Appendix F

AVIFAUNA STATEMENT

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Komati Solar Energy Facility Amendment Letter

Avifauna Assessment

November 2024

Prepared for
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Contents

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Low de Vries
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Pr. Sci. Nat. Zoological Science

List of Figures

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Expertise of Bird Specialists

Low de Vries is a registered bat assessment specialist with SABAA and has consulted for numerous field projects, which included bird surveys and the removal of dangerous snakes in Mozambique, as well as several biodiversity surveys in South Africa. He obtained a PhD in Zoology while investigating the general ecology of aardwolves with special focus on home range, diet, and prey abundance. After his PhD, he spent 14 months on Marion Island assisting with field work on elephant seals, fur seals and killer whales. During his subsequent postdoctoral position at the University of Pretoria, he spent six years conducting research on the ecology of bats and has obtained extensive knowledge on bat behaviour and movements, as well as experience in bat handling.

Justin obtained a BSc in Zoology & Botany, followed by an Honours degree in Biodiversity and Conservation. He is a professional bird guide (over 15 years of experience), who has led tours across 4 continents (over 20 countries) and is well versed in field identification, ecology and bird calls and has a sound understanding of rigorous scientific data collection. He has served as a bird specialist for Enviro-Insight, EXM as well as Birdlife South Africa. He has led avifaunal research and atlassing projects both on mainland Africa in the renewable energy sector, as well as conducted data collection out at sea to Antarctica and along the west coast from South Africa to Namibia.

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Disclaimer by Volant Environmental Director

I declare that the work presented in this report is my own and has not been influenced in any way by the developer. At no point has the developer asked me as the specialist to manipulate the results to make them more favourable for the proposed development. I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). I have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science)* in conducting this specialist report.

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Acronyms & Glossary of Terms

AOI: Area of Influence, the area that is affected by the proposed development.
Buffer zone: A zone established around areas that are identified as sensitive for bats and includes flyways, foraging areas and bat roosts.
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.
Cumulative Impact: Impacts created due to past, present, and future activities and impacts associated with these activities.
EMPr: Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.
Endemic: A species that is restricted to a particular area.
EIA (Environmental Impact Assessment): The process of identifying environmental impacts due to activities and assessing and reporting these impacts.
GPS: Global Positioning System device.
IUCN: International Union for Conservation of Nature.
MW: Megawatts.
NEMA: National Environmental Management Act.
Pre-construction phase: The period prior to the construction of a wind energy facility.
Red data species: Species included in the Critically Endangered, Endangered, Vulnerable or Rare categories as defined by the IUCN.
REDZ (Renewable Energy Development Zones): Areas where wind and solar photovoltaic power development can occur in concentrated zones.
S&EIA: Social and Environmental Impact Assessment (EIA): The process of identifying social and environmental impacts due to activities and assessing and reporting these impacts.
SABAA: South African Bat Assessment Association.
SACNASP: South African Council for Natural Scientific Professions.
SANBI: South African National Biodiversity Institute.
Scoping Report: A report contemplated in regulation 21 of the NEMA amended EIA regulations R326 dated 7 April 2017.
ToPS: Threatened or Protected Species.

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1. Introduction

1.1 Project Details

Volant Environmental (Pty) Ltd was commissioned by WSP Africa (Pty) Ltd to conduct a thorough Pre-Construction Survey to assess the potentially Sensitive Areas of avifauna at a proposed solar energy facility (SEF) which will be known as the Komati Power Station Solar Photovoltaic and Battery Energy Storage Project near Komati in Mpumalanga Province, South Africa. The Komati Power Station Facility received an environmental authorisation (EA) (DFFE:14/12/16/3/3/2/2456) on 02 February 2024, but Eskom Holdings SOC (Ltd) have proposed an expansion of the authorised 100 MW Solar Photovoltaics (PV) Energy Facility (SEF), the150 MW Battery Energy Storage System (BESS) and part of the associated infrastructure

1.2 Terms of Reference

The report has been compiled under the following terms of reference and provides:

- An assessment of all impacts related to the proposed changes;
- Advantages and disadvantages associated with the changes;
- Comparative assessment of the impacts before the changes and after the changes; and
- Measures to ensure avoidance, management and mitigation of impacts associated with such proposed changes, and any changes to the EMPr.

1.3 Project Location

The proposed SEF is located near the town of Komatie in the Nkangala District Municipality, Mpumalanga, South Africa. The proposed PAOI can be accessed using multiple routes but primarily using the R542 that runs South of the proposed site or the R35 that runs East of the proposed site.

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1.4 Description of Ecoregion

The proposed PAOI falls across the Grassland Bioregion with the majority of the PAOI consisting Eastern Highveld Grassland.

The extent of the Grassland Biome is relatively well defined on the basis of the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central plateau (Highveld), as well as the inland areas of the eastern seaboard and the established mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome being at a higher altitude result in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost. The presence of high amounts of moisture allows for grassland regions to be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*). It is noted that the moisture index affects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome.

The Eastern Highveld Grassland is primarily known for its slightly to moderately undulating plains, that include some well-defined low hills and pan depressions. The vegetation in this biome is short dense grassland dominated by the usual highveld grass composition. Small, scattered rocky outcrops with wiry, sour grasses are also found within this vegetation.

The warmest month (with the highest average high temperature) is December (29.86 C) while the coldest month (with the lowest average low temperature) is June (9.0 C). The area receives an average of 181.1 mm of rain during January, which is the wettest month of the year.

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2. Methods

The Pre-construction bird report for the Komati Power Station was reviewed, along with the current bird sensitivity buffers. Two site visits were completed on the 2nd and 30th of June 2023.

3. Proposed Amendments

3.1 Solar Energy Facility

Previously the Komati Power Station consisted of two sites, Solar PV A (127 Ha) and Solar PV B (50 Ha). This has been divided into Solar PV A1 (109 Ha), Solar PV A2 (21 Ha) and Solar PV B (30 Ha) as seen in Figure 1 and Figure 2 below. Solar PV A2 is a section of the what was previously known as Solar PV A, and is not an addition. Overall there is a 20 Ha reduction in the buildable areas when the footprints of the amended Solar PVs are considered. The solar modules will be placed I rows with space for perimeter roads and fencing on the boundaries and O&M access roads between the modules.

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Figure 1. Boundaries of Solar PV A and Solar PV B

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Figure 2. Amended boundaries of the Solar PV facilities A1, A2 and B

3.2 Grid Connections, Substations and Battery Energy Storage Facilities

For the amendment the 132 kV Grid connection that was previously approved will be removed. The previously approved substations will be removed and three new substations is proposed for each of the Solar sites (Figure 3). The footprints of these collector substations will fall within the boundaries of the respective Solar PV sites are as follow:

- Substation footprint A1 – 1.5 Ha
- Substation footprint A2 – 0.36 Ha

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- Substation footprint B – 0.36 Ha

It is proposed that the Area A Battery Enery Storage Facilty (BESS) is extended, however, this expansion will be on the existing Komati Power Station. Three BESS have been aproved and range in size from 2 Ha to 6 Ha (Figure 4).

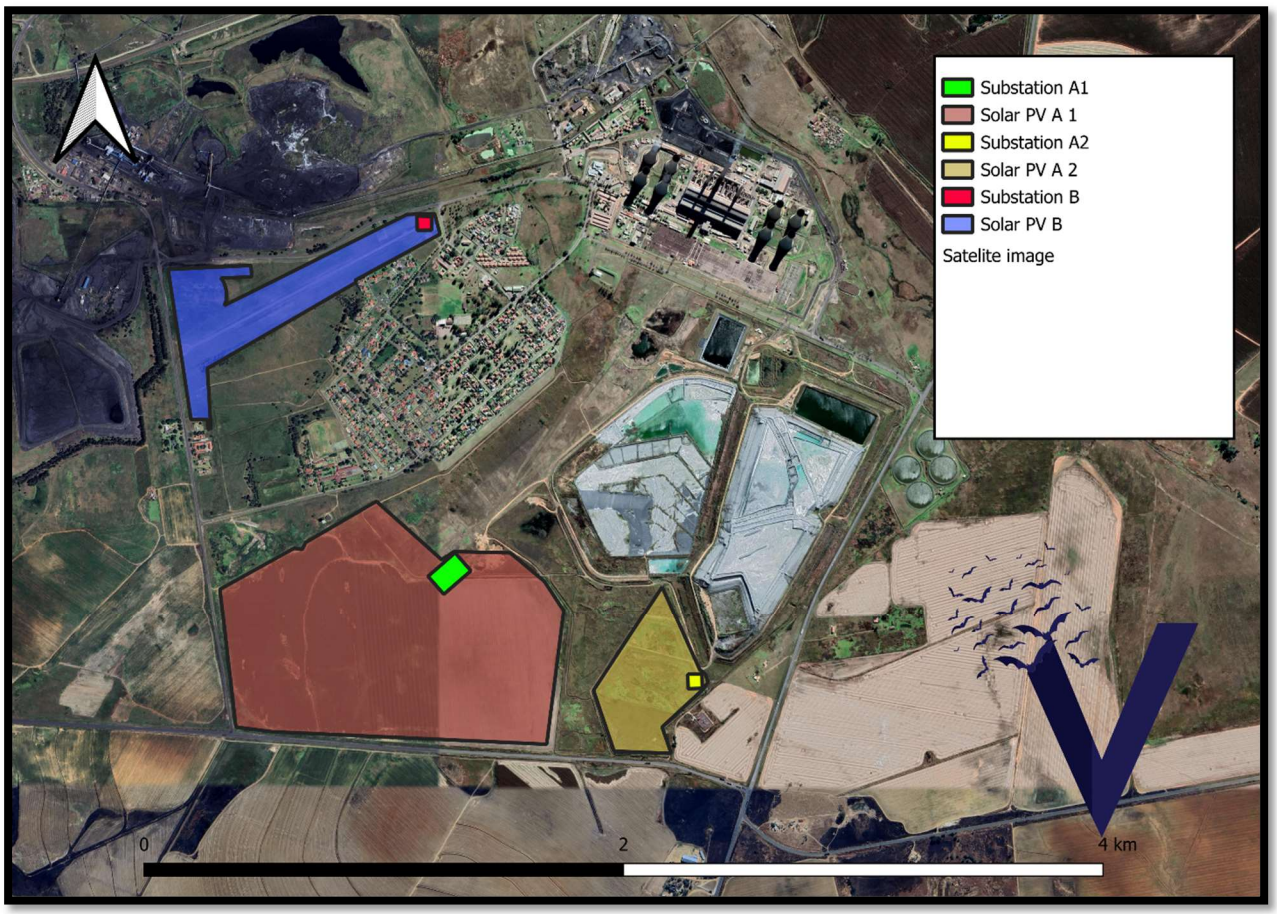

Figure 3. Locations of collector substations for each Solar PV site

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Figure 4. Locations of the approved Battery Energy Storage Facilities

3.3 Ancillary Infrastructure

No amendments have been made to the ancillary infrastructure and will only be confirmed after the conceptual design has been completed. The following infrastructure is, however, expected:

- Access roads;
- Perimeter roads;
- Below ground electrical cables;
- Above ground overhead lines;

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Pr. Sci. Nat. Zoological Science

- Meteorological Station;
- Operations and Maintenance (O&M) Building including control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities);
- Spares Warehouse and Workshop;
- Hazardous Chemical Store;
- Security Building;
- Parking areas and roads;
- Temporary laydown areas;
- Temporary concrete batching plant
- Construction camps and temporary laydown areas; and
- Onsite substations.

4. Sensitive Areas

The only sensitive areas found on or near the proposed Komati Power Station Solar Photovoltaic and Battery Energy Storage Project where two wetlands, and each will require a 200 m buffer. The buffer of one of these wetlands overlaps with Solar PV A 1, whereas the other overlaps with Solar PV A 2 (Figure 5). As these buffers should be considered a No-Go no construction may take place within these areas and the boundaries will have to be altered.

