AVIFAUNA STUDY: PROPOSSED CONSTRUCTION OF THE BUROTHO-SILIMELA POWERLINE, LIMPOPO PROVINCE, SOUTH AFRICA

Prepared for: NTC Group

Prepared by: EcoSolve Consulting & MORA Ecological Services (Pty) Ltd

26 Earlston Street Centurion, 0157

Contact person: Mokgatla Molepo

Cell: (081) 410 3763

E-mail: mokgatlajm@gmail.com

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DOCUMENT CONTROL

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Physical address	26 Earlston Street Centurion 0157
Primary author	Mokgatla Molepo (MSc. Zoology) *Pr. Nat. Sci*. (009509) 
Contact details	Email:mokgatlajm@gmail.com Contact: (081) 410 3763

EXECUTIVE SUMMARY

Project background

The “applicant” is proposing the construction of a 400kV powerline that is approximately 150 kilometers in length. The proposed powerline is herein referred to as the Burotho-Silimela Powerline. Powerline developments in South Africa is essential for power transmission services. The use of powerlines is to connect power stations and substations in transmitting large amounts of electric power at a very high voltage without loss. Powerlines, therefore, play a very crucial role in providing electricity. The proposed development falls on three Local Municipalities, namely, Ephraim Mogale, Modimolle-Mookgophong and Mogalakwena. Within the Limpopo Province of South Africa, the aforementioned local municipalities are within the Sekhukhune and Waterberg District Municipalities. The geographic coordinates of the northern region of the approved corridor are 23°52'34.76"S (latitude) and 28°55'40.55"E (longitude). The geographic coordinates of the southern region are 25° 5'22.72"S (latitude) and 29°17'48.23"E (longitude).

No no-go area for proposed development footprint was delineated and is applicable to the project site from an avifaunal perspective. Should the proposed construction not proceed, due to other specialist studies, the site will remain unchanged.

Avifaunal community

Based on field surveys, the proposed development site had an unstable abundance of species. Most species were generally observed in moderate numbers. There were, however, outlier species occurring in large numbers as well. Species diversity of the area was, therefore, moderate at the time of the assessments. The avifaunal community is mainly represented by drongos, doves, kites, starlings, swallows and weavers.

Impacts and mitigations for the transmission line

Loss of priority avian species from important habitats

Scored a Negative medium impact but can be reduced to Negative low impact with effective implementation and ongoing monitoring of required mitigations as specified.

Loss of resident avifauna through increased disturbance

Scored a Negative medium impact but can be reduced to Negative low impact with effective implementation and ongoing monitoring of required mitigations as specified.

Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats

Scored a Negative medium impact but can be reduced to Negative low impact with effective implementation and ongoing monitoring of required mitigations as specified.

Collisions with powerline infrastructure and electrocution risks leading to injury or loss of avian life which decreases avifauna species diversity.

Scored a Negative high impact but can be reduced to Negative medium impact with effective implementation and ongoing monitoring of required mitigations as specified.

Cumulative impacts of the above.

The cumulative and residual impacts should be prioritised. With the effective implementation and ongoing monitoring of required mitigations as specified, all potential impacts for the proposed powerline facility will remain on a Negative low impact rating. However, there exists an exception of cumulative impacts of powerline collisions and electrocution risks for birds when flying. The effective implementation and ongoing monitoring of required mitigations as suggested in the report will only reduce the impact scoring to a Negative medium impact. This is because collisions and electrocution risks are residual impacts and cannot be fully mitigated.

Impact statement

Despite some residual and cumulative impacts, there is no objection to the proposed powerline facility and associated infrastructure development from an avifaunal perspective. The overall impact of the project on avifauna can be effectively mitigated, should the controls prescribed in this report be adequately followed, with sufficient monitoring of mitigation effectiveness.

From the survey conducted, it is recommended that the proposed powerline be considered, provided that the recommendations and mitigations addressed in this study are adhered to.

SPECIALIST INFORMATION AND LEGAL REQUIREMENTS

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations 2014 (as amended) Requirements for Specialist Reports (Appendix 6):

The details of -	
○ the specialist who prepared the report; and	Page 64
○ the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 64
A declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 8
An indication of the scope of, and the purpose for which, the report was prepared;	
○ An indication of the quality and age of base data used for the specialist report;	Page 29-48
○ A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Page 50
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 29-30
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Page 29-30
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;	Page 41 & 50
An identification of any areas to be avoided, including buffers;	Page 60
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;	Page 22,51-52
A description of any assumptions made and any uncertainties or gaps in knowledge;	Page 16
A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Page 53-59
Any mitigation measures for inclusion in the EMPr;	Page 59-61
Any conditions for inclusion in the environmental authorisation;	
Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Page 60-61
A reasoned opinion-	
○ whether the proposed activity, activities or portions thereof should be authorised;	Page 60-61
○ regarding the acceptability of the proposed activity or activities; and	Page 60-61
○ 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;	Page 60-61

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DECLARATION BY THE SPECIALIST

I, Mokgatla Jerry Molepo, declare that:

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

Signature of the Specialist

MORA Ecological Services (Pty) Ltd

Name of Company

20/04/2024

Date

INTRODUCTION

Proposed Development

Eskom Holdings SOC Limited (herein referred to as Eskom) has appointed NTC Environmental (Pty) Ltd as an independent Environmental Assessment Practitioner (EAP) to undertake a Basic Assessment (BA) Process for the proposed construction of the Borutho-Silimela 400kV powerline and its associated infrastructure. The length of the powerline is approximately 150km. The proposed power line is located between the Borutho Substation on farm Gillimberg 861 in Mokopane and runs south to the Silimela Substation on farm Loskop Noord 12, near Marble Hall within the Lepelle-Nkumpi, Mogalakwena, Modimolle-Mookgophong and Ephriam Mogale Local Municipalities, Limpopo Province.

The proposed project will trigger some listed activities in terms of the EIA Regulations as promulgated under the National Environmental Management Act (NEMA), Act 107 of 1998, under Regulations R982 to R985 of 2014 as amended in 2017, respectively.

MORA Ecological Services (Pty) Ltd was requested by the appointed EAP, NTC Environmental (Pty) Ltd to conduct an avifaunal specialist study towards their pursuit of obtaining powerline construction rights by means of transforming land. Specialist studies are essential for obtaining the requisite environmental authorisations for the proposed project.

SITE DESCRIPTION

The proposed development is located in the Limpopo Province of South Africa as shown in Figure 1 below. Limpopo is the northernmost province of South Africa. Based on Figure 1, the extent of the authorized corridor runs on the N11 national route and the R518 and R519 highway. Within the Limpopo Province, the proposed development footprint falls on three Local Municipalities, namely, Ephraim Mogale, Modimolle-Mookgophong and Mogalakwena. Within the Limpopo Province of South Africa, the aforementioned local municipalities are within the Sekhukhune and Waterberg District Municipalities. The geographic coordinates of the northern region of the approved corridor are 23°52'34.76"S (latitude) and 28°55'40.55"E (longitude). The geographic coordinates of the southern region are 25° 5'22.72"S (latitude) and 29°17'48.23"E (longitude).

The construction of the power line will aid Eskom in strengthening the power supply with the following scope:

- Extend Borutho Substation to accommodate 1 x 400kV feeder bay for Silimela Line 1
- Extend Silimela Substation to accommodate 1 x 400kV feeder bay for Borutho Line 1
- Build approximately 150km 400kV line from Borutho Substation to Silimela Substation, with associated extensions at the terminal substations.

The powerline corridor that was assessed is approximately 250m wide from start to end.

Borutho subtation falls under the Waterberg District Municipality, in the Limpopo Province, South Africa. It is ensconced between the towns of: Steenbokpan (i.e., a village town) located west of Lephalale (former Elisras – Medupi located approximately 17.9km west of the town), Marken (i.e., a village town), Mokopane in the south-east (i.e., approximately 31km from Borutho substation) and the town of Polokwane in the east (i.e., the capital town of Limpopo - Borutho is approximately 48km).

The proposed development falls within three Local Municipalities, namely, Ephraim Mogale, Modimolle-Mookgophong and Mogalakwena, Limpopo Province. The Local Municipalities fall within the jurisdiction of the Sekhukhune and Waterberg District Municipalities.
The geographic coordinates are as follows:

- Start: 23° 54’24.97 S; 28° 58’41.96 E;
- Middle 24° 31’21.81 S; 28° 57’45.01 E .
- End: 25° 05’13.31 S; 29° 17’57.47 E.

The powerline will transverse the following properties:

▪ Portion 0 of Farm Ga Puka	▪ Portion 73 of Farm Piet Potgietersrust KS
▪ Portion 0 of Farm Gillimberg 861 LR	▪ Portion 47 of Farm Piet Potgietersrust KS
▪ Portion 7 of Farm Gillimberg 861 LR	▪ Portion 49 of Farm Piet Potgietersrust KS
▪ Portion 9 of Farm Gillimberg 861 LR	▪ Portion 2 of Farm Weltevrede
▪ Portion 17 of Farm Gillimberg 861 LR	▪ Portion 9 of Farm De Hoop
▪ Portion 8 of Farm Gillimberg 861 LR	▪ Portion 1 of Farm De Hoop
▪ Portion 6 of Farm Gillimberg 861 LR	▪ Portion 6 of Farm Klavervalley
▪ Portion 30 of Farm Gillimberg 861 LR	▪ Portion 2 of Farm Ceres
▪ Portion 10 of Farm Gillimberg 861 LR	▪ Portion 7 of Farm Geluksfontein
▪ Portion 29 of Farm Gillimberg 861 LR	▪ Portion 5 of Farm Springhaan Slaagte
▪ Portion 47 of Farm Gillimberg 861 LR	▪ Portion 0 of Farm Rondeberg
▪ Portion 1521 of Farm Piet Potgietersrust KS	▪ Portion 7 of Farm Conterberg
▪ Portion 1489 of Farm Piet Potgietersrust KS	▪ Portion 17 of Farm Conterberg
▪ Portion 1567 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Weltevrede
▪ Portion 1435 of Farm Piet Potgietersrust KS	▪ Portion 9 of Farm Conterberg
▪ Portion 1566 of Farm Piet Potgietersrust KS	▪ Portion 11 of Farm Haarde Kraal
▪ Portion 1486 of Farm Piet Potgietersrust KS	▪ Portion 5 of Farm Klavervalley
▪ Portion 1443 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Doornlaagte
▪ Portion 1446 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Rondeberg
▪ Portion 1533 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Mooigelegen
▪ Portion 1491 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm De Hoop
▪ Portion 1517 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Doornstock

▪ Portion 1481 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Rondeberg
▪ Portion 1482 of Farm Piet Potgietersrust KS	▪ Portion 23 of Farm Conterberg
▪ Portion 1539 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm De Bults Punt
▪ Portion 1529 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm De Bults Punt
▪ Portion 1474 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Springhaa Nslaagte
▪ Portion 1568 of Farm Piet Potgietersrust KS	▪ Portion 8 of Farm De Hoop
▪ Portion 1438 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Springhaa Nslaagte
▪ Portion 1432 of Farm Piet Potgietersrust KS	▪ Portion 2 of Farm Oranjefon Tein
▪ Portion 1427 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Oranjefon Tein
▪ Portion 1426 of Farm Piet Potgietersrust KS	▪ Portion 5 of Farm Conterberg
▪ Portion 1520 of Farm Piet Potgietersrust KS	▪ Portion 12 of Farm Springhaa Nslaagte
▪ Portion 1537 of Farm Piet Potgietersrust KS	▪ Portion 7 of Farm Klavervalley
▪ Portion 1483 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Doornstock
▪ Portion 1440 of Farm Piet Potgietersrust KS	▪ Portion 10 of Farm Conterberg
▪ Portion 1439 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Ceres
▪ Portion 48 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm Hartebeest Fontein
▪ Portion 52 of Farm Piet Potgietersrust KS	▪ Portion 1 of Farm Haakdoorn Kuil
▪ Portion 17 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Rondom
▪ Portion 98 of Farm Piet Potgietersrust KS	▪ Portion 3 of Farm Klipgat
▪ Portion 100 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Knoppiesdo Ornboom
▪ Portion 144 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Zoetfontein
▪ Portion 41 of Farm Piet Potgietersrust KS	▪ Portion 0 of Farm Haardekraal

