment Applications for Wind and Solar Farms

- Bokpoort Solar Amendment (Royal HaskoningDHV)
- Haga Haga (CES - Environmental and social advisory services)
- Paulputs (Arcus Consultancy Services South Africa)
- Suurplaat (Savannah Environmental)
- Kap Vley (juwi)
- San Kraal (Arcus Consultancy Services South Africa)
- Phezukomoya (Arcus Consultancy Services South Africa)
- Gemini (Savannah Environmental)
- Castle Wind Farm (juwi)
- Namas (Savannah Environmental)
- Zonnequa (Savannah Environmental)
- Ukomeleza (CES - Environmental and social advisory services)
- Great Kei (CES - Environmental and social advisory services)
- Motherwell (CES - Environmental and social advisory services)
- Dassiesridge (CES - Environmental and social advisory services)
- Great Karoo (Savannah Environmental)
- Gunstfontein (Savannah Environmental)
- Komserberg East and West (Aurecon South Africa)
- Soetwater (Savannah Environmental)
- Karusa (Savannah Environmental)
- Zen (Savannah Environmental)

Screening Studies

- Feasibility assessment for four potential wind farms in the Northern Cape (ABO Wind renewable energies)
- Feasibility assessment for four potential wind farms in Mozambique (Ibis Consulting)
- Assessment of the Feasibility of a Wind Farm in the Northern Cape (juwi Renewable Energies)
- Assessment of the Feasibility of two Wind Farms in the Eastern Cape (WKN Windcurrent SA)

6 PUBLICATIONS

Aronson, J.B., Shackleton, S., and Sikutshwa, L. (2019). Joining the puzzle pieces: reconceptualising ecosystem-based adaptation in South Africa within the current natural resource management and adaptation context. Policy Brief, African Climate and Development Initiative.

MacEwan, K., Aronson, J.B, Richardson, E., Taylor, P., Coverdale, B., Jacobs, D., Leeuwner, L., Marais, W., Richards, L. South African Bat Fatality Threshold Guidelines for Operational Wind Energy Facilities – South African Bat Assessment Association (1st Edition).

Aronson, J.B. and Sowler, S. (2016). Mitigation Guidance for Bats at Wind Energy Faculties in South Africa.

Aronson, J.B., Richardson, E.K., MacEwan, K., Jacobs, D., Marais, W., Aiken, S., Taylor, P., Sowler,S. and Hein, C (2014). South African Good Practise Guidelines for Operational Monitoring for Bats atWind Energy Facilities (1st Edition).

Sowler, S. and S. Stoffberg (2014). South African Good Practise Guidelines for Surveying Bats in WindEnergy Facility Developments - Pre-Construction (3rd Edition). Kath Potgieter, K., MacEwan, K., Lötter,C., Marais, M., Aronson, J.B., Jordaan, S., Jacobs, D.S, Richardson, K., Taylor, P., Avni, J., Diamond,M., Cohen, L., Dippenaar, S., Pierce, M., Power, J. and Ramalho, R (eds).

Aronson, J.B., Thomas, A. and Jordaan, S. 2013. Bat fatality at a Wind Energy Facility in the Western Cape, South Africa. African Bat Conservation News 31: 9-12.

7 TRAINING

- National Wind Coordinating Collaborative (NWCC) Wind Wildlife Research Meeting, December 2020.
- Conference on Wildlife and Wind Energy Impacts, Stirling, August 2019.
- GenEst Carcass Fatality Estimator Workshop, Stirling, August 2019.
- GenEst Carcass Fatality Estimator Workshop, Kirstenbosch Research Centre (KRC), October 2018.
- Windaba Conference and Exhibition - Africa's Premier Wind Energy Conference; Cape Town, 2013 – 2019
- Bats & Wind Energy Workshop, The Waterfront Hotel & Spa, Durban, July 2016.
- Endangered Wildlife Trust (EWT) Bats & Wind Energy Training Course, Oct 2013.
- Endangered Wildlife Trust (EWT) Bats & Wind Energy Training Course, Jan 2012.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

HIGHLANDS NORTH WIND ENERGY FACILITY AMENDMENT APPLICATION, EASTERN CAPE PROVINCE

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Camissa Sustainability Consulting			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Jonathan Aronson			
Specialist Qualifications:	MSc (Zoology), MSc (Environment and Resource Management)			
Professional affiliation/registration:	SACNASP			
Physical address:	Krelis Louwenstraat 5 Amsterdam, Netherlands			
Postal address:	Krelis Louwenstraat 5 Amsterdam, Netherlands			
Postal code:	1055 KA	Cell:	+31 62 797 1247	
Telephone:		Fax:		
E-mail:	jonathan@camissaconsulting.com			

2. DECLARATION BY THE SPECIALIST

I, Jonathan Aronson, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Camissa Sustainability Consulting

Name of Company:

03/05/2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Jonathan Aronson, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Camissa Sustainability Consulting

Name of Company

03/05/2021

Date

Signature of the Commissioner of Oaths

03/05/2021

Date

Commissioner of Oaths ex Officio
Advocate A FRIEDMAN
Advocate of the High Court
of South Africa
81 Maude Street, Sandton
Date 03/05/2021