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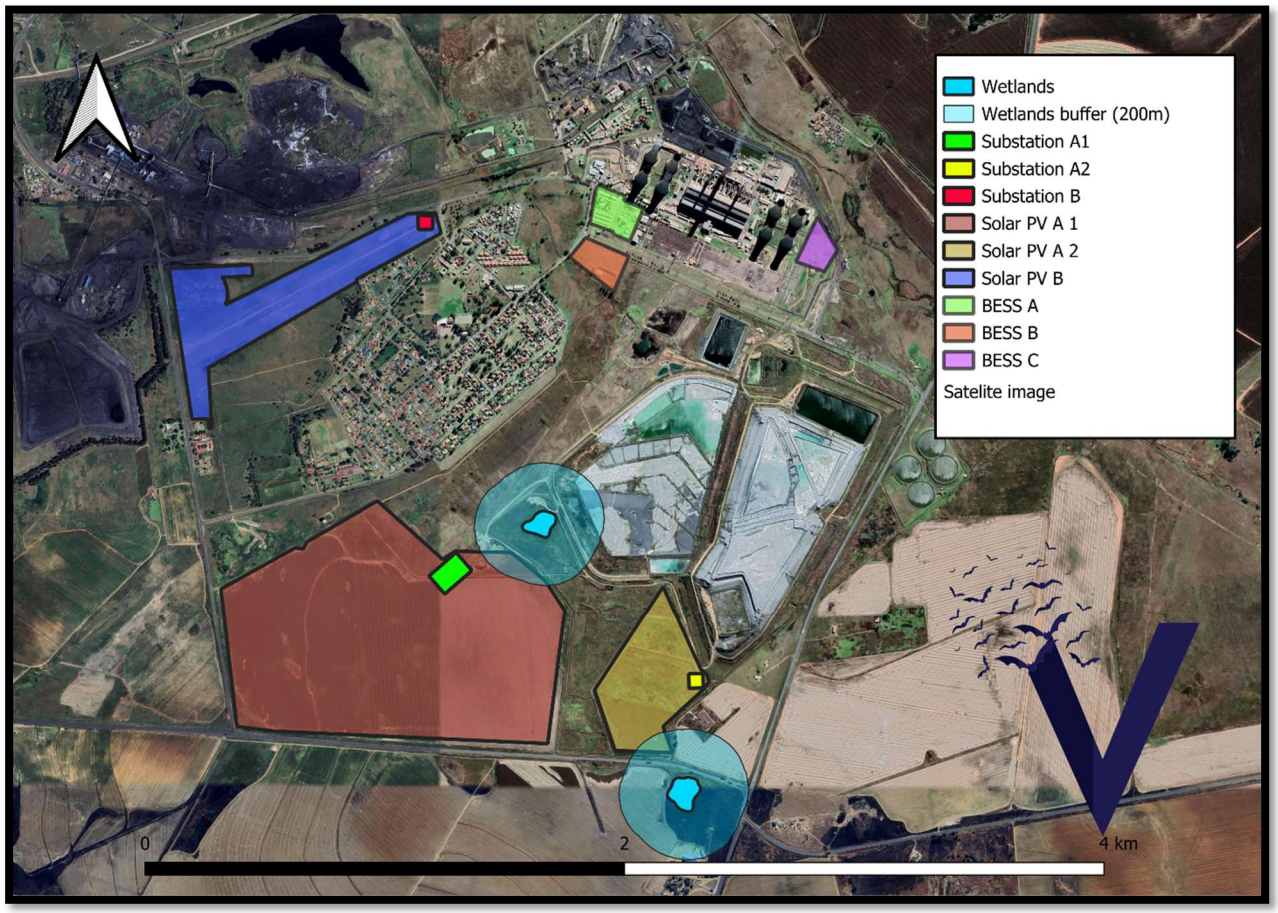

Figure 5. Sensitive areas found on or near the Project Area of Influence

5. Potential Impacts

Outlined below are the potential impacts and associated risk factors identified during the surveys in 2023 that may be generated by the proposed development.

According to Birdlife South Africa's Best Practice Guidelines on Birds and Solar Energy, the associated concerns with PV facilities are summarized below:

- Displacement of species of conservation concern.

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- Loss of habitat and disturbance during construction and operational phases.
- Collision with solar panels and power line infrastructure.

The proposed Komati SEF development will cover an area of approximately 157 ha, located within the Eastern Highveld Grassland vegetation type. This habitat represents the vegetation type of the surrounding area, whilst the development area itself is transformed, with large sections of developed areas and agriculture present. Of the 29 species of concern that have been reported in the broader area, only two were recorded during the site visit, both Peregrine Falcon and Black-Winged Kite being of least concern. The development is unlikely to have a significant impact on these species, but direct habitat loss and displacement will likely affect common local bird assemblages.

4.1 Identification of potential impacts

Potential impacts on avifauna associated with the proposed development are outlined in more detail below:

Habitat loss, displacement, and disturbance of avifauna

As a result of direct habitat loss to accommodate the construction of the solar energy facility, avifauna of all sizes will be affected to varying degrees. Smaller passerines will be highly susceptible to these changes, losing potential feeding, roosting, and breeding habitat. These habitat loss impacts are permanent in nature, whilst disturbances may be limited to the construction and operational phases, after which some species will begin to reutilize suitable parts of the development site again. Larger raptors and terrestrial species with larger home ranges and a tendency to show higher sensitivity to disturbances might be less likely and/or slower to return to the development area.

Collison risk and electrocutions with powerlines and infrastructure

Due to their size, small passerines carry less risk regarding collisions with overhead lines and the risks of electrocutions on power line infrastructure. Larger species of raptor and terrestrial birds are thus at a higher risk, and large raptors are prone to electrocution due to their tendency to

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roost, rest, and hunt from power lines and power line structures. This is of concern as many of these species are red-listed and are also prone to impacts from habitat loss and disturbance and can thus be severely affected by solar developments across all their accompanying impacts.

6. Assessment of Impacts

Impact assessments for the Komati SEF planning, construction and operational phases are outlined below. These impacts were assessed during the surveys in 2023 and no additional mitigation measures are proposed for the amendment.

6.1 Komati Solar Energy Development

6.1.1 Planning & Construction Phase

Impact Type	Direct Avifaunal Impacts During Construction – habitat loss & disturbance							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Local	Short-term	Medium	High	High	Medium-Low & Negative	Low & Negative	High

Mitigation & Management Actions

- Limit destruction of habitat during construction phase strictly to the development footprint
- All building waste produced during construction should be removed and disposed of at an official waste management facility.
- Any liquid or chemical spills should be dealt with immediately to avoid contamination of the environment on site.
- No construction should take place near to any active raptor or priority species nests should these be located prior to the implementation of the construction phase. Nesting should be allowed to run until completion and until chicks have successfully fledged before disturbance in the area recommences.
- Where trenches or holes are required to be dug, these are to be filled shortly afterwards. These open holes serve as potential pit-fall traps for fledgling birds and should not be left open for extended periods of time.
- Nesting sites and/or sensitive microhabitats should be avoided where possible, especially during the peak summer breeding seasons.
- An environmental induction prior to construction for all staff and contractors to explain that no animals are to be harmed or hunted, and that all necessary process to limit littering, chemical pollution, fires are implemented on site.
- Low speed limits should be adhered to on site, to avoid collisions with avifauna, especially nocturnal species (e.g. owls, nightjars, and thick-knees) that actively hunt and inhabit the roads after dark.

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Pr. Sci. Nat. Zoological Science

6.1.2 Operational Phase

Impact Type	Direct Avifaunal Impacts During Operation – disturbance and collision risk							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Local	Long-term	Medium-Low	Moderate	High	Medium-Low & Negative	Low & Negative	High

Mitigation & Management Actions

- If raptor or other bird species are found on any power line infrastructure, these should be left undisturbed until nesting and fledging of the chicks has taken place. If any nests are deemed to be of risk to the safety of the power line, nests of non-priory species should be removed before/after breeding has taken place. If the nest is of a priority species, an avifaunal specialist should be contacted to best advise on how to move forward with the best interests of the priority species in mind.
- Monthly monitoring is recommended post construction, especially for the first year, to note any high-risk areas, whether on the power lines themselves or associated infrastructure. Regular carcass searches will help pin-point high risk areas, and mitigation measures such as bird flappers can be installed in these zones to mitigate further injuries and death to local avifauna.

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6.2 Collective Impacts

Collective impacts that are likely to occur due to the construction of the Komati Solar Energy development, and other developments that may arise in the general area and their effect on local avifauna.

Impact Type	Broad-scale avifaunal impacts							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Localized	Long-term	Low	Medium	Low	Low & Negative	Low & Negative	Medium-High

Mitigation & Management Actions

- Minimize the development area as much as possible, focusing on areas of transformed habitat and low avifaunal sensitivity.
- The developed areas should be cleared of any debris (e.g., building rubble) that may attract prey items and thus raptors (especially owls), that may increase the risk of collisions with power lines and associated structures.
- All perimeter fencing should allow for small fauna and terrestrial avifauna (e.g. francolin, spurfowl, buttonquails, thick-knees, korhaans, and bustards) to pass through unrestricted. Only the developed sites should be fenced off, limiting the fencing of as much undeveloped and natural habitats as possible. Double layered fences, which can trap fauna should not be used, and electric strands should be located internally if necessary, and not on the external sides of the fence which can pose as a risk to fauna.

7. Conclusion and Recommendations

Compared to the previous impact assessment undertaken by Volant Environmental, it is unlikely that the amendments to the Komati SEF would change (*i.e.* increase or decrease) the current rated impacts to birds. The current Komati SEF development would contribute to approximately 157 ha of habitat loss in an already transformed area, with LOW avifaunal significance, and thus supports the sensitivity rating of the Screening Tool. The vegetation present on the development site yielded few species of concern, and at low abundance. No nesting sites or roost sites of red-listed species were located on site. No significant seasonal variation in species assemblages and movements across the development site are likely to occur, less so for probable species of concern, thus the overall impact of the development on avifauna is considered to be LOW.

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The impacts expected by the amended development of the Komati SEF will comprise of habitat destruction and the displacement, and disturbance of local bird assemblages, as well as the direct mortalities of avifauna which are likely to arise from electrocution from power line infrastructure, and expected collisions with solar panels, overhead power lines and any associated infrastructure. The displacement, habitat destruction and disturbance of avifauna, however, is likely to be restricted to the development site itself. Small passerines are most likely to be affected by the construction of the development site, however, none of which were recorded on site, are red-list species. Impacts on larger non-passerines might occur, but none of which were recorded on site and likely occur uncommonly in the area.

To further reduce risk on avifauna, mitigation measures during both the construction and post-construction phases can be executed. These mitigation measures include restricting habitat loss and limiting disturbance to the footprint of the development area itself, whilst bird flappers can be successfully used to reduce collisions with overhead powerlines and associated infrastructure, especially in areas of high-risk areas which will become apparent during the monitoring phase. With these mitigation measures in place, impact on avifauna by the development of this site will be further reduced, maintaining a low risk, and thus no fatal flaws are assigned to the development of this site with respect to avifauna.

Impact Statement

The proposed development footprint of the amended Komati SEF is considered suitable for development. No avifaunal impacts associated with the Komati SEF that cannot be mitigated to an adequate level were detected. Based on our findings and the area of development provided for this assessment, the amended Komati SEF should be allowed to proceed into the EIA phase from an avifaunal viewpoint.