▪ Portion 40 of Farm Piet Potgietersrust KS ▪ Portion 58 of Farm Uitloop 3 ▪ Portion 46 of Farm Gillimberg 861 LR ▪ Portion 59 of Farm Uitloop 3 ▪ Portion 55 of Farm Uitloop 3 ▪ Portion 62 of Farm Piet Potgietersrust KS ▪ Portion 35 of Farm Piet Potgietersrust KS ▪ Portion 175 of Farm Uitloop 3 ▪ Portion 57 of Farm Piet Potgietersrust KS ▪ Portion 140 of Farm Piet Potgietersrust KS ▪ Portion 80 of Farm Piet Potgietersrust KS ▪ Portion 75 of Farm Piet Potgietersrust KS	▪ Portion 4 of Farm Klavervalley ▪ Portion 0 of Farm Doornlaagte ▪ Portion 8 of Farm Geluksfontein ▪ Portion 16 of Farm Conterberg ▪ Portion 1 of Farm Mooigelegen ▪ Portion 1 of Farm Rondom ▪ Portion 0 of Farm Gegund

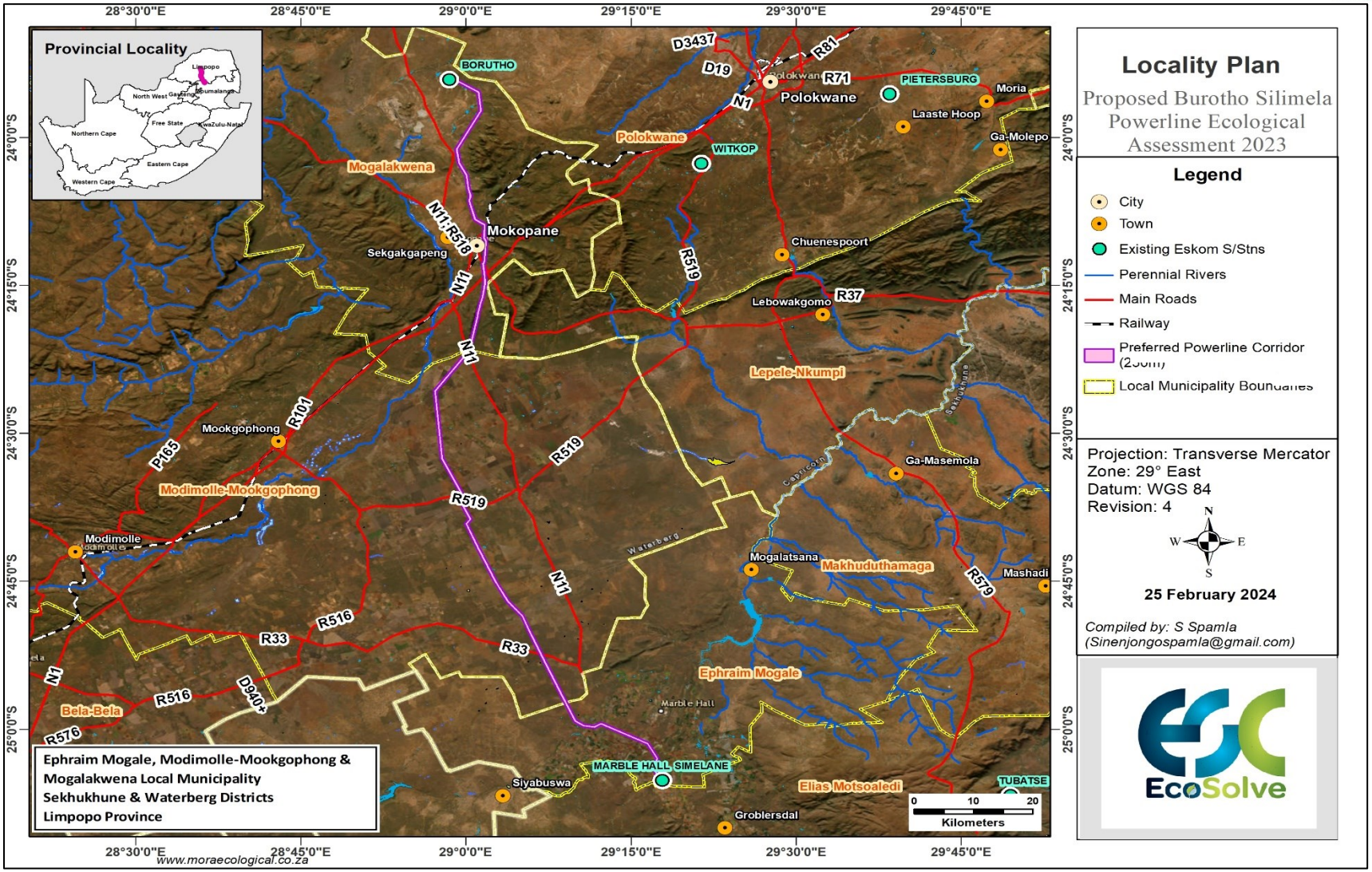

Figure 1: Project area location map.

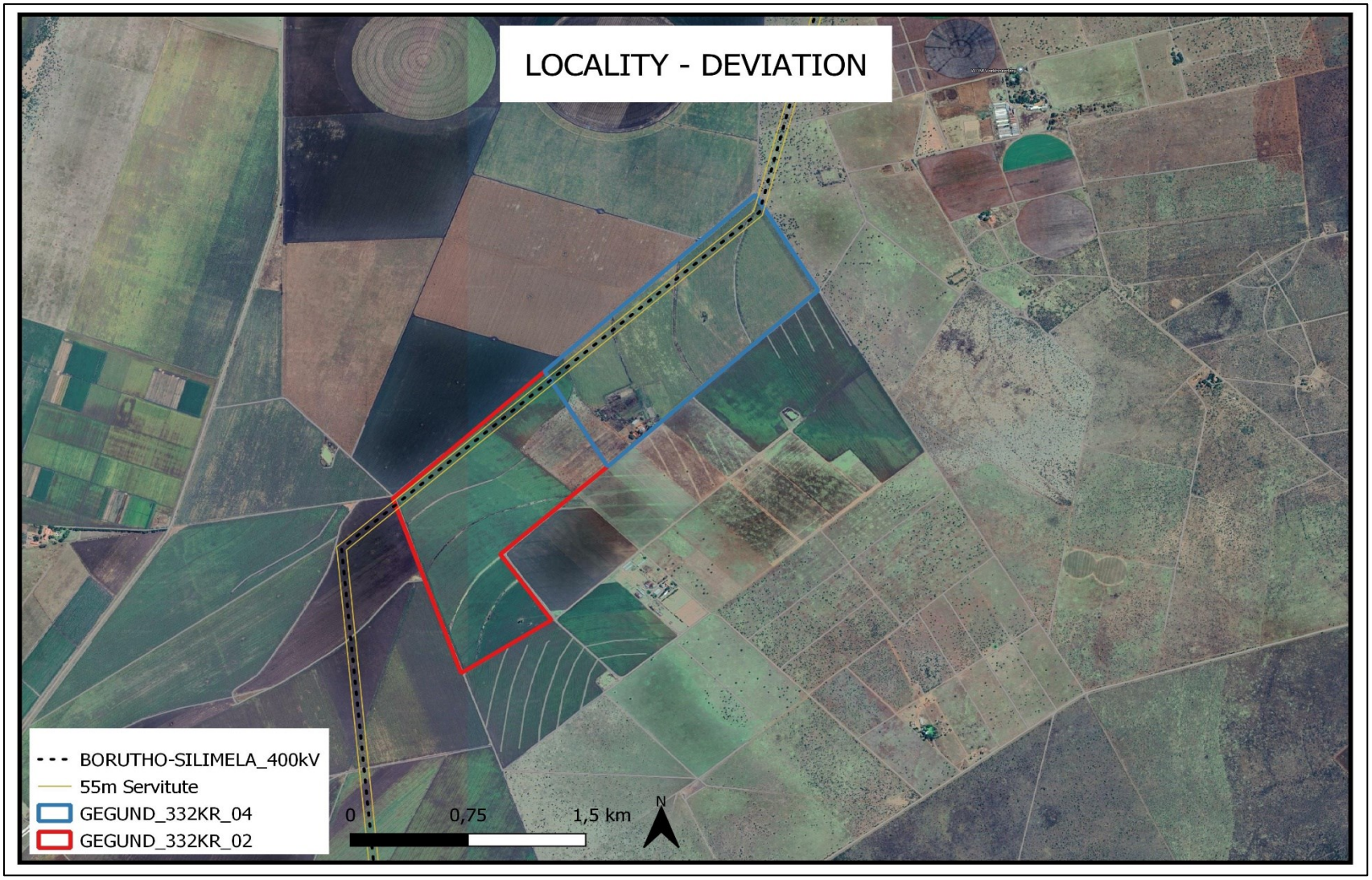

Figure 2: Project area location map (±5.2 km deviation).

TERMS OF REFERENCE

MORA Ecological Services (Pty) Ltd, a subsidiary of EcoSolve Consulting was requested by NTC Group to conduct a specialist avifaunal assessment towards their pursuit of obtaining the requisite environmental authorizations for the proposed power transmission facility.

The critical objective of this specialist avifaunal assessment is to determine the bird species community and the potential impacts the proposed development may have on avifauna species. The following tasks were undertaken by MORA Ecological Services (Pty) Ltd to achieve the assessment objective:

- Conducting a preliminary desktop study prior to conducting avifaunal surveys on the area of study;
- Site visits to identify the avian habitats associated with the proposed construction;
- Field data collection to define the current avifauna community within the construction site and the identification of Red Data and/or endemic species which could potentially be affected by the proposed construction and associated electrical infrastructure;
- Integration of the site data collected (species counts) and the Southern African Bird Atlas Project 2 avian atlases to develop a comprehensive avifaunal database likely to be present within the construction footprint;
- Identify potential negative impacts on the avifaunal diversity and species composition at the site of the proposed construction and assess the significance of these impacts;
- To provide recommendations and mitigation measures for the potential impacts in order to avert or lower their significance on the avifaunal diversity and species composition.

The survey was conducted throughout all identified habitats using various methods i.e., walked transects, vehicle drive transects, powerline inspection and the fixed-point survey.

ASSUMPTIONS, LIMITATIONS, UNCERTAINTIES AND GAP ANALYSIS

- The findings, results, conclusions and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the potential impacts of powerlines on avifauna species.
- The assessment of impacts was based on the current state of the primary environment currently.
- It was assumed that the information contained in existing databases, reports and publications is correct.
- MORA Ecological Services (Pty) Ltd relied on NTC Group, as the EAP, to supply correct information on the site locality and extent, as well as project details which were assumed to be correct.
- It was assumed that a single season of surveys will be adequate to understand the bird species community of the proposed development area.

- MORA reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.
- Bird behavior is not completely understood in South Africa and is hampered by good monitoring data to evaluate the effectiveness of proposed mitigations.

Vegetation

The proposed development footprint falls on the Savanna Biome. The Savanna Biome is the largest, comprising 32.5% of the land in South Africa and Eswatini combined. The Savanna Biome is dominated by a grassy and herbaceous layer with a woody upper layer of low to tall trees. Within the Savanna Biome, the proposed development falls on the Central Bushveld Savanna Bioregion (Figure 2). Within the Central Bushveld Savanna Bioregion, the authorized corridor runs dominantly on the Springbokvlakte Thornveld (SVcb 15) vegetation type. The Springbokvlakte Thornveld (SVcb 15) vegetation type is dominated by Vachellia species and a shrubby grassland layer.

Smaller portions of the authorized corridor also runs through other vegetation types, namely, the Makhado Sweet Bushveld and the Central Sandy Bushveld (Figure 2).

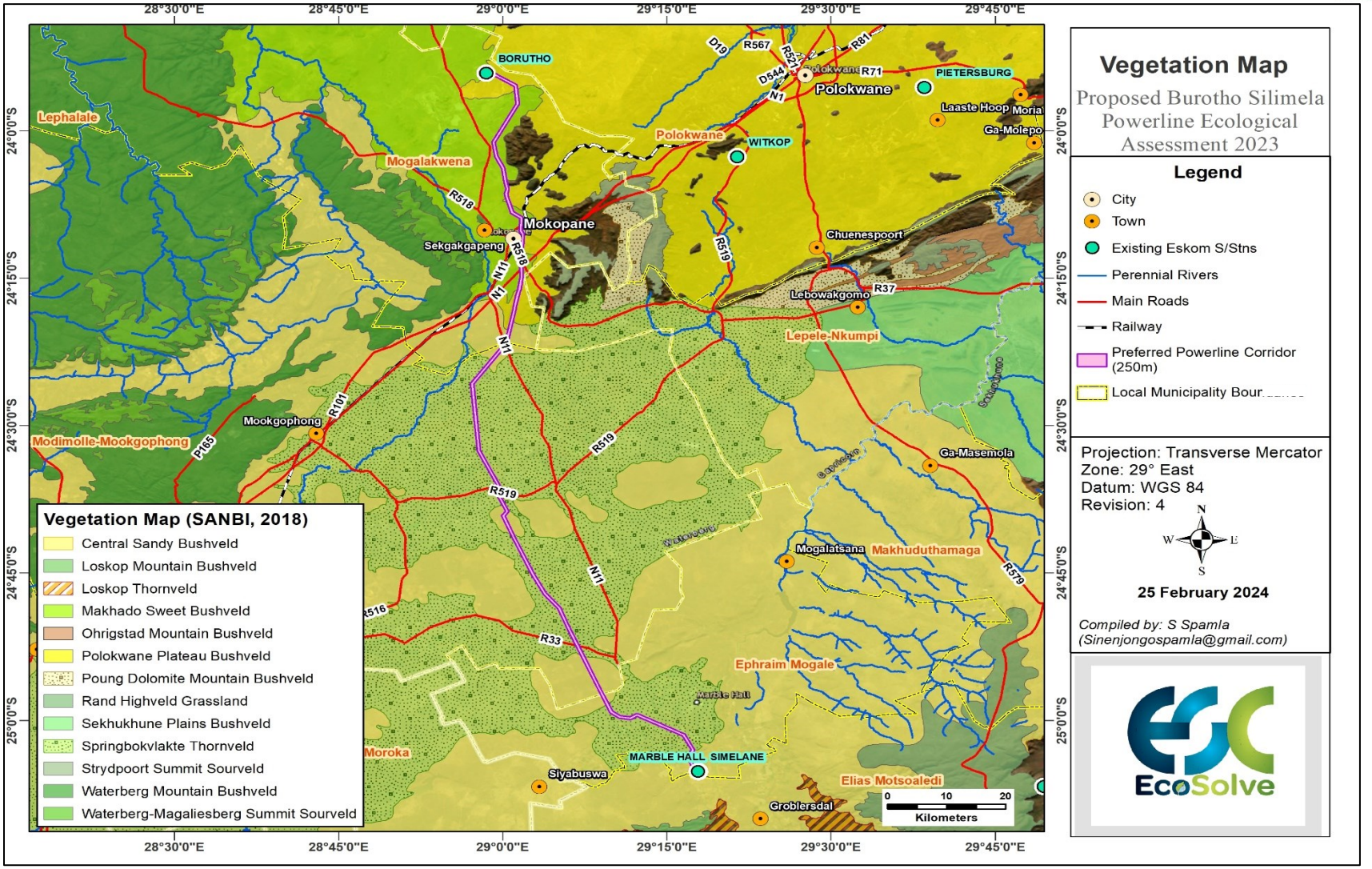

Figure 3: Vegetation map along the proposed powerline.

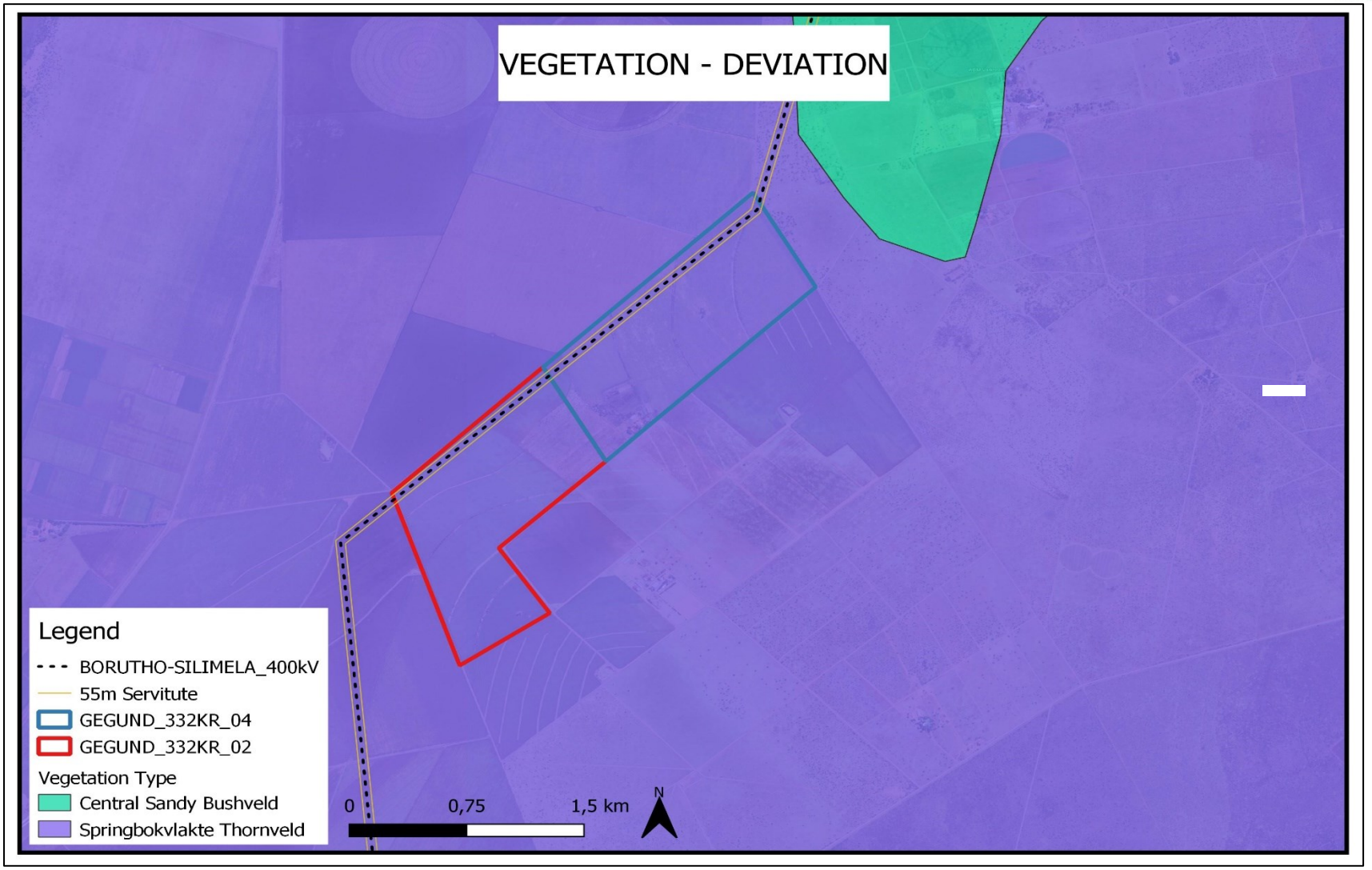

Figure 4: Vegetation map along the proposed powerline (±5.2 km deviation).

Climate

The climate of the area is generally sub-tropical, with almost exclusively summer rainfall and dry winter. The mean annual precipitation of the area is between 500 – 650 mm (Figure 5). The mean annual temperature has a wide range of between 35.2 ºC and -2.0 ºC.

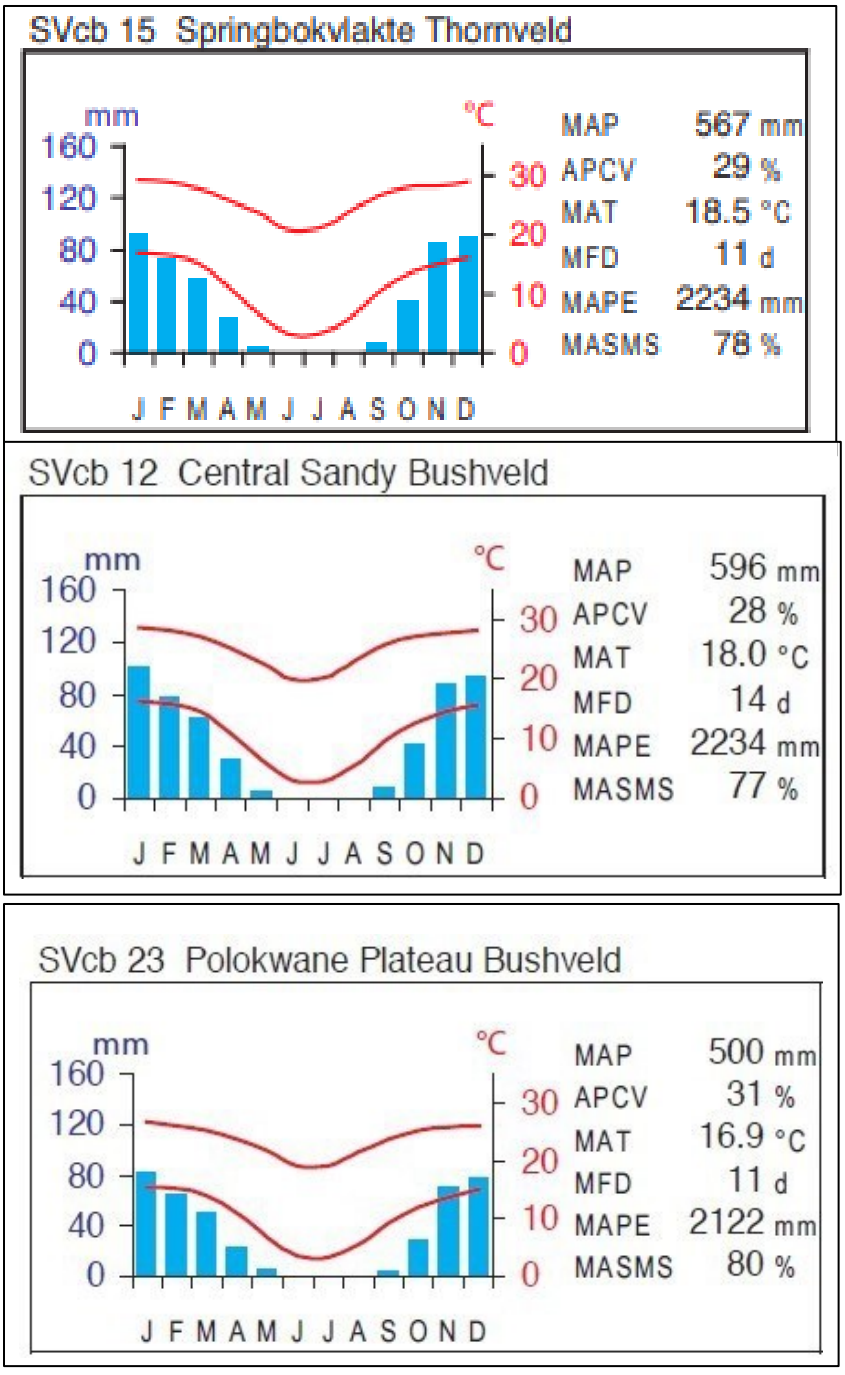

Figure 5: Climatic diagram of a large proportion of the proposed powerline.