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Pr. Sci. Nat. Zoological Science

8. References

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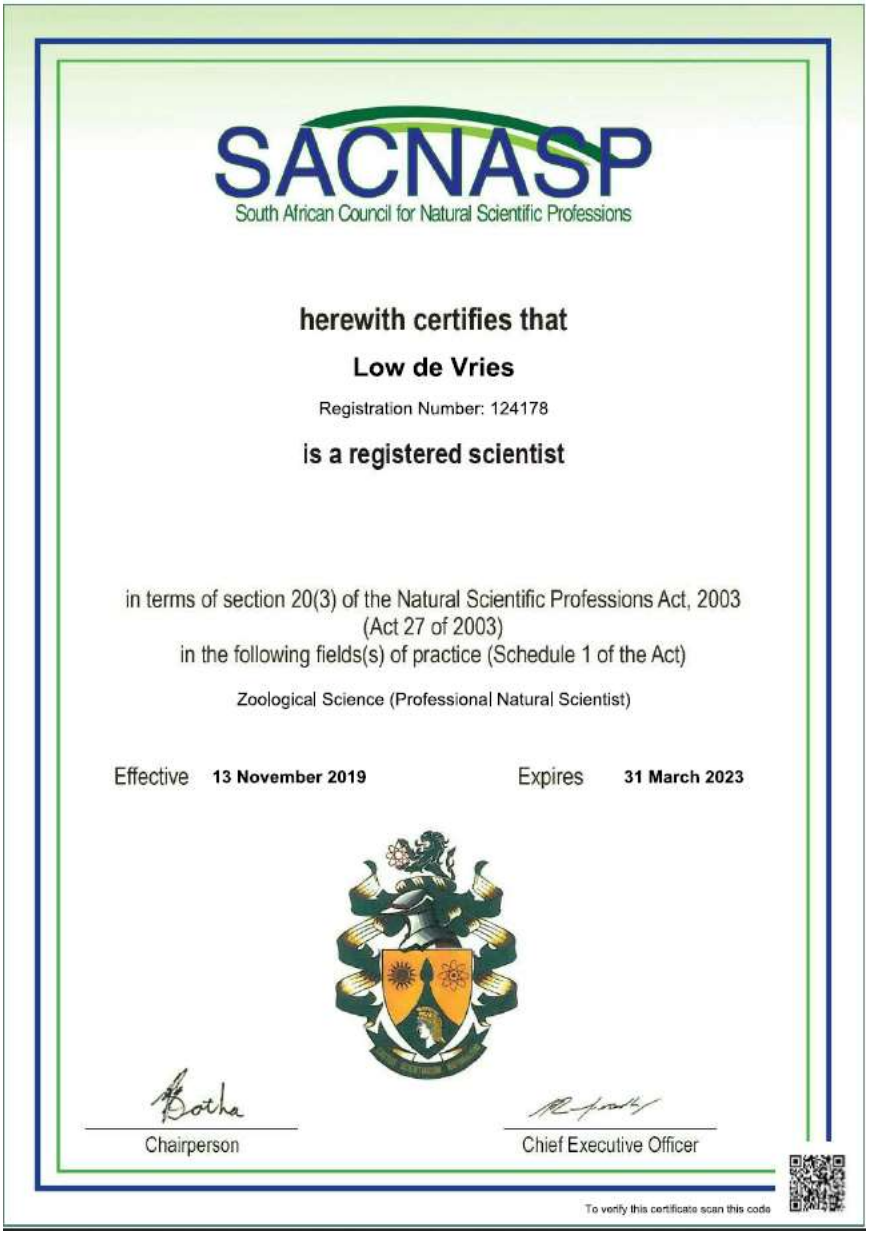
Appendix 1. Qualification of specialist



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Low de Vries

Registration Number: 124178

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Zoological Science (Professional Natural Scientist)

Effective **13 November 2019** Expires **31 March 2023**

Botha
Chairperson

Chief Executive Officer

To verify this certificate scan this code

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Appendix 2. CV of Specialist

Key areas of expertise

- Bat Specialist — Conducting surveys on bat diversity and abundance and researh on bat ecology.
- Environmental Assessment Practitioner — Writing and collating Basic Assessment (BA) for proposed Wind Energy Facilities

Personal details

Full Name	John Low de Vries
DOB	7 November 1984
Nationality	South African
Marital Status	Married
Email	low@volantenvironmental.com
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Education

Completed	Degree and Institution
2002	Matric, Hoërskool Jeugland, Kempton Park, South Africa
2006	B. Sc Zoology, University of Pretoria, Pretoria, South Africa
2007	B. Sc (Hons) Zoology, University of Pretoria, Pretoria, South Africa
2014	PhD Zoology, University of Pretoria, Pretoria, South Africa

Memberships & Certificates

- SACNASP Registered Professional Natural Scientist in the field of Zoological Science - Registration Number: 124178
- Bat Assessment Specialist with South African Bat Assessment Association (SABAA)

Other Training

- Multivariate statistical modelling (Cape Town, South Africa)
- Bat handling and identification course (AfricanBats)
- Snake handling (Chameleon Village (South Africa)
- ArcGis online course
- First Aid level 2 (Johannesburg, South Africa)

Publications

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Employment & work-related experiences

2020 - present	Director and founder of Volant Environmental
2016 - present	Postdoctoral fellow, University of Pretoria
2015 - 2016	Postdoctoral fellow, NZG
2014 - 2015	Marion Island field assistant, University of Pretoria
2013	Documentary presenter, Oxford Scientific Films
2010 - 2011	Wildlife Education Trainer, Enviro- Insight
2010 - 2011	Game Raning Lecturer, Damelin Centurion
2009 - 2018	Lecturer and tutor, University of Pretoria

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Recent Project Experience

For further details please contact me directly under low@volantenvironmental.com

Time span	Nature of project	Capacity	Industry / Sector	Client / Developer	Country (Province)
2022	Thand Tau Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Free State)
2022	Camden Bird Impact Assessment	Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Castle Wind Energy walkthrough	Bat Specialist	Renewable Energy / Onshore Wind	Savannah Environmental	South Africa (Northern Cape)
2022	Doringbaai Wind Energy Facility	Bat Specialist	Renewable Energy / Onshore Wind	WKN-Windcurrent	South Africa (Western Cape)
2022	Aggeneys Bat Impact Assessment Review	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2021	Dordrecht Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Indwe Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Waschbank Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Gorachouqua Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021	Khoemana Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021-2022	Dalmanutha Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Mpumalanga)
2020-2021	Bergrivier Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Western Cape)
2020-2021	Botterblom Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy	South Africa (Northern Cape)

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				Developments (Pty) Ltd	
2012	Dangerous snake removal	Herpetologist	Mining (Coal)	Anadarko	Mocimboa da Paia, Mozambique

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Pre-Construction Assessment of Birds for the Proposed Komati Solar Energy Facility

August 2023

Prepared for
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Contents

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Low de Vries
PhD Zoology
Pr. Sci. Nat. Zoological Science

Cell: +27 82 323 5475
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Low de Vries
PhD Zoology
Pr. Sci. Nat. Zoological Science

List of Figures

List of Tables

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EXPERTISE OF BIRD SPECIALISTS

Low de Vries is a registered bat assessment specialist with SABAA and has consulted for numerous field projects, which included bird surveys and the removal of dangerous snakes in Mozambique, as well as several biodiversity surveys in South Africa. He obtained a PhD in Zoology while investigating the general ecology of aardwolves with special focus on home range, diet, and prey abundance. After his PhD, he spent 14 months on Marion Island assisting with field work on elephant seals, fur seals and killer whales. During his subsequent postdoctoral position at the University of Pretoria, he spent six years conducting research on the ecology of bats and has obtained extensive knowledge on bat behaviour and movements, as well as experience in bat handling.

Justin obtained a BSc in Zoology & Botany, followed by an Honours degree in Biodiversity and Conservation. He is a professional bird guide (over 15 years of experience), who has led tours across 4 continents (over 20 countries) and is well versed in field identification, ecology and bird calls and has a sound understanding of rigorous scientific data collection. He has served as a bird specialist for Enviro-Insight, EXM as well as Birdlife South Africa. He has led avifaunal research and atlassing projects both on mainland Africa in the renewable energy sector, as well as conducted data collection out at sea to Antarctica and along the west coast from South Africa to Namibia.

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PhD Zoology
Pr. Sci. Nat. Zoological Science

Disclaimer by Volant Environmental Director

I declare that the work presented in this report is my own and has not been influenced in any way by the developer. At no point has the developer asked me as the specialist to manipulate the results to make them more favourable for the proposed development. I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). I have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science)* in conducting this specialist report.

Dr. Low de Vries

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Low de Vries
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Pr. Sci. Nat. Zoological Science

COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS, AS AMENDED

Requirements of Appendix 6 – GN R326 2014 EIA Regulations, 7 April 2017	Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain a) details of: i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	*Appendix 4*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Declaration*
c) an indication of the scope of, and the purpose for which, the report was prepared;	*Project Details*
cA. an indication of the quality and age of base data used for the specialist report;	*Methods*
cB. a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	*Assessment of Impacts*
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	*Field surveys*
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	*Methods*
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	*Sensitive Bird Areas*
g) an identification of any areas to be avoided, including buffers;	*Sensitive Bird Areas*
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	*Project Location*
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Assumptions and Limitations*
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	*Conclusion and Recommendations*
k) any mitigation measures for inclusion in the EMPr;	*Assessment of Impacts*
l) any conditions for inclusion in the environmental authorisation;	*Assessment of Impacts*
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	*Assessment of Impacts*
n) a reasoned opinion i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	*Conclusion*
o) a description of any consultation process that was undertaken during the course	*NA*

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Low de Vries
PhD Zoology
Pr. Sci. Nat. Zoological Science

of preparing the specialist report;	
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	*NA*
q) any other information requested by the competent authority.	*NA*
2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	*NA*

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Pr. Sci. Nat. Zoological Science

ACRONYMS & GLOSSARY OF TERMS

AOI: Area of Influence, the area that is affected by the proposed development.
Buffer zone: A zone established around areas that are identified as sensitive for bats and includes flyways, foraging areas and bat roosts.
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.
Cumulative Impact: Impacts created due to past, present, and future activities and impacts associated with these activities.
EMPr: Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.
Endemic: A species that is restricted to a particular area.
EIA (Environmental Impact Assessment): The process of identifying environmental impacts due to activities and assessing and reporting these impacts.
GPS: Global Positioning System device.
IUCN: International Union for Conservation of Nature.
MW: Megawatts.
NEMA: National Environmental Management Act.
Pre-construction phase: The period prior to the construction of a wind energy facility.
Red data species: Species included in the Critically Endangered, Endangered, Vulnerable or Rare categories as defined by the IUCN.
REDZ (Renewable Energy Development Zones): Areas where wind and solar photovoltaic power development can occur in concentrated zones.
S&EIA: Social and Environmental Impact Assessment (EIA): The process of identifying social and environmental impacts due to activities and assessing and reporting these impacts.
SABAA: South African Bat Assessment Association.
SACNASP: South African Council for Natural Scientific Professions.
SANBI: South African National Biodiversity Institute.
Scoping Report: A report contemplated in regulation 21 of the NEMA amended EIA regulations R326 dated 7 April 2017.
ToPS: Threatened or Protected Species.

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1. Introduction

1.1 Project Details

Volant Environmental (Pty) Ltd was commissioned by WSP Africa (Pty) Ltd to conduct a thorough Pre-Construction Survey to assess the potentially Sensitive Areas of avifauna at a proposed solar energy facility (SEF) which will be known as the Komati Power Station Solar Photovoltaic and Battery Energy Storage Project near Komati in Mpumalanga Province, South Africa. Project Area of Influence (PAOI) of the proposed SEF is divided into two sites, with Site 1 covering an area of *ca.* 115 ha and Site B *ca.* 25 ha. The SEF will include the development of a PV facility with a capacity of 100 MW and a BESS of up to 150 MW.

1.2 Project Location

The proposed SEF is located around the town of Komatie in the Nkangala District Municipality, Mpumalanga, South Africa (Figure 1). The proposed PAOI can be accessed using multiple routes but primarily using the R542 that runs South of the proposed site or the R35 that runs East of the proposed site. The combined PAOI (PAOI = SEF boundaries) that we were asked to perform the assessments on covers an area of *ca* 140 ha and is situated on the Komatie power station facility as well as undeveloped land around the town of Komatie.