Biodiversity

A Critical Biodiversity Plan, represented in Figure 4 below gives a precise spatial representation of the biodiversity status of the affected sector plan of the Limpopo Province, relative to the proposed development footprint. Critical Biodiversity Areas (CBAs) are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning, including avifaunal species community. Whereas Ecological Support Areas (ESAs) are supporting areas which are intended for safeguarding and/or preventing the degradation of CBAs. Figure 6 shows a large proportion of the proposed development area being categorized on delineated biodiversity areas CBA 1, CBA 2, ESA 1 and ESA 2. However, the areas within the deviation as seen in Figure 7 falls within “No Natural Remaining”. The area is characterised by crop farming. Spatial biodiversity results, therefore, gives an indication that the receiving environment is of great biodiversity significance. Construction activities should be limited to the lesser sensitive regions of the receiving environment.

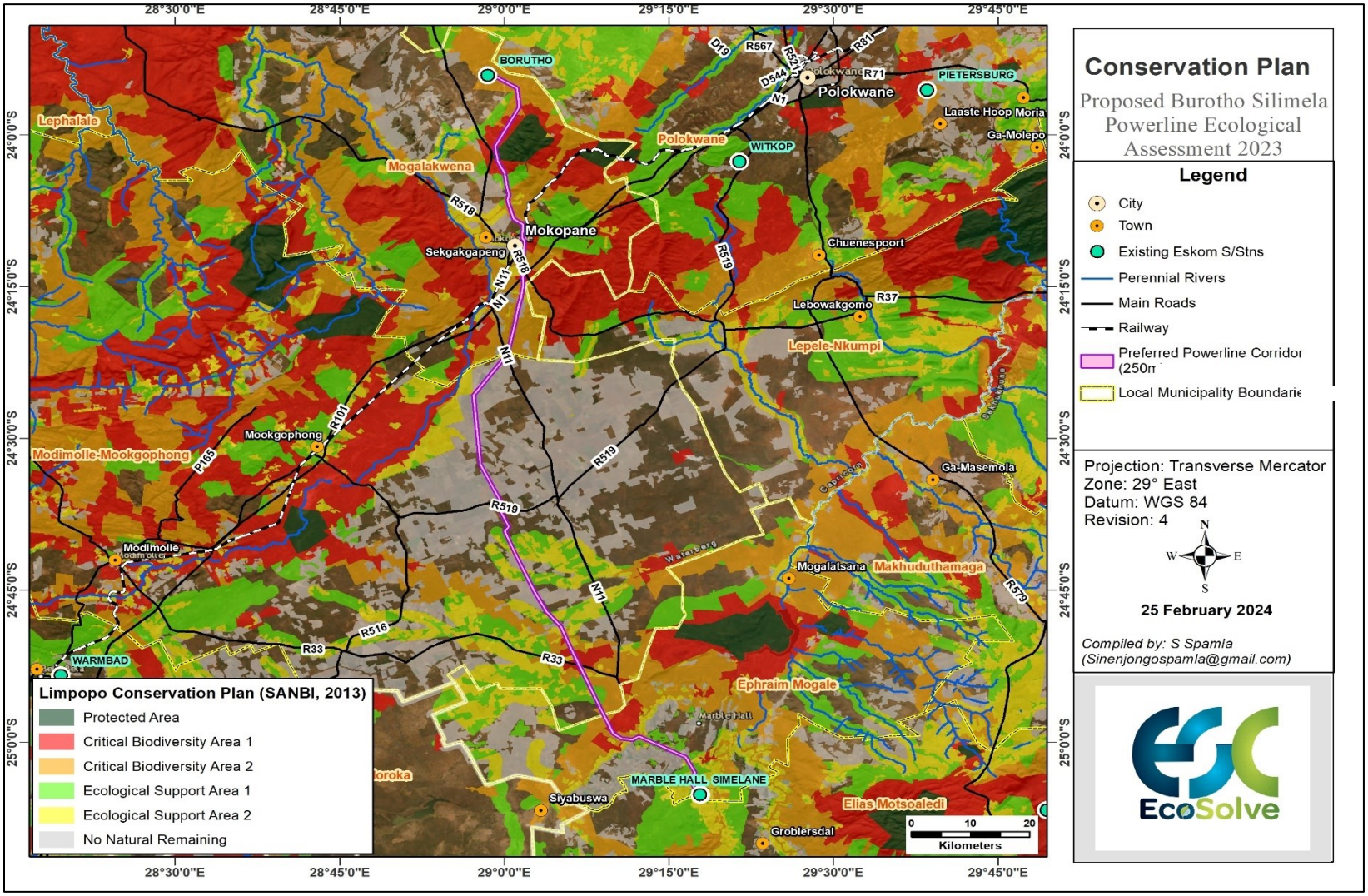

Figure 6: Biodiversity sector plan along the proposed powerline.

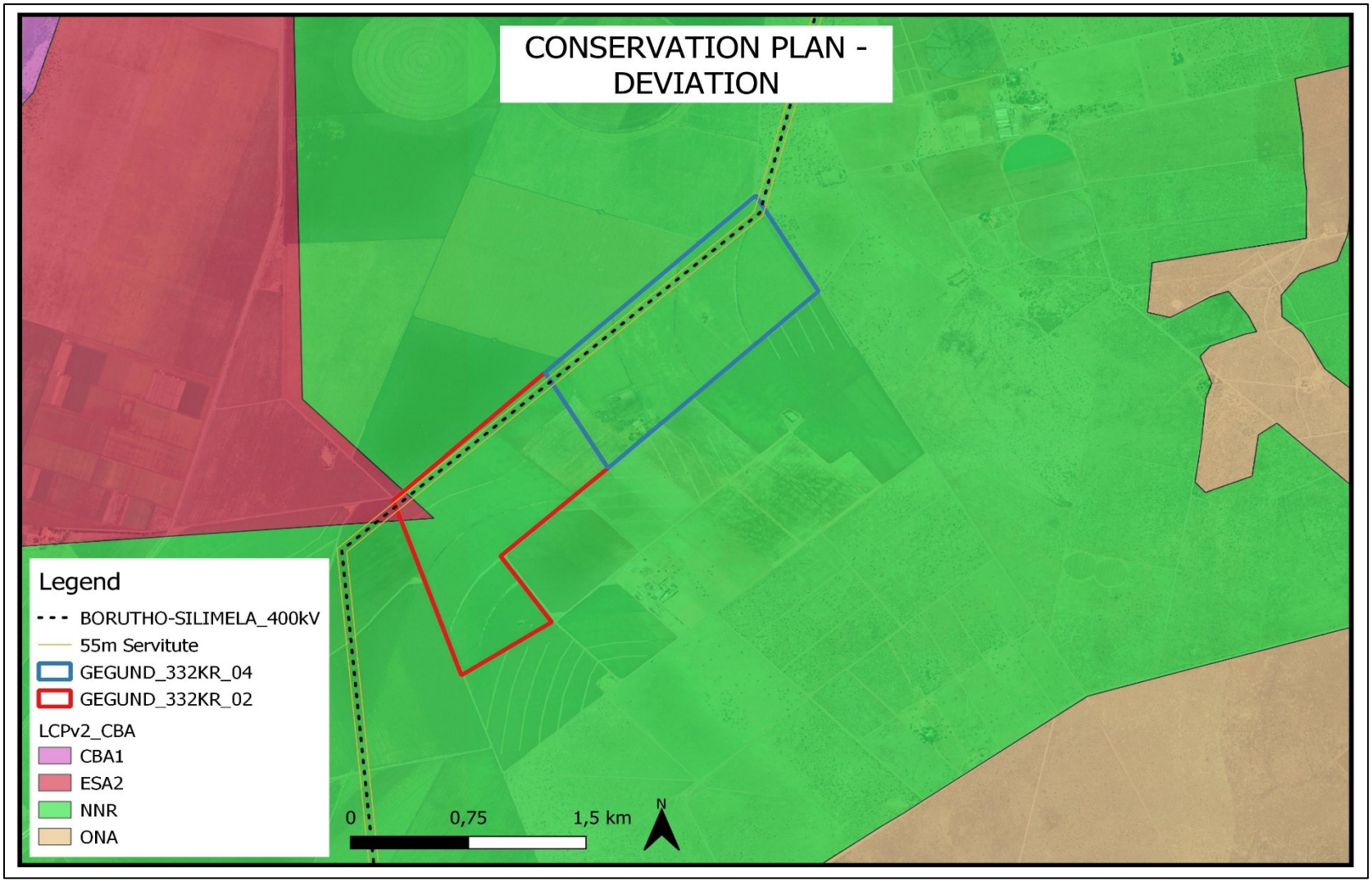

Figure 7: Biodiversity sector plan along the proposed powerline (±5.2 km deviation).

Table 1 below is a descriptive explanation of the four main categories of biodiversity category areas.

Table 1: Explanation of biodiversity priority areas.

Biodiversity Plan Category	Objective
Critical Biodiversity Area 1	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Critical Biodiversity Area 2	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Ecological Support Area 1	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services.

Land-use

The Savanna Biome is extensively used for livestock and game ranching, including numerous well-known wildlife sanctuaries.

Significance of avifauna population

The DFFE screening tool was consulted using the feasibility region of the applicable corridor for the proposed development. Based on the minimum requirements as stipulated in the Species Environmental Guideline Assessment (2020) protocol, different units identified in the mapping procedure of the screening tool are rated according to the scale shown in Table 2. Proponents for the use of birds as bio-indicators state that specific functional groupings of birds are particularly suitable due to their wide distribution, relative abundance, position in the food chain, diet specificity, and the ease with which they can be sampled.

Table 2. Site sensitivity ratings to species data in the screening tool.

Sensitivity Rating	Description of Sensitivity Rating

Very high	Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 is considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under the CR, EN, or VU criteria of the IUCN or species listed as Critically/Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.
High	Recent occurrence records for all threatened (CR, EN, VU) and/or Rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2002) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat. For birds, species distribution models (SDMs) and SABAP2 data (http://sabap2.birdmap.africa/) were combined to delineate the 'high' sensitivity areas
Medium	Medium Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
Low	Low Areas where no species of conservation concern (SCC) are known or expected to occur.

Two avifaunal microhabitats were identified within the affected area. Satellite data spatially represented the existence of both the terrestrial and aquatic microhabitats that could potentially support bird life. The aquatic microhabitats, however, exist mostly within the buffer zones and will not be impacted upon to a substantial extent. Due to the potential loss of sensitive microhabitats for bird life and the occurrence of red-data species in the development footprint boundary, the outcome of the DEFE screening for the proposed corridor is "High". However, this is also a representation of all fauna species of conservation significance occurring within the proposed development footprint. This includes mammals, reptiles, avifauna,

amphibians etc., therefore, suggesting the importance of a fauna specialist study. The High environmental sensitivity for the development site is due to the presence of medium-highly sensitive avifauna species in Table 4.

Table 3: Summary of DFFE screening tool output

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Animal Species		**X**		

Table 4: Sensitive avifauna species along the proposed powerline corridor

Group-Species	Sensitivity
Aves-*Aquila rapax*	High
Aves-*Sagittarius serpentarius*	High
Aves-*Mycteria ibis*	High
Aves-*Podica senegalensis*	Medium
Aves-*Hydroprogne caspia*	Medium
Aves-*Aquila verreauxii*	Medium

The desktop component of the study suggested the susceptibility of Least Concern avifauna species to become mostly impacted to powerline developments in the Limpopo Province. Field assessments within the proposed development area suggested the dominance of common resident species which are also mostly of Least Concern. As a result, from an avifaunal perspective, the site has a moderate species diversity and there are no objections to the proposed powerline development to continue, given that the recommended mitigations are thoroughly implemented by the developer. This report gives feasible mitigations to further recommendations for ongoing impacts throughout the four development phases.

It is important to delineate sensitive avian habitats within the project site to ensure the development does not have a long-term negative impact on these habitats. Important avian habitats play an integral role in their persistence within a landscape providing nesting, foraging, and reproductive benefits. It is also recommended that the sensitive habitats be used as a guide for sensitive areas during the construction and operational phase.

The site sensitivity ratings based on the DFFE screening tool for the animal species for the proposed development is as follows (Figure 8):

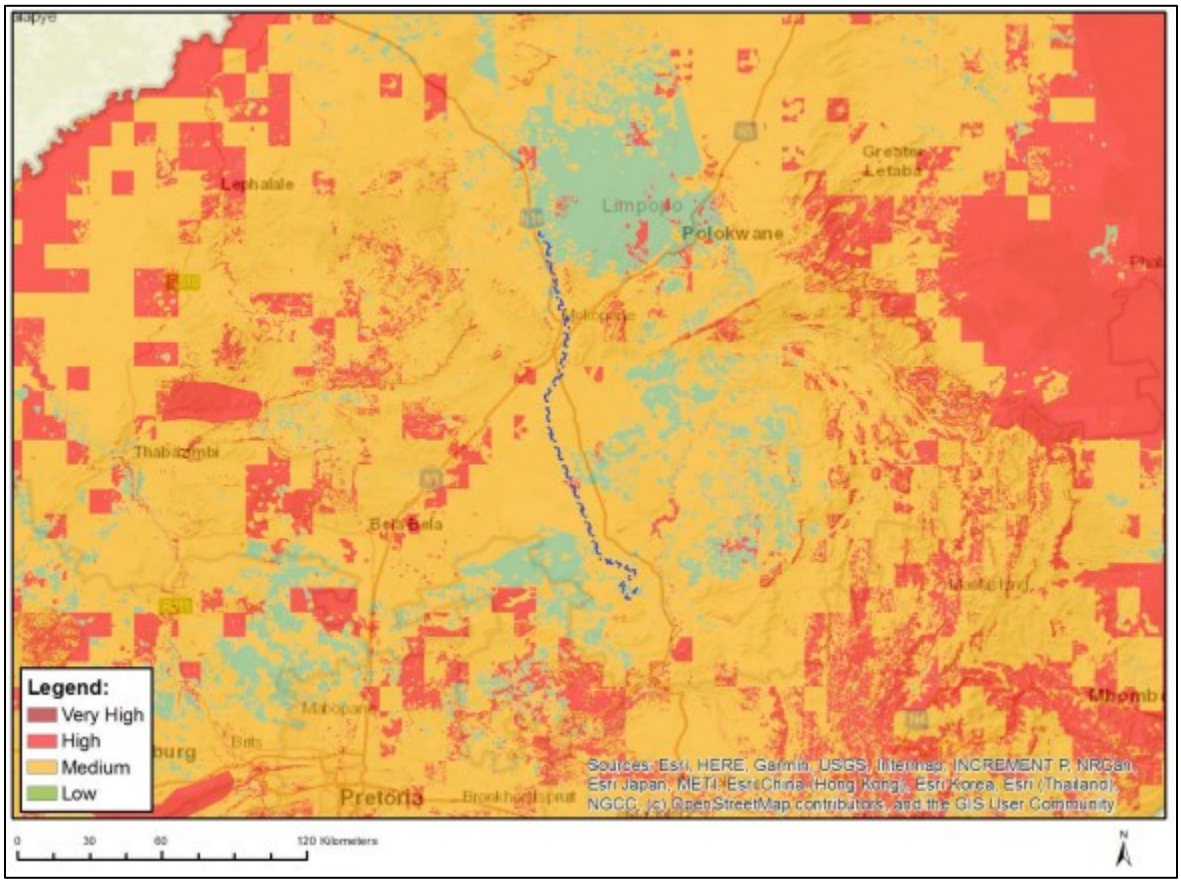

Figure 8: DFFE screening tool outputs of relative animal species sensitivity for the proposed powerline footprint.

LEGAL FRAMEWORK RELATING TO AVIFAUNA AND PROPOSED DEVELOPMENT

International law and conventions

The importance of sustainable development and the protection of environmental resources have globally become a driving factor in the construction of new legislation governing industrial practices and their impact on the environment. South Africa has signed and ratified a number of global treaties, protocols and conventions, agreeing to implement the policies, which endorse sustainable development and promote a positive environmental legacy for future generations. A considerable international convention to which South Africa is in agreement with in signatory is namely the Convention on Biological Diversity (CBD). The

CBD is notably the key international convention for sustainable development. The CBD has three main objectives which lead and encourage a sustainable future. These are:

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits from the use of genetic resources.

The convention covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business and culture.

South African Constitution

The foundation of South Africans Environmental law is set in the Constitution of the Republic of South Africa (1996), specifically “Chapter 2- The Bill of Rights: section 24”. This has allowed for the rapid development of environmentally based legislations which guard, enforce and guide all parties to maintain the human rights granted in the Constitution. These rights include:

- The right to an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management Act (NEMA)

The National Environmental Management Act (NEMA), Act 107 of 1998 is the fundamental environmental legislation which aims to strengthen the rights granted in the South African Constitution. The NEMA Act is the foundation of environmental law in South Africa and has set the framework for additional legislation to build on. The Act establishes principles for decision-making on environmental matters, as well as providing motive for institutions which promote cooperative governance, and which can coordinate environmental action plans. Section 2(4) specifies that sustainable development requires the consideration of all relevant factors. In the regard to biodiversity and South Africa’s ecological integrity, development should not result in the disturbance of ecosystems and loss of biological diversity, if not possible, these effects must be minimized and remedied. A low-risk, cautious approach should always be applied, considering limits of current knowledge concerning consequences and actions. Always anticipate possible negative impacts on the environment and people's environmental rights, identified impacts should be prevented and where they cannot be altogether prevented, are minimized and mitigated. Outlined NEMA principles with regard to biodiversity are to:

- Prevent pollution and ecological degradation
- Promote conservation; and

- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management of Biodiversity Act (NEMBA)

The National Environmental Management of Biodiversity Act (NEMBA) Act 10 of 2004 was designed to provide a management and conservation outline for biological diversity, as drafted under the NEMA. NEMBA focuses on the management and conservation of biodiversity, with its relevant components, which include the use of indigenous biological resources in a sustainable manner, the fair and equitable sharing of benefits arising from bio-prospecting, cooperative governance in biodiversity management and conservation within the structures of NEMA. The Act, in protecting biodiversity, deals with the protection of threatened ecosystems and species, the control of alien invasive species, genetically modified organisms and regulates bio-prospecting. As with NEMA, NEMBA incorporates and gives effect to international agreements relating to biodiversity. The Act gives the Minister of Environmental Affairs, Forestry and Fisheries currently known as the Department of Fisheries Forestry and Environment (DFFE) the power to categorize any process or activity in a listed ecosystem, as a threatening process, thereafter, be regarded as an activity contemplated in Section 24(2) (b) of NEMA which states that: Specified activities may not be commenced without prior authorization from the Minister or MEC and specify such activities. NEMBA is the most prominent statute containing provisions directly aimed at the conservation of birds with the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations). The NEMBA Regulations on Threatened or Protected Species (TOPS, 2007) lists all of the species (including avian) that are threatened with extinction and therefore, nationally protected under an approach to sustainable use and development. Periodically, Red Data books are published, and the data used to update these lists of protected species.

Norms, Guidelines and Standards

BirdLife South Africa compiled the Best Practice Guidelines on Birds and Solar Energy to guide the assessment and monitoring of the impact of solar generating and transmitting facilities on birds in South Africa. This guideline has been followed as far as possible in the compilation of this report.

Specialist Protocol

This report has been compiled in accordance with the *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species,* GN 1150 (October 2020). According to the protocols, a site sensitivity verification (SSV) must be undertaken to verify the likelihood of the presence of the SCC. The site sensitivity verification must be undertaken through the use of a desktop study, a site inspection and making use of any other available information of relevance.

When a site is identified by the Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool as being of 'Medium' sensitivity for the animal species theme, either an Animal Species Compliance Statement or Specialist Impact Assessment Report must be compiled, depending on the findings of the outcome of a site sensitivity verification. Where the site

sensitivity verification found no SCC on site and/or confirmed their occurrence to be unlikely, a Compliance Statement must be compiled. Based on the findings, the site was confirmed to be of Medium Sensitivity for birds.

METHODS

Methodology

Prior to conducting field assessments, a comprehensive literature review of available published and unpublished literature pertaining to the current use of the land and the potential environmental sensitivity of the site was conducted. Figure 9 below is a photographic representation of the development footprint area.


Figure 9: Photographic representation of the assessed development footprint.

A list of previously recorded birds was obtained from Southern African Bird Atlas Project 2 (SABAP 2), and Google Earth was also used to determine potential habitats for birds. The field methodology was thereafter conducted to assess the impact of the proposed development on the extant avifaunal population. All habitat types were covered during assessments, and all attempts were made to ensure a representative spread of sampling localities and survey effort that reflected overall habitat composition.

Resident avifaunal population assessment

In determining the *in situ* local avifauna and avian habitats present on the proposed development area, site visits were conducted. The site visit was initially undertaken in May 2023 with a follow up survey in November 2023 to undertake necessary in-field procedures in assessing the avifaunal community within the study area. The survey was conducted by competent fieldworkers of MORA Ecological Services (Pty) Ltd, i.e., a senior ecologist (Pr. Sci. Nat.) and an assistant (Junior Specialist, Cand. Sci. Nat). Surveys were conducted on the development footprint area (Figure 1) and the survey time daily was from 06h00 am until 18h00 pm.

Birds were observed using 8 x 42 Bushnell binoculars and photographic records were taken where possible.

Data collection methods included the following:

- Vehicle drive surveys: Vehicle surveys were predominantly done along the roads
- Walked-transects: Walking a fixed-length transect within a given time and recording all bird species seen or heard within a specified transect width.
- For large tree-nesting birds, tall trees were walked through in order to check for raptor nests.
- Lastly, waterbodies were inspected for waterfowl and other species that frequent waterbodies.

All data was recorded on BasicAirData GPS logger and BirdLasser. The entire project area was sampled to achieve the objectives of the assessment.

BASELINE DESCRIPTION OF THE AVIFAUNAL COMMUNITY

SABAP2 data

The Second South African Bird Atlas Project 2 (SABAP2), a continuous initiative of the Animal Demography Unit of the University of Cape Town, was consulted for data collected on the pentads in which the site is situated. SABAP2 is the second bird atlas project that was initiated in July 2007. SABAP2 was designed to run indefinitely with the aim to create valuable long-term dataset for southern Africa. The objective of the SABAP2 project is to accurately provide specified information on bird distributions, taken over a period of years. Each pentad occupies approximately 7,700 Ha.

The pentad areas covers a greater avian diversity and comprises priority habitats including waterbodies. Assessments of avifauna in general terms in South Africa are best described at regional or habitat scales due to their high mobility and the vastly different movement and migration patterns exhibited between species. The inclusion of aquatic habitats in the pentads will substantially increase the species counts. These species counts should not be expected for the proposed construction site.