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Pr. Sci. Nat. Zoological Science

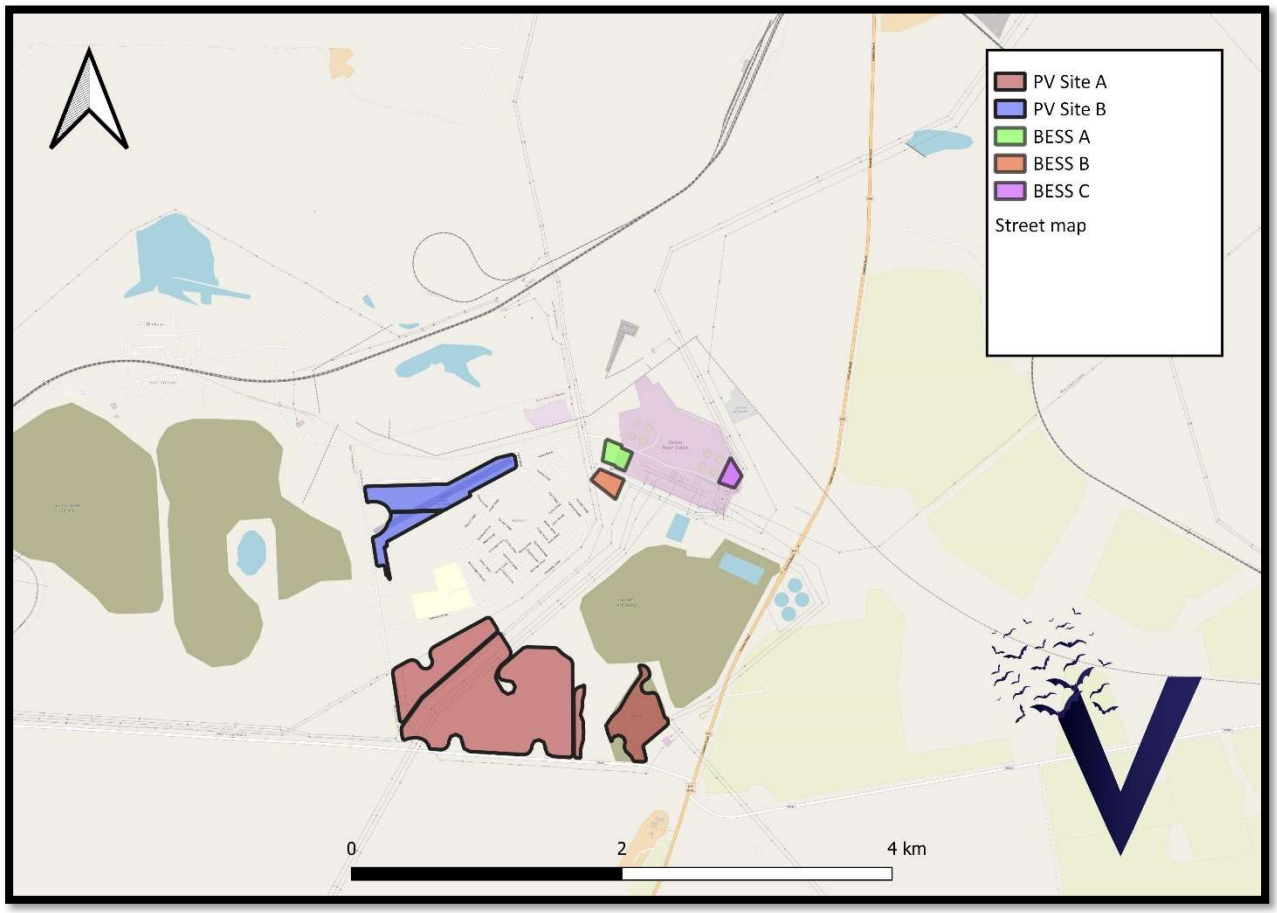

Figure 1. Location of the Komati Solar Energy Facility

1.3 Description of Ecoregion

The proposed PAOI falls across the Grassland Bioregion with the majority of the PAOI consisting Eastern Highveld Grassland.

The extent of the Grassland Biome is relatively well defined on the basis of the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central plateau (Highveld), as well as the inland areas of the eastern seaboard and the established

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Pr. Sci. Nat. Zoological Science

mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome being at a higher altitude result in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost. The presence of high amounts of moisture allows for grassland regions to be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*). It is noted that the moisture index affects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome.
The Eastern Highveld Grassland is primarily known for its slightly to moderately undulating plains, that include some well-defined low hills and pan depressions. The vegetation in this biome is short dense grassland dominated by the usual highveld grass composition. Small, scattered rocky outcrops with wiry, sour grasses are also found within this vegetation.
The warmest month (with the highest average high temperature) is December (29.86 C) while the coldest month (with the lowest average low temperature) is June (9.0 C). The area receives an average of 181.1 mm of rain during January, which is the wettest month of the year.

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Pr. Sci. Nat. Zoological Science

Figure 2. Examples of vegetation found on the Project Area of Influence

1.4 Assumptions and Limitations

- The assumption was made that all sources of information used during the completion of this report, are reliable and accurate.
- Vantage point surveys and transects are only conducted during daylight. Therefore, any bird movement occurring at night was recorded under *ad hoc* conditions. Some waterbirds and Palearctic and intra-African migrants are known to make regular flights and migratory movements at night.
- Although very useful, the SABAP1 bird data set is more than two decades old. This dataset does however provide an adequate baseline to use when assessing species presence, distribution, and abundance. The use of SABAP2 in conjunction with SABAP1 will provide substantial data to be used during initial desktop assessments. This data was, however, mostly obtained by citizen scientists, and its accuracy is dependent on the individual's skill set.

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2. Methods

2.1 Regulatory Requirements

2.1.1 Screening Report

The Minister of Environment, Forestry and Fisheries gave notice that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.

In addition, a set of protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process were developed and on 20 March 2020, the Minister of Forestry, Fisheries and the Environment gazetted the Protocols for national implementation purposes. The gazette '*Procedures to be followed for the Assessment and Minimum Criteria for Reporting of Identified Environmental Themes in terms of Section 24(5)(a) and (h) of the National Environmental Management Act (1998) when Applying for Environmental Authorisation*', has protocols that have been developed for environmental themes which include agriculture, avifauna, biodiversity (Terrestrial and Aquatic Biodiversity), noise, defence and civil aviation.

The protocols set requirements for the assessment and reporting of environmental impacts of activities requiring EA. The higher the sensitivity rating of the features on the proposed site as identified by the screening tool report, the more rigorous the assessment and reporting requirements.

Based on the screening report generated on 04/08/2023, the Avian Combined Sensitivity Theme is indicated as Low sensitivity for the PAOI.

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2.1.2 Birds and Solar Energy Best Practise Guidelines

Based on Appendix 2 (Minimum requirements for avifaunal impact assessment) in the "Best-Practice Guidelines for assessing and monitoring the impact of solar energy facilities on birds in southern Africa" (Jenkins et al., 2017) monitoring at a potential SEF must follow a tiered approach with three stages.
During Stage 1 a preliminary assessment is conducted. This assessment should give an overview of likely impacts and potential red flags. During this stage methodologies for the monitoring phase should be planned.
Stage 2 includes an in-depth study with structured data collection following set methodologies on which to base the Impact Assessment Report.
The final tier is Stage 3 during which an Impact assessment is done based on the data collected during Stage 2.

2.2 Desktop survey

A thorough desktop study was undertaken to estimate the likelihood of specific species of avifauna being present at the proposed SEF. This included investigations into available literature, including Southern African Bird Atlas Project 1 (Harrison et al, 1997), The Southern African Bird Atlas Project 2 (http://sabap2.adu.org.za/v1/index.php), The Important Bird Areas report (http://www.birdlife.org.za/conservation/important-bird-areas), the IUCN 2013 Red List (http://www.iucnredlist.org/), Birdlife South Africa Checklist of Birds in South Africa (2014) and any other birds surveys or monitoring reports for nearby WEF or facilities which included avifaunal monitoring as determined from the REEA (2022 Q1) information. Lack of public access to existing monitoring reports is a recurring problem in the industry and one that severely hampers pre-construction monitoring studies and the recommendations therein, a problem to be addressed by relevant NGOs and governmental institutions.

A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1).

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2.3 Field surveys

All methods used for field surveys were implemented according to the Best Practice Guidelines for Birds & Solar Energy in South Africa (Jenkins *et al*., 2017). This document was strictly followed.

2.3.1 Site Visits

Due to the size of the site and the Low Sensitivity status for birds the site falls under Regime 1, and only requires one site visit. Two site visits were completed on the 2nd and 30th of June 2023.

2.3.2 Scoping Survey

An initial Scoping Survey was performed by walking across the project area and investigating areas surrounding the PAOI as a ground-truthing exercise. This was done to identify potentially sensitive areas and hotspots for birds and to locate possible nesting sites.

2.3.3 Driven and Walked Transects

The vegetation on the PAOI consists of transformed and developed lands with areas of agriculture. Due to the size of the site three walked transects of *ca* 1 km and one driven transect was done (Figure 3). These methods fall within the requirements of the Best Practice Guidelines, and all bird species observed were recorded, in addition to the distance and azimuth to the animals. Avifaunal species were identified based on sight and calls. All incidental observations were noted to construct a species list for the area.

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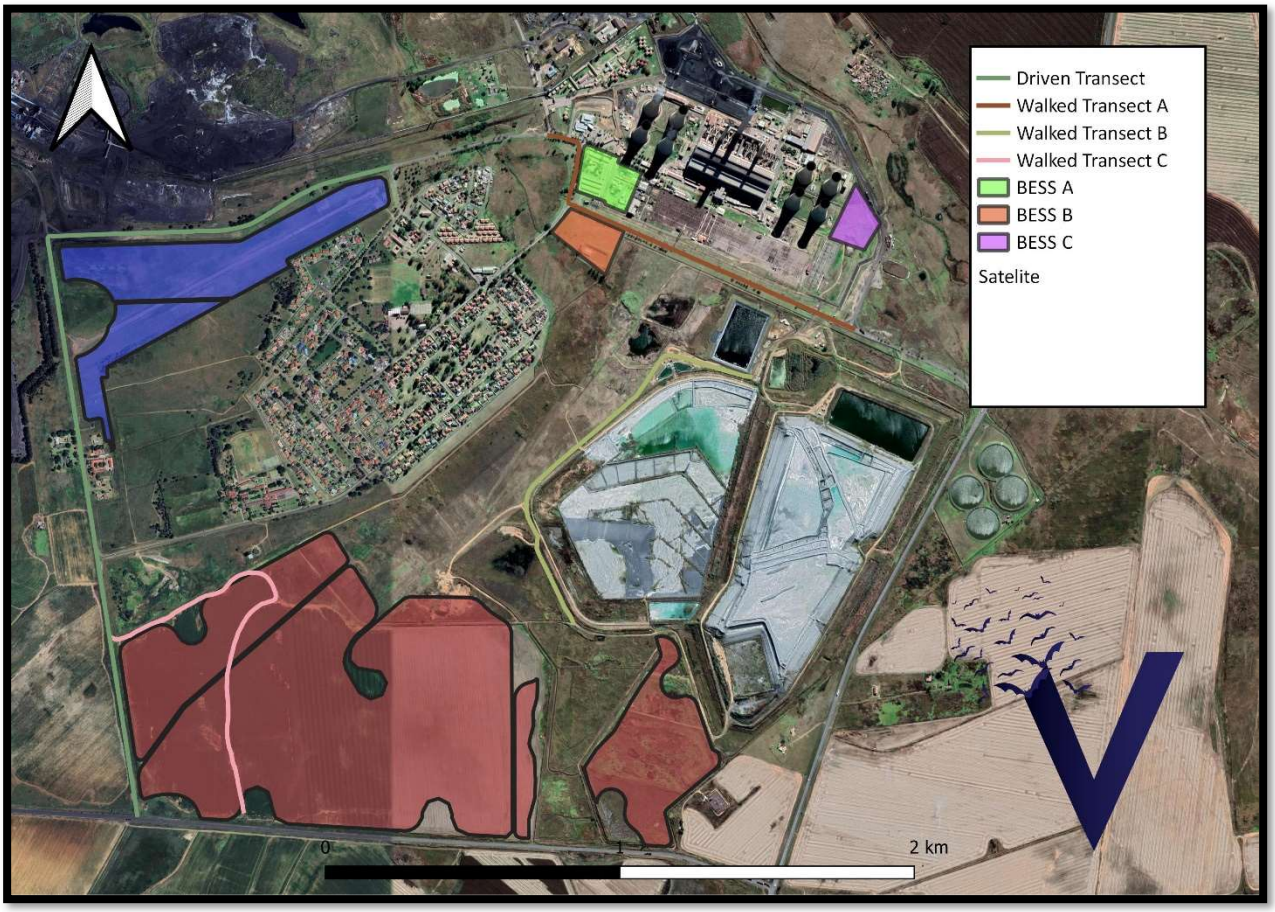

Figure 3. Transects across the Project Area of Influence

2.4 Impact Assessment

All potential impacts and associated risk factors that may be generated by the development were identified and assessed. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed, classified, and discussed.