Based on the acquired results from avifauna species during SABAP2 specialist data collection, a total of 613 species have been recorded were the development footprint falls. Table 5 gives the current conservation status of each species occurring in the broader development area.

Table 5. List of avifauna species encountered on site during structured surveys or recorded during SABAP2 assessments for the wider pentads.

No.	Group	Species	Conservation status
1	Apalis	Bar-throated	Least Concern
2	Apalis	Rudd's	Near Threatened
3	Apalis	Yellow-breasted	Least Concern
4	Avocet	Pied	Least Concern
5	Babbler	Arrow-marked	Least Concern
6	Babbler	Southern Pied	Least Concern
7	Barbet	Acacia Pied	Least Concern
8	Barbet	Black-collared	Least Concern
9	Barbet	Crested	Least Concern
10	Batis	Cape	Least Concern
11	Batis	Chinspot	Least Concern
12	Bee-eater	Blue-cheeked	Least Concern
13	Bee-eater	European	Least Concern
14	Bee-eater	Little	Least Concern

No.	Group	Species	Conservation status
15	Bee-eater	Southern Carmine	Least Concern
16	Bee-eater	Swallow-tailed	Least Concern
17	Bee-eater	White-fronted	Least Concern
18	Bee-eater	White-throated	Least Concern
19	Bishop	Southern Red	Least Concern
20	Bishop	Yellow	Least Concern
21	Bishop	Yellow-crowned	Least Concern
22	Bittern	Dwarf	Least Concern
23	Bittern	Eurasian	Critically Endangered
24	Bittern	Little	Least Concern
25	Blackcap	Bush	Vulnerable
26	Boubou	Ethiopian	Least Concern
27	Boubou	Southern	Least Concern
28	Boubou	Tropical	Least Concern
29	Broadbill	African	Vulnerable
30	Brownbul	Terrestrial	Least Concern
31	Bulbul	African Red-eyed	Least Concern
32	Bulbul	Dark-capped	Least Concern
33	Bunting	Cape	Least Concern
34	Bunting	Cinnamon-breasted	Least Concern
35	Bunting	Golden-breasted	Least Concern
36	Bunting	Lark-like	Least Concern
37	Bushshrike	Black-fronted	Least Concern
38	Bushshrike	Gorgeous	Least Concern
39	Bushshrike	Grey-headed	Least Concern
40	Bushshrike	Olive	Least Concern
41	Bushshrike	Orange-breasted	Least Concern
42	Bustard	Black-bellied	Least Concern
43	Bustard	Denham's	Vulnerable
44	Bustard	Kori	Near Threatened
45	Bustard	White-bellied	Least Concern
46	Buttonquail	Black-rumped	Least Concern
47	Buttonquail	Common	Least Concern
48	Buzzard	Common	Least Concern
49	Buzzard	Forest	Least Concern
50	Buzzard	Jackal	Least Concern
51	Buzzard	Lizard	Least Concern
52	Camaroptera	Green-backed	Least Concern
53	Camaroptera	Grey-backed	Least Concern
54	Canary	Black-throated	Least Concern
55	Canary	Brimstone	Least Concern

No.	Group	Species	Conservation status
56	Canary	Cape	Least Concern
57	Canary	Forest	Least Concern
58	Canary	Lemon-breasted	Near Threatened
59	Canary	Yellow	Least Concern
60	Canary	Yellow-fronted	Least Concern
61	Chat	Ant-eating	Least Concern
62	Chat	Arnot's	Least Concern
63	Chat	Boulder	Least Concern
64	Chat	Buff-streaked	Least Concern
65	Chat	Familiar	Least Concern
66	Chat	Mocking Cliff	Least Concern
67	Cisticola	Cloud	Least Concern
68	Cisticola	Croaking	Least Concern
69	Cisticola	Desert	Least Concern
70	Cisticola	Lazy	Least Concern
71	Cisticola	Levaillant's	Least Concern
72	Cisticola	Rattling	Least Concern
73	Cisticola	Red-faced	Least Concern
74	Cisticola	Rufous-winged	Least Concern
75	Cisticola	Tinkling	Least Concern
76	Cisticola	Wailing	Least Concern
77	Cisticola	Wing-snapping	Least Concern
78	Cisticola	Zitting	Least Concern
79	Common_group	Common_species	Least Concern
80	Coot	Red-knobbed	Least Concern
81	Cormorant	Reed	Least Concern
82	Cormorant	White-breasted	Least Concern
83	Coucal	Black	Least Concern
84	Coucal	Burchell's	Vulnerable
85	Coucal	Senegal	Least Concern
86	Courser	Bronze-winged	Least Concern
87	Courser	Double-banded	Least Concern
88	Courser	Temminck's	Least Concern
89	Courser	Three-banded	Least Concern
90	Crake	African	Least Concern
91	Crake	Baillon's	Least Concern
92	Crake	Black	Least Concern
93	Crake	Corn	Least Concern
94	Crake	Spotted	Least Concern
95	Crake	Striped	Least Concern
96	Crane	Blue	Least Concern

No.	Group	Species	Conservation status
97	Crane	Grey Crowned	Least Concern
98	Crane	Wattled	Critically Endangered
99	Crombec	Long-billed	Least Concern
100	Crow	Cape	Least Concern
101	Crow	Pied	Least Concern
102	Cuckoo	African	Least Concern
103	Cuckoo	African Emerald	Least Concern
104	Cuckoo	Black	Least Concern
105	Cuckoo	Common	Least Concern
106	Cuckoo	Diederik	Least Concern
107	Cuckoo	Great Spotted	Least Concern
108	Cuckoo	Jacobin	Least Concern
109	Cuckoo	Klaas's	Least Concern
110	Cuckoo	Levaillant's	Least Concern
111	Cuckoo	Madagascan	Least Concern
112	Cuckoo	Red-chested	Least Concern
113	Cuckoo	Thick-billed	Least Concern
114	Cuckoo-Hawk	African	Least Concern
115	Cuckooshrike	Black	Least Concern
116	Cuckooshrike	Grey	Least Concern
117	Cuckooshrike	White-breasted	Least Concern
118	Curlew	Eurasian	Least Concern
119	Darter	African	Least Concern
120	Dove	Blue-spotted Wood	Least Concern
121	Dove	Cape Turtle	Least Concern
122	Dove	Emerald-spotted Wood	Least Concern
123	Dove	Laughing	Least Concern
124	Dove	Lemon	Least Concern
125	Dove	Mourning Collared	Least Concern
126	Dove	Namaqua	Least Concern
127	Dove	Red-eyed	Least Concern
128	Dove	Rock	Least Concern
129	Dove	Tambourine	Least Concern
130	Drongo	Common Square-tailed	Least Concern
131	Drongo	Fork-tailed	Least Concern
132	Duck	African Black	Least Concern
133	Duck	Domestic	Least Concern
134	Duck	Fulvous Whistling	Least Concern
135	Duck	Knob-billed	Least Concern
136	Duck	Maccoa	Near Threatened
137	Duck	White-backed	Least Concern

No.	Group	Species	Conservation status
138	Duck	White-faced Whistling	Least Concern
139	Duck	Yellow-billed	Least Concern
140	Eagle	African Fish	Least Concern
141	Eagle	Black-chested Snake	Least Concern
142	Eagle	Booted	Least Concern
143	Eagle	Brown Snake	Least Concern
144	Eagle	Crowned	Least Concern
145	Eagle	Lesser Spotted	Least Concern
146	Eagle	Long-crested	Least Concern
147	Eagle	Martial	Endangered
148	Eagle	Steppe	Least Concern
149	Eagle	Tawny	Endangered
150	Eagle	Verreaux's	Vulnerable
151	Eagle	Wahlberg's	Least Concern
152	Eagle-Owl	Cape	Least Concern
153	Eagle-Owl	Spotted	Least Concern
154	Eagle-Owl	Verreaux's	Least Concern
155	Egret	Great	Least Concern
156	Egret	Intermediate	Least Concern
157	Egret	Little	Least Concern
158	Egret	Slaty	Least Concern
159	Egret	Western Cattle	Least Concern
160	Eremomela	Burnt-necked	Least Concern
161	Eremomela	Green-capped	Least Concern
162	Eremomela	Yellow-bellied	Least Concern
163	Falcon	Amur	Least Concern
164	Falcon	Lanner	Vulnerable
165	Falcon	Peregrine	Least Concern
166	Falcon	Red-footed	Near Threatened
167	Falcon	Sooty	Least Concern
168	Falcon	Taita	Least Concern
169	Finch	Cuckoo	Least Concern
170	Finch	Cut-throat	Least Concern
171	Finch	Hybrid Cut-throat/Red-headed	Least Concern
172	Finch	Red-headed	Least Concern
173	Finfoot	African	Vulnerable
174	Firefinch	African	Least Concern
175	Firefinch	Jameson's	Least Concern
176	Firefinch	Red-billed	Least Concern
177	Fiscal	Southern	Least Concern
178	Flamingo	Greater	Near Threatened

No.	Group	Species	Conservation status
179	Flamingo	Lesser	Near Threatened
180	Flufftail	Buff-spotted	Least Concern
181	Flufftail	Red-chested	Least Concern
182	Flufftail	Streaky-breasted	Least Concern
183	Flufftail	Striped	Least Concern
184	Flycatcher	African Dusky	Least Concern
185	Flycatcher	African Paradise	Least Concern
186	Flycatcher	Ashy	Least Concern
187	Flycatcher	Blue-mantled Crested	Least Concern
188	Flycatcher	Collared	Least Concern
189	Flycatcher	Fairy	Least Concern
190	Flycatcher	Fiscal	Least Concern
191	Flycatcher	Marico	Least Concern
192	Flycatcher	Pale	Least Concern
193	Flycatcher	Southern Black	Least Concern
194	Flycatcher	Spotted	Least Concern
195	Francolin	Coqui	Least Concern
196	Francolin	Crested	Least Concern
197	Francolin	Grey-winged	Least Concern
198	Francolin	Red-winged	Least Concern
199	Francolin	Shelley's	Least Concern
200	Gallinule	Allen's	Least Concern
201	Go-away-bird	Grey	Least Concern
202	Godwit	Bar-tailed	Least Concern
203	Goose	African Pygmy	Least Concern
204	Goose	Domestic	Least Concern
205	Goose	Egyptian	Least Concern
206	Goose	Spur-winged	Least Concern
207	Goshawk	African	Least Concern
208	Goshawk	Dark Chanting	Least Concern
209	Goshawk	Gabar	Least Concern
210	Goshawk	Pale Chanting	Least Concern
211	Grassbird	Cape	Least Concern
212	Grassbird	Fan-tailed	Least Concern
213	Grebe	Black-necked	Least Concern
214	Grebe	Great Crested	Least Concern
215	Grebe	Little	Least Concern
216	Greenbul	Sombre	Least Concern
217	Greenbul	Yellow-bellied	Least Concern
218	Greenbul	Yellow-streaked	Least Concern
219	Greenshank	Common	Least Concern