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PhD Zoology
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According to Birdlife South Africa, the main concerns with PV facilities are the following:

• Displacement or the exclusion of nationally and/or globally threatened, rare, endemic, or range-restricted bird species from important habitats.

• Loss of habitat and disturbance of resident bird species caused by construction, operation and maintenance activities.

• Collision with the solar panels, which may be mistaken for water bodies.

• Collision and electrocution caused when perching on or flying into associated power line infrastructure.

• Habitat destruction and disturbance/exclusion of avifauna through construction (short-term) and maintenance (long-term) of new power line infrastructure.

• Habitat destruction and disturbance of birds caused by the construction and maintenance of new roads and other infrastructure.

Our assessment of the impact of the proposed SEF was based on these concerns.

.

3. Results

3.1 Desktop Survey

3.1.1 Previous Studies in the Region:

All nearby existing and proposed WEFs and SEF facilities were searched for online to find additional data regarding bird findings that might be of importance to the proposed SEF. Investigations into available literature on other surveys or monitoring reports from nearby (100 km) the proposed SEF application were undertaken (Table 1) as determined from the REEA (2022 Q1) information. These reports identified the potential impact of the proposed energy-generating facilities on bird populations present and the mitigation strategies followed. Extensive lists of bird species, that could be present on or near the proposed SEF, were also compiled using previous study data and publicly available information.

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Pr. Sci. Nat. Zoological Science

Table 1. Bird reports for Renewable Energy Facilities (and other developments) in the region of the proposed SEF.

Project	Report details	Consultant
Camden 1 Wind Energy Facility	Camden I Wind Energy Facility	WSP Global Inc.
Camden 2 Wind Energy Facility	Camden 2 Wind Energy Facility	WSP Global Inc.
Camden 1 Solar Energy Facility	Camden 1 Solar Energy Facility	WSP Global Inc.
Solar Photovoltaic Power Plant at Eskom Arnot Power Station	Solar Photovoltaic Power Plant at Eskom Arnot Power Station	ILISO Consulting (Pty) Ltd
Solar Photovoltaic Power Plant at Eskom Duvha Power Station	Solar Photovoltaic Power Plant at Eskom Duvha Power Station	ILISO Consulting (Pty) Ltd
Proposed Haverfontein Wind Energy Project, Carolina, Mpumalanga Province of South	Proposed Haverfontein Wind Energy Project, Carolina, Mpumalanga Province of South	Coastal & Environmental Services

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3.1.1.1 Camden I Wind Energy Facility

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 234 bird species could potentially occur within the broader area of the proposed WEF PAOI.
- Of these, 37 species were classified as priority species and 16 of these were identified on the South African Red List species. Of the priority species, 25 were likely to occur regularly in the development area.
- The project site is not located in an Important Bird Area (IBA), but it is located between three IBAs.
- Due to the close proximity of the site to the IBAs, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project.
- Specific environmental sensitivity areas have been identified from an avifaunal perspective indicating where mitigation strategies should be applied.

3.1.1.2 Camden 2 Wind Energy Facility

- The Camden II WEF project area was classified as Medium to High sensitivity when the DFFE Screening Tool was utilized.
- This was determined based on the potential presence of several SCC namely Grey Crowned Crane (Globally and Regionally Endangered), Martial Eagle (Globally and Regionally Endangered), Southern Bald Ibis (Globally and Regionally Vulnerable), White-bellied Korhaan (Regionally Vulnerable), Secretarybird (Globally Endangered and Regionally Vulnerable) and Wattled Crane (Globally Vulnerable and Regionally Critically Endangered).
- This classification was confirmed during on-site visits and field surveys conducted throughout the study period.
- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100m all infrastructure exclusion zone must be implemented around drainage lines and associated wetlands.

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- After the pre-construction survey was completed, the avifauna specialist was informed of a potential Martial Eagle nest located near the Camden II WEF. A 5km no turbine exclusion zone around this nest was therefore suggested.

3.1.1.3 Camden 1 Solar Energy Facility

- It was determined that the proposed solar energy facility will have a moderate impact on priority avifauna which could be reduced to low impact through appropriate mitigation.
- No fatal flaws were discovered during the onsite investigations of the proposed SEF.
- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100m all infrastructure exclusion zone must be implemented around drainage lines and associated wetlands.

3.1.1.4 Solar Photovoltaic Power Plant at Eskom Arnot Power Station

- It was stated that according to Birdlife South Africa, the study area does not fall within any Important Bird Areas (IBA).
- The avifaunal species found in the study area were seen as all commonly occurring species, which are well adapted to the already transformed habitat within the proposed development site.
- No avifaunal Species of Conservation Concern (SCC) were identified during the site survey.

3.1.1.5 Solar Photovoltaic Power Plant at Eskom Duvha Power Station

- It was stated that according to Birdlife South Africa, the study area does not fall within any Important Bird Areas (IBA).
- In terms of avifaunal SCC, only Southern Bald Ibis was identified and reported during the site survey.

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- It was however determined that there is a high probability that African Marsh Harriers and African Grass Owls may possibly use the study area specifically for foraging purposes around the wetland sections.

3.1.1.6 Proposed Haverfontein Wind Energy Project, Carolina, Mpumalanga Province of South Africa

- The target species list identified for this study site was determined to be: Southern Bald Ibis, African Marsh Harrier, Blue Crane, Grey Crowned Crane, Denham's Bustard, Whitebellied Korhaan, Yellow-billed Stork, Greater and Lesser Flamingo, Secretarybird and Blue Korhaan and White Stork.
- It was also stressed that smaller grassland dependent species such as larks and pipits will also be of concern for this project.
- The Nooitgedacht dam identified close to site also featured multiple water bird species. The flyways used to access this dam was an aspect that needed further reporting and assessment.

3.1.2 Potential Species Present in the Area

Based on a list of bird species drawn from the nine pentads that covers and surrounds the PAOI a total of 205 species have been identified of which 29 species have been identified as Priority Species (Appendix 2). Of the Priority Species, nine have an Overall Priority Score of 290 or higher, placing them in the top 30 Priority species (Table 2). These include Grey-Winged Francolin, Denham's Bustards, Blue Korhaan, Northern Black Korhaan, Grey Crowned Crane, Black Winged Pratincole, White Stork, Saddle Billed Stork, Southern Bald Ibis.

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PhD Zoology
Pr. Sci. Nat. Zoological Science

Table 2. Priority species that could potentially occur on the Project Area of Influence

Common name	Scientific name	Priority Score
Pheasants & Allies (Phasianidae)		
Grey-winged Francolin	*Scleroptila afra*	190
Bustards (Otididae)		
Denham's Bustard	*Neotis denhami*	300
Blue Korhaan	*Eupodotis caerulescens*	270
Northern Black Korhaan	*Afrotis afraoides*	180
Cranes (Gruidae)		
Grey Crowned Crane	*Balearica regulorum*	314
Coursers, Pratincoles (Glareolidae)		
Black-winged Pratincole	*Glareola nordmanni*	202
Storks (Ciconiidae)		
White Stork	*Ciconia ciconia*	220
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	240
Ibises, Spoonbills (Threskiornithidae)		
Southern Bald Ibis	*Geronticus calvus*	330
Secretarybird (Sagittariidae)		
Secretarybird	*Sagittarius serpentarius*	320
Kites, Hawks, Eagles (Accipitridae)		
Black-winged Kite	*Elanus caeruleus*	174
African Harrier-Hawk	*Polyboroides typus*	190
Black-chested Snake Eagle	*Circaetus pectoralis*	230
Martial Eagle	*Polemaetus bellicosus*	350
Long-crested Eagle	*Lophaetus occipitalis*	190
Black Sparrowhawk	*Accipiter melanoleucus*	170
Montagu's Harrier	*Circus pygargus*	210
Yellow-billed Kite	*Milvus aegyptius*	No value
African Fish Eagle	*Haliaeetus vocifer*	290
Common Buzzard	*Buteo buteo*	210
Jackal Buzzard	*Buteo rufofuscus*	250
Barn Owls (Tytonidae)		
African Grass Owl	*Tyto capensis*	289
Owls (Strigidae)		
Marsh Owl	*Asio capensis*	180
Spotted Eagle-Owl	*Bubo africanus*	170
Caracaras, Falcons (Falconidae)		
Rock Kestrel	*Falco rupicolus*	No value

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Greater Kestrel	*Falco rupicoloides*	174
Amur Falcon	*Falco amurensis*	210
Lanner Falcon	*Falco biarmicus*	300
Larks (Alaudidae)		
Melodious Lark	*Mirafra cheniana*	180

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3.1.3 Nature Reserves in the Area

A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1). The reserves consist of privately as well as publicly owned land, used for wildlife conservation as well as specific livestock farming. These sites are all registered designated protected areas (SAPAD 2022, Q1).

Table 3. The identified public/privately owned protected areas identified close to the proposed SEF site

Name	Location From SEF Site
Heyns Private Nature Reserve	18 Km North
Burnside Private Nature Reserve	18 Km North
Witbank Nature Reserve	19 Km North
Vaalbank Private Nature Reserve	27 Km North
Botshabelo Nature Reserve	42 Km North
Bezuidenhoutshoek Nature Reserve	42 Km North
Buks Private Nature Reserve	52 Km North
Loskop Dam Nature Reserve	68 Km North
Annasdal Private Nature Reserve	67 Km North
Moutse Nature Reserve	90 Km Northwest
Uitzoek Private Nature Reserve	90 Km Northwest
Diana Ranch Private Nature Reserve	89 Km Northwest
Mabusa Nature Reserve	89 Km Northwest
Nederwelt Private Nature Reserve	56 Km Northeast
Grootrietvley Private Nature Reserve	75 Km Northeast
Langkloof Private Nature Reserve	77 Km Northeast
Greater Lakenvlei Protected Environment	81 Km Northeast
Cecilia Private Nature Reserve	50 Km Northeast
Nooitgedacht Dam Nature Reserve	56 Km East
Paulina Van Niekerk Private Nature Reserve	80 Km East

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Rentia Kritzinger Private Nature Reserve	68 Km East
Chrissiesmeer Protected Environment	71 Km East
Ahlers Private Nature Reserve	70 Km Southeast
Rietvlei Private Nature Reserve	60 Km Southeast
Langcarel Private Nature Reserve	90 Km Southeast
Devon Protected Environment	75 Km West
Nicolaas Private Nature Reserve	90 Km West
Voortrekker Private Nature Reserve	95 Km West

3.1.4 Important Bird Areas

Important Bird and Biodiversity Areas (IBAs) are defined by BirdLife International, as sites of global significance for bird conservation, identified nationally through multi-stakeholder processes using globally standardised, quantitative, and scientifically agreed criteria. These areas are seen as the most important sites for conserving and should be considered during avifaunal impact assessments. The closest known IBA is the Amersfoort–Bethal–Carolina District IBA (Figure 4). This specific IBA stretches throughout Mpumalanga province and covers an area of 343 320 ha. This specific IBA is classified as an unprotected site which correlates to no official protection under the National Environmental Management: Protected Areas Act (2003). However, the conservation response is not completely absent from unprotected IBAs with input from civil society groups, a degree of monitoring, research and conservation action still taking place at sites of biological significance. Species found within this IBA that are of conservational concern is the globally threatened Botha's Lark, with 10% of the global population suspected to be present within this area. Other globally threatened species are Blue Crane, Southern Bald Ibis, Black Harrier, Blue Korhaan, Black-winged Pratincole, Secretarybird, Martial Eagle and Denham's Bustard. Regionally threatened species are African Grass Owl, Whitebellied Korhaan and Lanner Falcon. Restricted-range and biome-restricted species are the previously mentioned Botha's Lark, Kurrichane Thrush and Buff-streaked Chat.

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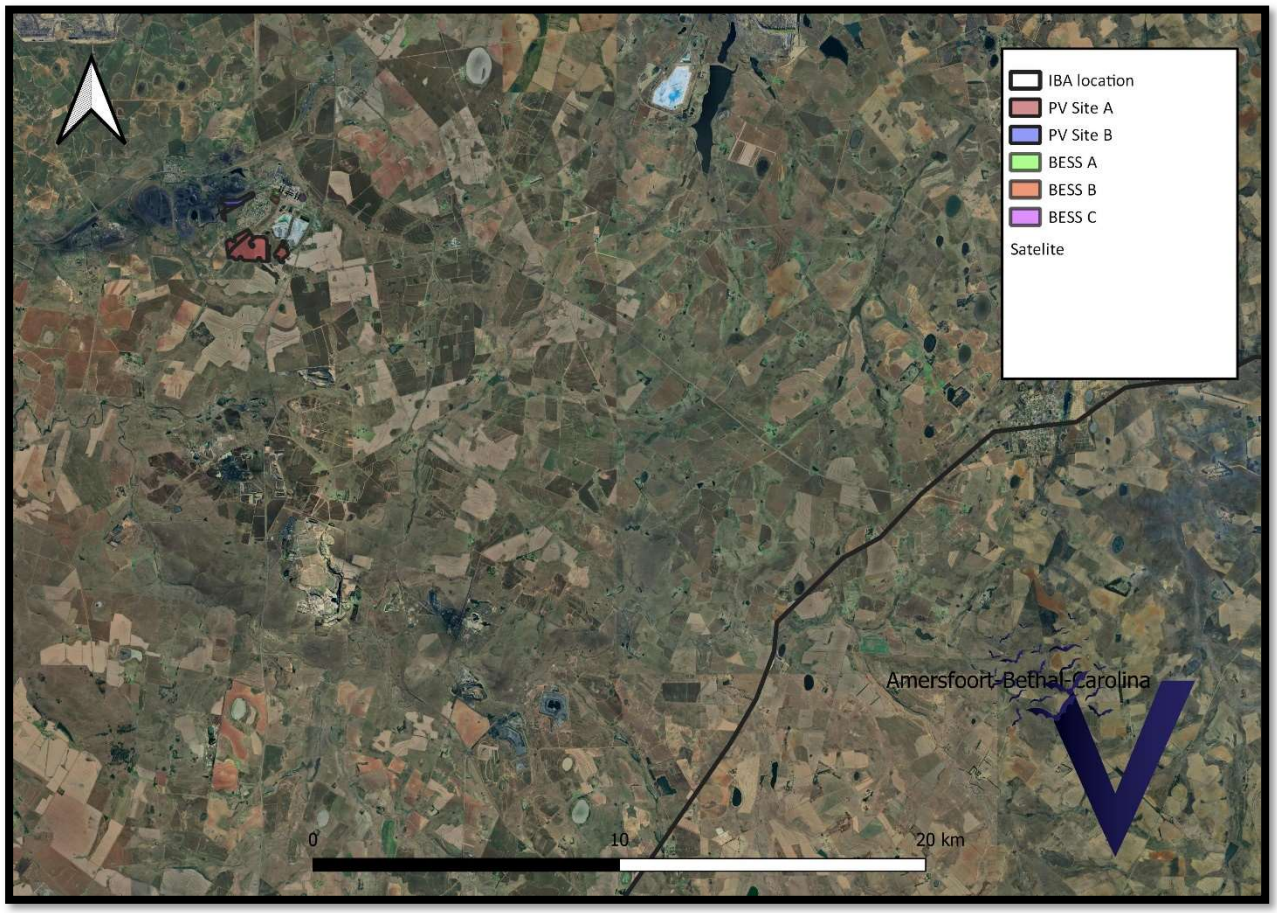

Figure 4. Important Bird Areas located near the Proposed Area of Influence

3.2. Observed Species

All species that were seen or heard during walked transects and ground-truthing across the development site were recorded. A total of 30 unique species were identified (Appendix 3). Of these species, two species of raptors were observed, namely Peregrine Falcon and Black-Winged Kite.

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3.2.1 Walked and Driven Transects

The most recorded species was Speckled Pigeon, with a total of 164 individuals across the transect, followed by Cape Sparrow (Table 4). Neither of these are considered a priority species. The Peregrine Falcon was seen hunting Speckled Pigeons during walked transects, while the Black-Winged Kite was detected during the driven transects.

Table 4. Species recorded during transect

Name	Latin Name	Number observed
Speckled Pigeon	*Columba guinea*	164
Cape Sparrow	*Passer melanurus*	36
Helmeted Guineafowl	*Numida meleagris*	29
Ring-necked Dove	*Streptopelia capicola*	28
Cape White-eye	*Zosterops virens*	25
House Sparrow	*Passer domesticus*	21
Cape Longclaw	*Macronyx capensis*	21
Dark-capped Bulbul	*Pycnonotus tricolor*	19
Common Myna	*Acridotheres tristis*	17
Hadada Ibis	*Bostrychia hagedash*	16
Common Waxbill	*Estrilda astrild*	16
African Stonechat	*Saxicola torquatus*	12
Rock Martin	*Ptyonoprogne fuligula*	11
Blacksmith Lapwing	*Vanellus armatus*	9
Western Cattle Egret	*Bubulcus ibis*	8
Southern Fiscal	*Lanius collaris*	7
Red-knobbed Coot	*Fulica cristata*	7
Glossy Ibis	*Plegadis falcinellus*	7
Black-headed Heron	*Ardea melanocephala*	6
Cape Wagtail	*Motacilla capensis*	5
Speckled Mousebird	*Colius striatus*	5
Crowned Lapwing	*Vanellus coronatus*	4
Red-winged Starling	*Onychognathus morio*	4
Southern Masked Weaver	*Ploceus velatus*	3

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African Pipit	*Anthus cinnamomeus*	3
Grey Heron	*Ardea cinerea*	2
Ant-eating Chat	*Myrmecocichla formicivora*	2
Peregrine Falcon	*Falco peregrinus*	1
Black-winged Kite	*Elanus caeruleus*	1

3.3 Sensitive Bird Areas

The habitat that the PAOI will be located on is relatively homogenous consisting largely of old transformed and developed. No areas of avifaunal sensitivity were located on the development area, or immediate surrounds.

4. Potential Impacts

Outlined below are the potential impacts and associated risk factors that may be generated by the proposed development.

According to Birdlife South Africa's Best Practice Guidelines on Birds and Solar Energy, the associated concerns with PV facilities are summarized below:

- Displacement of species of conservation concern.
- Loss of habitat and disturbance during construction and operational phases.
- Collision with solar panels and power line infrastructure.

The proposed Komati SEF development will cover an area of approximately 140 ha, located within the Eastern Highveld Grassland vegetation type. This habitat represents the vegetation type of the surrounding area, whilst the development area itself is transformed, with large sections of developed areas and agriculture present. Of the 29 species of concern that have been reported in the broader area, only two were recorded during the site visit, both Peregrine Falcon and Black-Winged Kite being of least concern. The development is unlikely to have a significant impact on these species, but direct habitat loss and displacement will likely affect common local bird assemblages.

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4.1 Identification of potential impacts

Potential impacts on avifauna associated with the proposed development are outlined in more detail below:

Habitat loss, displacement, and disturbance of avifauna

As a result of direct habitat loss to accommodate the construction of the solar energy facility, avifauna of all sizes will be affected to varying degrees. Smaller passerines will be highly susceptible to these changes, losing potential feeding, roosting, and breeding habitat. These habitat loss impacts are permanent in nature, whilst disturbances may be limited to the construction and operational phases, after which some species will begin to reutilize suitable parts of the development site again. Larger raptors and terrestrial species with larger home ranges and a tendency to show higher sensitivity to disturbances might be less likely and/or slower to return to the development area.

Collison risk and electrocutions with powerlines and infrastructure

Due to their size, small passerines carry less risk regarding collisions with overhead lines and the risks of electrocutions on power line infrastructure. Larger species of raptor and terrestrial birds are thus at a higher risk, and large raptors are prone to electrocution due to their tendency to roost, rest, and hunt from power lines and power line structures. This is of concern as many of these species are red-listed and are also prone to impacts from habitat loss and disturbance and can thus be severely affected by solar developments across all their accompanying impacts.

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5. Assessment of Impacts

Impact assessments for the Komati SEF planning, construction and operational phases are outlined below:

5.1 Komati Solar Energy Development

5.1.1 Planning & Construction Phase

Impact Type	Direct Avifaunal Impacts During Construction – habitat loss & disturbance							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Local	Short-term	Medium	High	High	Medium-Low & Negative	Low & Negative	High

Mitigation & Management Actions

- Limit destruction of habitat during construction phase strictly to the development footprint
- All building waste produced during construction should be removed and disposed of at an official waste management facility.
- Any liquid or chemical spills should be dealt with immediately to avoid contamination of the environment on site.
- No construction should take place near to any active raptor or priority species nests should these be located prior to the implementation of the construction phase. Nesting should be allowed to run until completion and until chicks have successfully fledged before disturbance in the area recommences.
- Where trenches or holes are required to be dug, these are to be filled shortly afterwards. These open holes serve as potential pit-fall traps for fledgling birds and should not be left open for extended periods of time.
- Nesting sites and/or sensitive microhabitats should be avoided where possible, especially during the peak summer breeding seasons.
- An environmental induction prior to construction for all staff and contractors to explain that no animals are to be harmed or hunted, and that all necessary process to limit littering, chemical pollution, fires are implemented on site.
- Low speed limits should be adhered to on site, to avoid collisions with avifauna, especially nocturnal species (e.g. owls, nightjars, and thick-knees) that actively hunt and inhabit the roads after dark.

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5.1.2 Operational Phase

Impact Type	Direct Avifaunal Impacts During Operation – disturbance and collision risk							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Local	Long-term	Medium-Low	Moderate	High	Medium-Low & Negative	Low & Negative	High

Mitigation & Management Actions

- If raptor or other bird species are found on any power line infrastructure, these should be left undisturbed until nesting and fledging of the chicks has taken place. If any nests are deemed to be of risk to the safety of the power line, nests of non-priory species should be removed before/after breeding has taken place. If the nest is of a priority species, an avifaunal specialist should be contacted to best advise on how to move forward with the best interests of the priority species in mind.
- Monthly monitoring is recommended post construction, especially for the first year, to note any high-risk areas, whether on the power lines themselves or associated infrastructure. Regular carcass searches will help pin-point high risk areas, and mitigation measures such as bird flappers can be installed in these zones to mitigate further injuries and death to local avifauna.

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5.2 Collective Impacts

Collective impacts that are likely to occur due to the construction of the Komati Solar Energy development, and other developments that may arise in the general area and their effect on local avifauna.

Impact Type	Broad-scale avifaunal impacts							
	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance & Status		Confidence Level
						No Mitigation	With Mitigation	
Komati	Localized	Long-term	Low	Medium	Low	Low & Negative	Low & Negative	Medium-High

Mitigation & Management Actions

- Minimize the development area as much as possible, focusing on areas of transformed habitat and low avifaunal sensitivity.
- The developed areas should be cleared of any debris (e.g., building rubble) that may attract prey items and thus raptors (especially owls), that may increase the risk of collisions with power lines and associated structures.
- All perimeter fencing should allow for small fauna and terrestrial avifauna (e.g. francolin, spurfowl, buttonquails, thick-knees, korhaans, and bustards) to pass through unrestricted. Only the developed sites should be fenced off, limiting the fencing of as much undeveloped and natural habitats as possible. Double layered fences, which can trap fauna should not be used, and electric strands should be located internally if necessary, and not on the external sides of the fence which can pose as a risk to fauna.

6. Conclusion and Recommendations

The current Komati SEF development would contribute to approximately 140 ha of habitat loss in an already transformed area, with LOW avifaunal significance, and thus supports the sensitivity rating of the Screening Tool. The vegetation present on the development site yielded few species of concern, and at low abundance. No nesting sites or roost sites of red-listed species were located on site. No significant seasonal variation in species assemblages and movements across the development site are likely to occur, less so for probable species of concern, thus the overall impact of the development on avifauna is considered to be LOW.

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The impacts expected by the development of the Komati SEF will comprise of habitat destruction and the displacement, and disturbance of local bird assemblages, as well as the direct mortalities of avifauna which are likely to arise from electrocution from power line infrastructure, and expected collisions with solar panels, overhead power lines and any associated infrastructure. The displacement, habitat destruction and disturbance of avifauna, however, is likely to be restricted to the development site itself. Small passerines are most likely to be affected by the construction of the development site, however, none of which were recorded on site, are red-list species. Impacts on larger non-passerines might occur, but none of which were recorded on site and likely occur uncommonly in the area.