No.	Group	Species	Conservation status
220	Guineafowl	Crested	Least Concern
221	Guineafowl	Helmeted	Least Concern
222	Gull	Grey-headed	Least Concern
223	Harrier	African Marsh	Least Concern
224	Harrier	Montagu's	Least Concern
225	Harrier	Pallid	Least Concern
226	Harrier	Western Marsh	Least Concern
227	Harrier-Hawk	African	Least Concern
228	Hawk	Bat	Endangered
229	Hawk-eagle	African	Least Concern
230	Hawk-Eagle	Ayre's	Least Concern
231	Helmetshrike	Retz's	Least Concern
232	Helmetshrike	White-crested	Least Concern
233	Heron	Black	Least Concern
234	Heron	Black-crowned Night	Least Concern
235	Heron	Black-headed	Least Concern
236	Heron	Goliath	Least Concern
237	Heron	Grey	Least Concern
238	Heron	Purple	Least Concern
239	Heron	Rufous-bellied	Least Concern
240	Heron	Squacco	Least Concern
241	Heron	Striated	Least Concern
242	Heron	White-backed Night	Vulnerable
243	Hobby	African	Least Concern
244	Hobby	Eurasian	Least Concern
245	Honeybird	Brown-backed	Least Concern
246	Honey-buzzard	European	Least Concern
247	Honeyguide	Greater	Least Concern
248	Honeyguide	Lesser	Least Concern
249	Honeyguide	Scaly-throated	Least Concern
250	Hoopoe	African	Least Concern
251	Hornbill	African Grey	Least Concern
252	Hornbill	Crowned	Least Concern
253	Hornbill	Southern Ground	Endangered
254	Hornbill	Southern Red-billed	Least Concern
255	Hornbill	Southern Yellow-billed	Least Concern
256	Hornbill	Trumpeter	Least Concern
257	Hyliota	Southern	Least Concern
258	Ibis	African Sacred	Least Concern
259	Ibis	Glossy	Least Concern
260	Ibis	Hadada	Least Concern

No.	Group	Species	Conservation status
261	Ibis	Southern Bald	Vulnerable
262	Indigobird	Dusky	Least Concern
263	Indigobird	Purple	Least Concern
264	Indigobird	Village	Least Concern
265	Jacana	African	Least Concern
266	Jacana	Lesser	Vulnerable
267	Kestrel	Dickinson's	Least Concern
268	Kestrel	Greater	Least Concern
269	Kestrel	Lesser	Least Concern
270	Kestrel	Rock	Least Concern
271	Kingfisher	African Pygmy	Least Concern
272	Kingfisher	Brown-hooded	Least Concern
273	Kingfisher	Giant	Least Concern
274	Kingfisher	Grey-headed	Least Concern
275	Kingfisher	Half-collared	Least Concern
276	Kingfisher	Malachite	Least Concern
277	Kingfisher	Pied	Least Concern
278	Kingfisher	Striped	Least Concern
279	Kingfisher	Woodland	Least Concern
280	Kite	Black	Least Concern
281	Kite	Black-winged	Least Concern
282	Kite	Yellow-billed	Least Concern
283	Korhaan	Northern Black	Least Concern
284	Korhaan	Red-crested	Least Concern
285	Lapwing	African Wattled	Least Concern
286	Lapwing	Black-winged	Least Concern
287	Lapwing	Blacksmith	Least Concern
288	Lapwing	Crowned	Least Concern
289	Lapwing	Senegal	Least Concern
290	Lapwing	White-crowned	Least Concern
291	Lark	Dusky	Least Concern
292	Lark	Eastern Clapper	Least Concern
293	Lark	Eastern Long-billed	Least Concern
294	Lark	Fawn-colored	Least Concern
295	Lark	Flappet	Least Concern
296	Lark	Melodious	Least Concern
297	Lark	Monotonous	Least Concern
298	Lark	Pink-billed	Least Concern
299	Lark	Red-capped	Least Concern
300	Lark	Rufous-naped	Least Concern
301	Lark	Sabota	Least Concern

No.	Group	Species	Conservation status
302	Lark	Short-clawed	Least Concern
303	Lark	Spike-heeled	Least Concern
304	Longclaw	Cape	Least Concern
305	Longclaw	Yellow-throated	Least Concern
306	Mannikin	Bronze	Least Concern
307	Mannikin	Magpie	Least Concern
308	Mannikin	Red-backed	Least Concern
309	Martin	Banded	Least Concern
310	Martin	Brown-throated	Least Concern
311	Martin	Common House	Least Concern
312	Martin	Rock	Least Concern
313	Martin	Sand	Least Concern
314	Moorhen	Common	Least Concern
315	Moorhen	Lesser	Vulnerable
316	Mousebird	Red-faced	Least Concern
317	Mousebird	Speckled	Least Concern
318	Mousebird	White-backed	Least Concern
319	Myna	Common	Least Concern
320	Nicator	Eastern	Least Concern
321	Nightingale	Thrush	Least Concern
322	Nightjar	European	Least Concern
323	Nightjar	Fiery-necked	Least Concern
324	Nightjar	Freckled	Least Concern
325	Nightjar	Pennant-winged	Least Concern
326	Nightjar	Rufous-cheeked	Least Concern
327	Nightjar	Square-tailed	Least Concern
328	Openbill	African	Least Concern
329	Oriole	African Golden	Least Concern
330	Oriole	Black-headed	Least Concern
331	Oriole	Eurasian Golden	Least Concern
332	Osprey	Western	Least Concern
333	Ostrich	Common	Least Concern
334	Owl	African Grass	Least Concern
335	Owl	African Scops	Least Concern
336	Owl	African Wood	Least Concern
337	Owl	Marsh	Least Concern
338	Owl	Pel's Fishing	Least Concern
339	Owl	Southern White-faced Scops	Least Concern
340	Owl	Western Barn	Least Concern
341	Owlet	African Barred	Least Concern
342	Owlet	Pearl-spotted	Least Concern

No.	Group	Species	Conservation status
343	Oxpecker	Red-billed	Least Concern
344	Oxpecker	Yellow-billed	Least Concern
345	Painted-snipe	Greater	Least Concern
346	Palm Thrush	Collared	Least Concern
347	Parakeet	Rose-ringed	Least Concern
348	Parrot	Brown-headed	Least Concern
349	Parrot	Brown-necked	Least Concern
350	Parrot	Cape	Endangered
351	Parrot	Meyer's	Least Concern
352	Peafowl	Indian	Least Concern
353	Pelican	Great White	Vulnerable
354	Pelican	Pink-backed	Vulnerable
355	Phalarope	Red	Least Concern
356	Pigeon	African Green	Least Concern
357	Pigeon	African Olive	Least Concern
358	Pigeon	Speckled	Least Concern
359	Pipit	African	Least Concern
360	Pipit	Buffy	Least Concern
361	Pipit	Bushveld	Least Concern
362	Pipit	Golden	Least Concern
363	Pipit	Long-billed	Least Concern
364	Pipit	Nicholson's	Least Concern
365	Pipit	Plain-backed	Least Concern
366	Pipit	Short-tailed	Least Concern
367	Pipit	Striped	Least Concern
368	Pipit	Tree	Least Concern
369	Plover	American Golden	Least Concern
370	Plover	Caspian	Least Concern
371	Plover	Chestnut-banded	Least Concern
372	Plover	Common Ringed	Least Concern
373	Plover	Greater Sand	Least Concern
374	Plover	Grey	Least Concern
375	Plover	Kittlitz's	Least Concern
376	Plover	Pacific Golden	Least Concern
377	Plover	Three-banded	Least Concern
378	Plover	White-fronted	Least Concern
379	Pochard	Southern	Least Concern
380	Pratincole	Black-winged	Near Threatened
381	Pratincole	Collared	Least Concern
382	Prinia	Black-chested	Least Concern
383	Prinia	Drakensberg	Least Concern

No.	Group	Species	Conservation status
384	Prinia	Tawny-flanked	Least Concern
385	Puffback	Black-backed	Least Concern
386	Pytilia	Green-winged	Least Concern
387	Pytilia	Orange-winged	Least Concern
388	Quail	Common	Least Concern
389	Quail	Harlequin	Least Concern
390	Quelea	Red-billed	Least Concern
391	Rail	African	Least Concern
392	Raven	White-necked	Least Concern
393	Robin	White-starred	Least Concern
394	Robin-Chat	Cape	Least Concern
395	Robin-Chat	Chorister Robin-Chat	Least Concern
396	Robin-Chat	Red-capped	Least Concern
397	Robin-Chat	White-browed	Least Concern
398	Robin-Chat	White-throated	Least Concern
399	Roller	Broad-billed	Least Concern
400	Roller	European	Near Threatened
401	Roller	Lilac-breasted	Least Concern
402	Roller	Purple	Least Concern
403	Roller	Racket-tailed	Least Concern
404	Sandgrouse	Burchell's	Least Concern
405	Sandgrouse	Double-banded	Least Concern
406	Sandgrouse	Namaqua	Least Concern
407	Sandgrouse	Yellow-throated	Near Threatened
408	Sandpiper	Common	Least Concern
409	Sandpiper	Curlew	Least Concern
410	Sandpiper	Green	Least Concern
411	Sandpiper	Marsh	Least Concern
412	Sandpiper	Pectoral	Least Concern
413	Sandpiper	Wood	Least Concern
414	Saw-wing	Black (Southern Africa)	Least Concern
415	Scimitarbill	Common	Least Concern
416	Scrub Robin	Bearded	Least Concern
417	Scrub Robin	Brown Scrub	Least Concern
418	Scrub Robin	Kalahari	Least Concern
419	Scrub Robin	White-browed	Least Concern
420	Seedeater	Streaky-headed	Least Concern
421	Shelduck	South African	Least Concern
422	Shoveler	Cape	Least Concern
423	Shrike	Crimson-breasted	Least Concern
424	Shrike	Lesser Grey	Least Concern

No.	Group	Species	Conservation status
425	Shrike	Magpie	Least Concern
426	Shrike	Red-backed	Least Concern
427	Shrike	Southern White-crowned	Least Concern
428	Skimmer	African	Least Concern
429	Snipe	African	Least Concern
430	Sparrow	Cape	Least Concern
431	Sparrow	Great	Least Concern
432	Sparrow	House	Least Concern
433	Sparrow	Northern Grey-headed	Least Concern
434	Sparrow	Southern Grey-headed	Least Concern
435	Sparrow	Yellow-throated Bush	Least Concern
436	Sparrowhawk	Black	Least Concern
437	Sparrowhawk	Little	Least Concern
438	Sparrowhawk	Ovambo	Least Concern
439	Sparrowhawk	Rufous-breasted	Least Concern
440	Sparrow-Lark	Chestnut-backed	Least Concern
441	Sparrow-Lark	Grey-backed	Least Concern
442	Sparrow-Weaver	White-browed	Least Concern
443	Spinetail	BÃ¶hm's	Least Concern
444	Spinetail	Mottled	Least Concern
445	Spoonbill	African	Least Concern
446	Spurfowl	Natal	Least Concern
447	Spurfowl	Red-billed	Least Concern
448	Spurfowl	Swainson's	Least Concern
449	Starling	Burchell's	Least Concern
450	Starling	Cape	Least Concern
451	Starling	Common	Least Concern
452	Starling	Greater Blue-eared	Least Concern
453	Starling	Meves's	Least Concern
454	Starling	Miombo Blue-eared	Least Concern
455	Starling	Pied	Least Concern
456	Starling	Red-winged	Least Concern
457	Starling	Violet-backed	Least Concern
458	Starling	Wattled	Least Concern
459	Stilt	Black-winged	Least Concern
460	Stint	Little	Least Concern
461	Stonechat	African	Least Concern
462	Stork	Abdim's	Least Concern
463	Stork	Black	Least Concern
464	Stork	Marabou	Least Concern
465	Stork	Saddle-billed	Endangered