To further reduce risk on avifauna, mitigation measures during both the construction and post-construction phases can be executed. These mitigation measures include restricting habitat loss and limiting disturbance to the footprint of the development area itself, whilst bird flappers can be successfully used to reduce collisions with overhead powerlines and associated infrastructure, especially in areas of high-risk areas which will become apparent during the monitoring phase. With these mitigation measures in place, impact on avifauna by the development of this site will be further reduced, maintaining a low risk, and thus no fatal flaws are assigned to the development of this site with respect to avifauna.

Impact Statement

The proposed development footprint of Komati SEF is considered suitable for development. No avifaunal impacts associated with the Komati SEF that cannot be mitigated to an adequate level were detected. Based on our findings and the area of development provided for this assessment, the Komati SEF should be allowed to proceed into the EIA phase from an avifaunal viewpoint.

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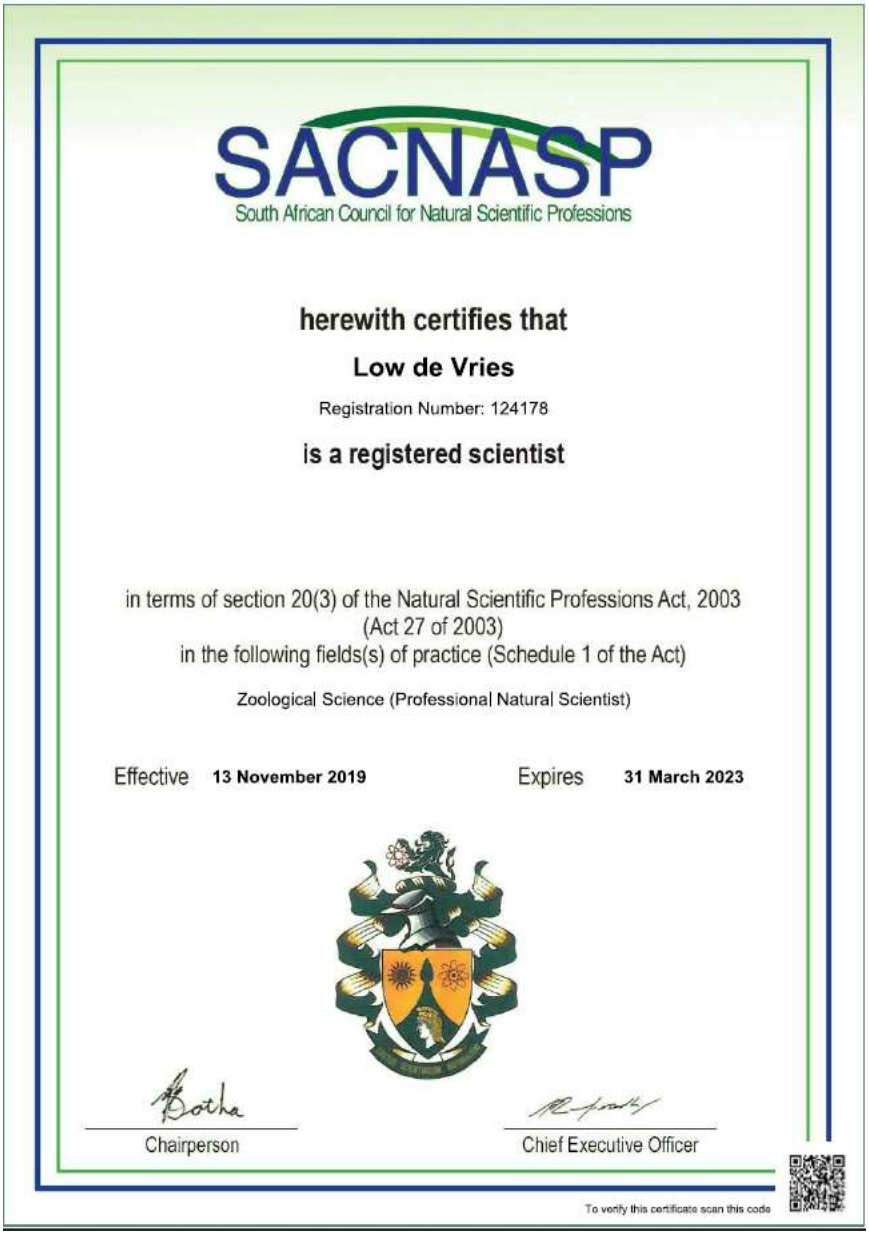
Appendix 1. Qualification of specialist



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Low de Vries

Registration Number: 124178

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Zoological Science (Professional Natural Scientist)

Effective **13 November 2019** Expires **31 March 2023**

Botha
Chairperson

Chief Executive Officer

To verify this certificate scan this code

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Appendix 2: Potential species present

Table 5: List of potential species that could be present at the Project Area of Influence with Priority Species in Bold

Common name	Scientific name
Ducks, Geese, Swans (Anatidae)	
White-faced Whistling Duck	*Dendrocygna viduata*
Fulvous Whistling Duck	*Dendrocygna bicolor*
White-backed Duck	*Thalassornis leuconotus*
Spur-winged Goose	*Plectropterus gambensis*
Knob-billed Duck	*Sarkidiornis melanotos*
Egyptian Goose	*Alopochen aegyptiaca*
South African Shelduck	*Tadorna cana*
Cape Shoveler	*Spatula smithii*
African Black Duck	*Anas sparsa*
Cape Teal	*Anas capensis*
Red-billed Teal	*Anas erythrorhyncha*
Southern Pochard	*Netta erythrophthalma*
Maccoa Duck	*Oxyura maccoa*
Guineafowl (Numididae)	
Helmeted Guineafowl	*Numida meleagris*
Pheasants & Allies (Phasianidae)	
Red-winged Francolin	*Scleroptila levaillantii*
Grey-winged Francolin	***Scleroptila afra***
Orange River Francolin	*Scleroptila gutturalis*
Common Quail	*Coturnix coturnix*
Swainson's Spurfowl	*Pternistis swainsonii*
Swifts (Apodidae)	
African Palm Swift	*Cypsiurus parvus*
African Black Swift	*Apus barbatus*
Little Swift	*Apus affinis*
Horus Swift	*Apus horus*
White-rumped Swift	*Apus caffer*

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Bustards (Otididae)	
Denham's Bustard	***Neotis denhami***
Blue Korhaan	***Eupodotis caerulescens***
Northern Black Korhaan	***Afrotis afraoides***
Cuckoos (Cuculidae)	
Diederik Cuckoo	*Chrysococcyx caprius*
Pigeons, Doves (Columbidae)	
Rock Dove	*Columba livia*
Speckled Pigeon	*Columba guinea*
Red-eyed Dove	*Streptopelia semitorquata*
Ring-necked Dove	*Streptopelia capicola*
Laughing Dove	*Spilopelia senegalensis*
Namaqua Dove	*Oena capensis*
Rails, Crakes & Coots (Rallidae)	
African Rail	*Rallus caerulescens*
Common Moorhen	*Gallinula chloropus*
Red-knobbed Coot	*Fulica cristata*
African Swamphen	*Porphyrio madagascariensis*
Black Crake	*Zapornia flavirostra*
Cranes (Gruidae)	
Grey Crowned Crane	***Balearica regulorum***
Grebes (Podicipedidae)	
Little Grebe	*Tachybaptus ruficollis*
Great Crested Grebe	*Podiceps cristatus*
Black-necked Grebe	*Podiceps nigricollis*
Buttonquail (Turnicidae)	
Common Buttonquail	*Turnix sylvaticus*
Stone-curlews, Thick-knees (Burhinidae)	
Spotted Thick-knee	*Burhinus capensis*
Stilts, Avocets (Recurvirostridae)	
Black-winged Stilt	*Himantopus himantopus*

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Pied Avocet	*Recurvirostra avosetta*
Plovers (Charadriidae)	
Blacksmith Lapwing	*Vanellus armatus*
Crowned Lapwing	*Vanellus coronatus*
African Wattled Lapwing	*Vanellus senegallus*
Common Ringed Plover	*Charadrius hiaticula*
Kittlitz's Plover	*Charadrius pecuarius*
Three-banded Plover	*Charadrius tricollaris*
Jacanas (Jacanidae)	
African Jacana	*Actophilornis africanus*
Sandpipers, Snipes (Scolopacidae)	
Ruff	*Calidris pugnax*
Curlew Sandpiper	*Calidris ferruginea*
Little Stint	*Calidris minuta*
African Snipe	*Gallinago nigripennis*
Common Sandpiper	*Actitis hypoleucos*
Marsh Sandpiper	*Tringa stagnatilis*
Wood Sandpiper	*Tringa glareola*
Common Greenshank	*Tringa nebularia*
Coursers, Pratincoles (Glareolidae)	
Black-winged Pratincole	***Glareola nordmanni***
Gulls, Terns, Skimmers (Laridae)	
Grey-headed Gull	*Chroicocephalus cirrocephalus*
Whiskered Tern	*Chlidonias hybrida*
Storks (Ciconiidae)	
White Stork	***Ciconia ciconia***
Saddle-billed Stork	***Ephippiorhynchus senegalensis***
Anhingas, Darters (Anhingidae)	
African Darter	*Anhinga rufa*
Cormorants, Shags (Phalacrocoracidae)	
Reed Cormorant	*Microcarbo africanus*

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White-breasted Cormorant	*Phalacrocorax lucidus*
Ibises, Spoonbills (Threskiornithidae)	
African Sacred Ibis	*Threskiornis aethiopicus*
Southern Bald Ibis	***Geronticus calvus***
Hadada Ibis	*Bostrychia hagedash*
Glossy Ibis	*Plegadis falcinellus*
African Spoonbill	*Platalea alba*
Herons, Bitterns (Ardeidae)	
Little Bittern	*Ixobrychus minutus*
Black-crowned Night Heron	*Nycticorax nycticorax*
Squacco Heron	*Ardeola ralloides*
Western Cattle Egret	*Bubulcus ibis*
Grey Heron	*Ardea cinerea*
Black-headed Heron	*Ardea melanocephala*
Goliath Heron	*Ardea goliath*
Purple Heron	*Ardea purpurea*
Great Egret	*Ardea alba*
Intermediate Egret	*Ardea intermedia*
Black Heron	*Egretta ardesiaca*
Little Egret	*Egretta garzetta*
Hamerkop (Scopidae)	
Hamerkop	*Scopus umbretta*
Secretarybird (Sagittariidae)	
Secretarybird	***Sagittarius serpentarius***
Kites, Hawks, Eagles (Accipitridae)	
Black-winged Kite	***Elanus caeruleus***
African Harrier-Hawk	***Polyboroides typus***
Black-chested Snake Eagle	***Circaetus pectoralis***
Martial Eagle	***Polemaetus bellicosus***
Long-crested Eagle	***Lophaetus occipitalis***
Black Sparrowhawk	***Accipiter melanoleucus***
Montagu's Harrier	***Circus pygargus***
Yellow-billed Kite	***Milvus aegyptius***
African Fish Eagle	***Haliaeetus vocifer***
Common Buzzard	***Buteo buteo***

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Jackal Buzzard	***Buteo rufofuscus***
Barn Owls (Tytonidae)	
Western Barn Owl	*Tyto alba*
African Grass Owl	***Tyto capensis***
Owls (Strigidae)	
Marsh Owl	***Asio capensis***
Spotted Eagle-Owl	***Bubo africanus***
Mousebirds (Coliidae)	
Speckled Mousebird	*Colius striatus*
Hoopoes (Upupidae)	
African Hoopoe	*Upupa africana*
Wood Hoopoes (Phoeniculidae)	
Green Wood Hoopoe	*Phoeniculus purpureus*
Kingfishers (Alcedinidae)	
Malachite Kingfisher	*Corythornis cristatus*
Giant Kingfisher	*Megaceryle maxima*
Pied Kingfisher	*Ceryle rudis*
Bee-eaters (Meropidae)	
European Bee-eater	*Merops apiaster*
African Barbets (Lybiidae)	
Black-collared Barbet	*Lybius torquatus*
Crested Barbet	*Trachyphonus vaillantii*
Woodpeckers (Picidae)	
Red-throated Wryneck	*Jynx ruficollis*
Ground Woodpecker	*Geocolaptes olivaceus*
Caracaras, Falcons (Falconidae)	
Rock Kestrel	***Falco rupicolus***
Greater Kestrel	***Falco rupicoloides***
Amur Falcon	***Falco amurensis***

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Pr. Sci. Nat. Zoological Science

Lanner Falcon	*Falco biarmicus*
Shrikes (Laniidae)	
Red-backed Shrike	*Lanius collurio*
Southern Fiscal	*Lanius collaris*
Crows, Jays (Corvidae)	
Pied Crow	*Corvus albus*
Larks (Alaudidae)	
Spike-heeled Lark	*Chersomanes albofasciata*
Sabota Lark	*Calendulauda sabota*
Eastern Clapper Lark	*Mirafra fasciolata*
Rufous-naped Lark	*Mirafra africana*
Melodious Lark	***Mirafra cheniana***
Pink-billed Lark	*Spizocorys conirostris*
Red-capped Lark	*Calandrella cinerea*
Bulbuls (Pycnonotidae)	
Dark-capped Bulbul	*Pycnonotus tricolor*
Swallows, Martins (Hirundinidae)	
Banded Martin	*Neophedina cincta*
Sand Martin	*Riparia riparia*
Brown-throated Martin	*Riparia paludicola*
Rock Martin	*Ptyonoprogne fuligula*
White-throated Swallow	*Hirundo albigularis*
Barn Swallow	*Hirundo rustica*
Common House Martin	*Delichon urbicum*
Lesser Striped Swallow	*Cecropis abyssinica*
Greater Striped Swallow	*Cecropis cucullata*
South African Cliff Swallow	*Petrochelidon spilodera*
Crombecs, African Warblers (Macrosphenidae)	
Cape Grassbird	*Sphenoeacus afer*
Leaf Warblers (Phylloscopidae)	
Willow Warbler	*Phylloscopus trochilus*

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Reed Warblers & Allies (Acrocephalidae)	
Lesser Swamp Warbler	*Acrocephalus gracilirostris*
Great Reed Warbler	*Acrocephalus arundinaceus*
Sedge Warbler	*Acrocephalus schoenobaenus*
Common Reed Warbler	*Acrocephalus scirpaceus*
Marsh Warbler	*Acrocephalus palustris*
Grassbirds & Allies (Locustellidae)	
Little Rush Warbler	*Bradypterus baboecala*
Cisticolas & Allies (Cisticolidae)	
Wailing Cisticola	*Cisticola lais*
Levaillant's Cisticola	*Cisticola tinniens*
Neddicky	*Cisticola fulvicapilla*
Zitting Cisticola	*Cisticola juncidis*
Desert Cisticola	*Cisticola aridulus*
Cloud Cisticola	*Cisticola textrix*
Pale-crowned Cisticola	*Cisticola cinnamomeus*
Wing-snapping Cisticola	*Cisticola ayresii*
Tawny-flanked Prinia	*Prinia subflava*
Black-chested Prinia	*Prinia flavicans*
Bar-throated Apalis	*Apalis thoracica*
White-eyes (Zosteropidae)	
Cape White-eye	*Zosterops virens*
Starlings, Rhabdornises (Sturnidae)	
Common Myna	*Acridotheres tristis*
Wattled Starling	*Creatophora cinerea*
Cape Starling	*Lamprotornis nitens*
Pied Starling	*Lamprotornis bicolor*
Red-winged Starling	*Onychognathus morio*
Thrushes (Turdidae)	
Groundscraper Thrush	*Turdus litsitsirupa*
Karoo Thrush	*Turdus smithi*
Chats, Old World Flycatchers (Muscicapidae)	
Spotted Flycatcher	*Muscicapa striata*
Cape Robin-Chat	*Cossypha caffra*

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African Stonechat	*Saxicola torquatus*
Ant-eating Chat	*Myrmecocichla formicivora*
Mountain Wheatear	*Myrmecocichla monticola*
Capped Wheatear	*Oenanthe pileata*
Familiar Chat	*Oenanthe familiaris*
Sunbirds (Nectariniidae)	
Amethyst Sunbird	*Chalcomitra amethystina*
Malachite Sunbird	*Nectarinia famosa*
Greater Double-collared Sunbird	*Cinnyris afer*
Old World Sparrows, Snowfinches (Passeridae)	
Cape Sparrow	*Passer melanurus*
Southern Grey-headed Sparrow	*Passer diffusus*
House Sparrow	*Passer domesticus*
Weavers, Widowbirds (Ploceidae)	
Cape Weaver	*Ploceus capensis*
Southern Masked Weaver	*Ploceus velatus*
Village Weaver	*Ploceus cucullatus*
Red-billed Quelea	*Quelea quelea*
Yellow-crowned Bishop	*Euplectes afer*
Southern Red Bishop	*Euplectes orix*
Yellow Bishop	*Euplectes capensis*
Fan-tailed Widowbird	*Euplectes axillaris*
White-winged Widowbird	*Euplectes albonotatus*
Red-collared Widowbird	*Euplectes ardens*
Long-tailed Widowbird	*Euplectes progne*
Waxbills, Munias & Allies (Estrildidae)	
Common Waxbill	*Estrilda astrild*
Quailfinch	*Ortygospiza atricollis*
Red-headed Finch	*Amadina erythrocephala*
Orange-breasted Waxbill	*Amandava subflava*
Indigobirds, Whydahs (Viduidae)	
Pin-tailed Whydah	*Vidua macroura*
Wagtails, Pipits (Motacillidae)	
Cape Wagtail	*Motacilla capensis*

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Cape Longclaw	*Macronyx capensis*
African Pipit	*Anthus cinnamomeus*
Nicholson's Pipit	*Anthus nicholsoni*
Plain-backed Pipit	*Anthus leucophrys*
Finches, Euphonias (Fringillidae)	
Black-throated Canary	*Crithagra atrogularis*
Yellow-fronted Canary	*Crithagra mozambica*
Yellow Canary	*Crithagra flaviventris*
Cape Canary	*Serinus canicollis*
Species: 205	
IOC World Bird List 13.1 (January 2023)	

Appendix 4. CV of Specialist

Personal details

Full Name	John Low de Vries
DOB	7 November 1984
Nationality	South African
Marital Status	Married
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ID number	841107 5188087

Education

Completed	Degree and Institution
2002	Matric, Hoërskool Jeugland, Kempton Park, South Africa
2006	B. Sc Zoology, University of Pretoria, Pretoria, South Africa
2007	B. Sc (Hons) Zoology, University of Pretoria, Pretoria, South Africa
2014	PhD Zoology, University of Pretoria, Pretoria, South Africa

Key areas of expertise

- Bat Specialist — Conducting surveys on bat diversity and abundance and researh on bat ecology.
- Environmental Assessment Practitioner — Writing and collating Basic Assessment (BA) for proposed Wind Energy Facilities

Memberships & Certificates

- SACNASP Registered Professional Natural Scientist in the field of Zoological Science - Registration Number: 124178
- Bat Assessment Specialist with South African Bat Assessment Association (SABAA)

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Other Training

- Multivariate statistical modelling (Cape Town, South Africa)
- Bat handling and identification course (AfricanBats)
- Snake handling (Chameleon Village (South Africa)
- ArcGis online course
- First Aid level 2 (Johannesburg, South Africa)

Publications

Wood, M., **de Vries, JL**., Monadjem, A., Markotter, W. A critical review of factors influencing interspecific variation in home range size of bats. Mammal Review. *In submission*

Markotter W, **de Vries, J.L,** Paweska, J. 2022. Wing tattoos: A cost-effective and permanent method for marking bats. *In review*

Geldenhuys, M., **de Vries, JL.,** Dietrich, M., Mortlock, M., Epstein, J. H., Weyer, J., Paweska, J T., Markotter, W. Longitudinal surveillance of diverse coronaviruses within a *Rousettus aegyptiacus* maternal colony towards understanding viral maintenance and excretion dynamics. *In submission*

Markotter, W., Coertse, J., **de Vries, JL.**, Geldenhuys, M., Mortlock, M. 2020. Bat-borne viruses in Africa: A critical review. Journal of Zoology. 311:2. 77-98

de Vries JL, Marneweck D, Dalerum F, Page-Nicholson S, Mills MGL, Yarnell RW, Sliwa A, Do Linh San E. 2016. A conservation assessment of *Proteles cristata*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland, and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Dalerum F, Le Roux A, **de Vries JL**, Kamler JF, Page-Nicholson S, Stuart C, Stuart M, Wilson B, Do Linh San E. 2016. A conservation assessment of *Otocyon megalotis*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The

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Red List of Mammals of South Africa, Swaziland, and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Dalerum, F., **de Vries, J.L.,** Pirk, C.W.W., Cameron, E.Z. 2016. Spatial and temporal dimensions to the taxonomic diversity of arthropods in an arid grassland savannah. *Journal of Arid Environments*. 144. 21-30

Kotze, R., Bennett, N., Cameron, E.Z., **de Vries, J.L.**, Marneweck, D.G., Pirk, C.W.W., Dalerum, F. 2012. Temporal patterns of den use suggest polygamous mating patterns in an obligate monogamous mammal. *Animal Behaviour*. 84. 1573-1578

de Vries, J.L., Pirk, C.W.W., Bateman, P.W., Cameron, E.Z., Dalerum, F. 2011. Extension of the diet of an extreme foraging specialist, the aardwolf (*Proteles cristata*). *African Zoology*. 6:1 194-196.

de Vries, J. L., Oosthuizen, M. K., Sichilima, A. M., Bennett, N. C. 2008. Circadian rhythms of locomotor activity in Ansell's mole-rat: are mole-rat's clocks ticking? *Journal of Zoology*.
276:4. 343-349

Conference Contributions

Markotter W, **de Vries, J.L,** Wood, M. 2022. Small scale movement of *Rousettus aegyptiacus*. International Bat Research Conference. Austin, Texas

Infectious Diseases of Bats Symposium. Fort Collins, Colorado 2017. Body mass index of the Egyptian fruit bat, *Rousettus aegyptiacus*: An indicator of infection status. **de Vries, J.L.**, Dietrich, M., Paweska, J., Markotter, W.

SASAS 2016. **de Vries, J.L.,** Jonker, M.L., Kriel, D., Kotze, A.K. The Tankwa goat: Phenotypically that different?

De Beers Diamond Route Conference, 2010. **de Vries, J.L.,** Pirk, C.W.W., Bennett, N.C. Is the aardwolf a seasonally influenced optimal forager?

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Kimberley biodiversity research symposium, 2009. **de Vries, J.L.,** Bennett, N.C., Pirk, C.W.W., Dalerum, F., Cameron, E.Z. Den, and home range use of the aardwolf, *Proteles cristatus*

Employment & work-related experiences

2020 - present	Director and founder of Volant Environmental
2016 - present	Postdoctoral fellow, University of Pretoria
2015 - 2016	Postdoctoral fellow, NZG
2014 - 2015	Marion Island field assistant, University of Pretoria
2013	Documentary presenter, Oxford Scientific Films
2010 - 2011	Wildlife Education Trainer, Enviro- Insight
2010 - 2011	Game Raning Lecturer, Damelin Centurion
2009 - 2018	Lecturer and tutor, University of Pretoria

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Recent Project Experience

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Time span	Nature of project	Capacity	Industry / Sector	Client / Developer	Country (Province)
2022	Thand Tau Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Free State)
2022	Camden Bird Impact Assessment	Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Castle Wind Energy walkthrough	Bat Specialist	Renewable Energy / Onshore Wind	Savannah Environmental	South Africa (Northern Cape)
2022	Doringbaai Wind Energy Facility	Bat Specialist	Renewable Energy / Onshore Wind	WKN-Windcurrent	South Africa (Western Cape)
2022	Aggeneys Bat Impact Assessment Review	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2021	Dordrecht Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Indwe Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Waschbank Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Gorachouqua Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021	Khoemana Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021-2022	Dalmanutha Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Mpumalanga)
2020-2021	Bergrivier Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Western Cape)
2020-2021	Botterblom Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy	South Africa (Northern Cape)

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				Developments (Pty) Ltd	
2012	Dangerous snake removal	Herpetologist	Mining (Coal)	Anadarko	Mocimboa da Paia, Mozambique

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