No.	Group	Species	Conservation status
466	Stork	White	Least Concern
467	Stork	Woolly-necked	Least Concern
468	Stork	Yellow-billed	Least Concern
469	Sugarbird	Gurney's	Least Concern
470	Sunbird	Amethyst	Least Concern
471	Sunbird	Collared	Least Concern
472	Sunbird	Greater Double-collared	Least Concern
473	Sunbird	Malachite	Least Concern
474	Sunbird	Marico	Least Concern
475	Sunbird	Purple-banded	Least Concern
476	Sunbird	Scarlet-chested	Least Concern
477	Sunbird	Southern Double-collared	Least Concern
478	Sunbird	White-bellied	Least Concern
479	Swallow	Barn	Least Concern
480	Swallow	Greater Striped	Least Concern
481	Swallow	Grey-rumped	Least Concern
482	Swallow	Lesser Striped	Least Concern
483	Swallow	Mosque	Least Concern
484	Swallow	Pearl-breasted	Least Concern
485	Swallow	Red-breasted	Least Concern
486	Swallow	South African Cliff	Least Concern
487	Swallow	White-throated	Least Concern
488	Swallow	Wire-tailed	Least Concern
489	Swamphen	African	Least Concern
490	Swift	African Black	Least Concern
491	Swift	African Palm	Least Concern
492	Swift	Alpine	Least Concern
493	Swift	Common	Least Concern
494	Swift	Horus	Least Concern
495	Swift	Little	Least Concern
496	Swift	White-rumped	Least Concern
497	Tchagra	Black-crowned	Least Concern
498	Tchagra	Brown-crowned	Least Concern
499	Tchagra	Southern	Least Concern
500	Teal	Blue-billed	Least Concern
501	Teal	Cape	Least Concern
502	Teal	Red-billed	Least Concern
503	Tern	Bridled	Least Concern
504	Tern	Caspian	Least Concern
505	Tern	Whiskered	Least Concern
506	Tern	White-winged	Least Concern

No.	Group	Species	Conservation status
507	Thick-knee	Spotted	Least Concern
508	Thick-knee	Water	Least Concern
509	Thrush	Cape Rock	Least Concern
510	Thrush	Groundscraper	Least Concern
511	Thrush	Karoo	Least Concern
512	Thrush	Kurrichane	Least Concern
513	Thrush	Olive	Least Concern
514	Thrush	Orange Ground	Least Concern
515	Thrush	Sentinel Rock	Least Concern
516	Thrush	Short-toed Rock	Least Concern
517	Tinkerbird	Red-fronted	Least Concern
518	Tinkerbird	Yellow-fronted	Least Concern
519	Tinkerbird	Yellow-rumped	Least Concern
520	Tit	Ashy	Least Concern
521	Tit	Cape Penduline	Least Concern
522	Tit	Grey Penduline	Least Concern
523	Tit	Southern Black	Least Concern
524	Tit-Flycatcher	Grey	Least Concern
525	Trogon	Narina	Least Concern
526	Turaco	Knysna	Least Concern
527	Turaco	Purple-crested	Least Concern
528	Turnstone	Ruddy	Least Concern
529	Twinspot	Green	Least Concern
530	Twinspot	Pink-throated	Least Concern
531	Vulture	Cape	Endangered
532	Vulture	Egyptian	Least Concern
533	Vulture	Hooded	Least Concern
534	Vulture	Lappet-faced	Least Concern
535	Vulture	Palm-nut	Endangered
536	Vulture	White-backed	Least Concern
537	Vulture	White-headed	Least Concern
538	Wagtail	African Pied	Least Concern
539	Wagtail	Cape	Least Concern
540	Wagtail	Grey	Least Concern
541	Wagtail	Mountain	Least Concern
542	Wagtail	Western Yellow	Least Concern
543	Warbler	African Reed (Old, Use Common Reed Warbler)	Least Concern
544	Warbler	African Yellow	Least Concern
545	Warbler	Barratt's	Least Concern
546	Warbler	Chestnut-vented	Least Concern
547	Warbler	Common Reed	Least Concern

No.	Group	Species	Conservation status
548	Warbler	Garden	Least Concern
549	Warbler	Great Reed	Least Concern
550	Warbler	Icterine	Least Concern
551	Warbler	Lesser Swamp	Least Concern
552	Warbler	Little Rush	Least Concern
553	Warbler	Marsh	Least Concern
554	Warbler	Olive-tree	Least Concern
555	Warbler	River	Least Concern
556	Warbler	Sedge	Least Concern
557	Warbler	Upcher's	Least Concern
558	Warbler	Willow	Least Concern
559	Warbler	Wood	Least Concern
560	Warbler	Yellow-throated Woodland	Least Concern
561	Wattle-eye	Black-throated	Least Concern
562	Waxbill	Black-faced	Least Concern
563	Waxbill	Blue	Least Concern
564	Waxbill	Common	Least Concern
565	Waxbill	Grey	Least Concern
566	Waxbill	Orange-breasted	Least Concern
567	Waxbill	Swee	Least Concern
568	Waxbill	Violet-eared	Least Concern
569	Weaver	Cape	Least Concern
570	Weaver	Golden	Least Concern
571	Weaver	Lesser Masked	Least Concern
572	Weaver	Red-billed Buffalo	Least Concern
573	Weaver	Red-headed	Least Concern
574	Weaver	Scaly-feathered	Least Concern
575	Weaver	Southern Masked	Least Concern
576	Weaver	Spectacled	Least Concern
577	Weaver	Thick-billed	Least Concern
578	Weaver	Village	Least Concern
579	Wheatear	Capped	Least Concern
580	Wheatear	Mountain	Least Concern
581	Wheatear	Northern	Least Concern
582	Whimbrel	Eurasian	Least Concern
583	White-eye	Cape	Least Concern
584	White-eye	Northern Yellow	Least Concern
585	White-eye	Southern Yellow	Least Concern
586	Whitethroat	Common	Least Concern
587	Whydah	Long-tailed Paradise	Least Concern
588	Whydah	Pin-tailed	Least Concern

No.	Group	Species	Conservation status
589	Whydah	Shaft-tailed	Least Concern
590	Widowbird	Fan-tailed	Least Concern
591	Widowbird	Long-tailed	Least Concern
592	Widowbird	Red-collared	Least Concern
593	Widowbird	White-winged	Least Concern
594	Wood Hoopoe	Green	Least Concern
595	Woodpecker	Bearded	Least Concern
596	Woodpecker	Bennett's	Least Concern
597	Woodpecker	Cardinal	Least Concern
598	Woodpecker	Golden-tailed	Least Concern
599	Woodpecker	Olive	Least Concern
600	Wren-Warbler	Barred	Least Concern
601	Wren-Warbler	Stierling's	Least Concern
602	Wryneck	Red-throated	Least Concern
603		Bateleur	Least Concern
604		Bokmakierie	Least Concern
605		Brubru	Least Concern
606		Hamerkop	Least Concern
607		Mallard	Least Concern
608		Neddicky	Least Concern
609		Quailfinch	Least Concern
610		Ruff	Least Concern
611		Sanderling	Least Concern
612		Secretarybird	Vulnerable
613		Shikra	Least Concern

Of all the listed avifauna species occurring within the broader region of the SABP2 pentads, it is all the species highlighted in green in Table 5 noted by Taylor et al., 2015 to be either Nearly Threatened, Endangered, Critically Endangered or Vulnerable.

Species of conservation importance

Nine (9) categories are used by the International Union for Conservation of Nature (IUCN) in distinguishing the conservation status of species across all taxa (IUCN, 2001). Figure 10 is a diagram showing the structure of the 9 categories and Table 6 gives a summary of the 9 categories which were all considered for this study. The categories are important for classifying species at high risk of global extinction to further inform specialist recommendations. The assessment of Red Data status follows Taylor (2015) and the ESKOM Red Data Book of Birds of South Africa, Lesotho and Swaziland.

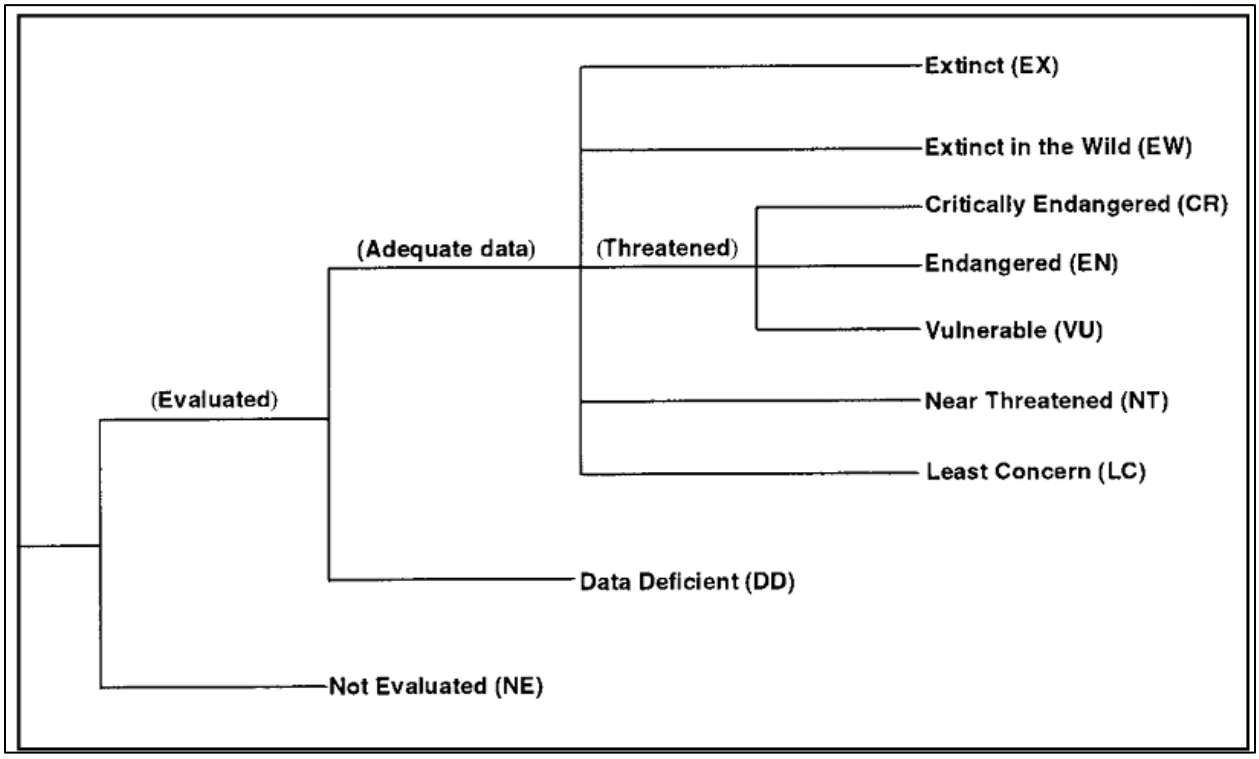

Figure 10: A representation of the relationships between the 9 categories (IUCN, 2001).

Table 6. IUCN red-list conservation criteria.

Extinct	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild	A taxon is extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), and throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered	A taxon is critically endangered when the best available evidence indicates that it meets any of the criteria for critically endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered	A taxon is endangered when the best available evidence indicates that it meets any of the criteria for endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable	A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria for vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened	A taxon is near threatened when it has been evaluated against the criteria but does not qualify for critically endangered, endangered or vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern	A taxon is least concern when it has been evaluated against the criteria and does not qualify for critically endangered, endangered, vulnerable or near threatened. Widespread and abundant taxa are included in this category.
Data Deficient	A taxon is data deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Not Evaluated	A taxon is not evaluated when it is has not yet been evaluated against the criteria.

Endemic species

South Africa has a rich diversity of nationally and regionally endemic species that are found nowhere else on earth and, therefore, warrant consideration for assessment of sensitivity to potential developments. An example from the broader pentad areas, the African Red-eyed Bulbul (*Pycnonotus nigricans*) is listed to occur in the proposed development area. The African Red-eyed Bulbul is listed by Taylor et al., (2015) to be a near-endemic species.

RESULTS OF AVIFAUNAL POPULATION ASSESSMENT

Species composition, diversity and abundance

Figure 11 below is representations of the observed species during assessments (species abundance) using the different sampling methods. Tables 11 is a list of the recorded species during assessments, using the different sampling methods. Species composition of encountered avifaunal community during assessments and the site can be concluded to have a moderate diversity.

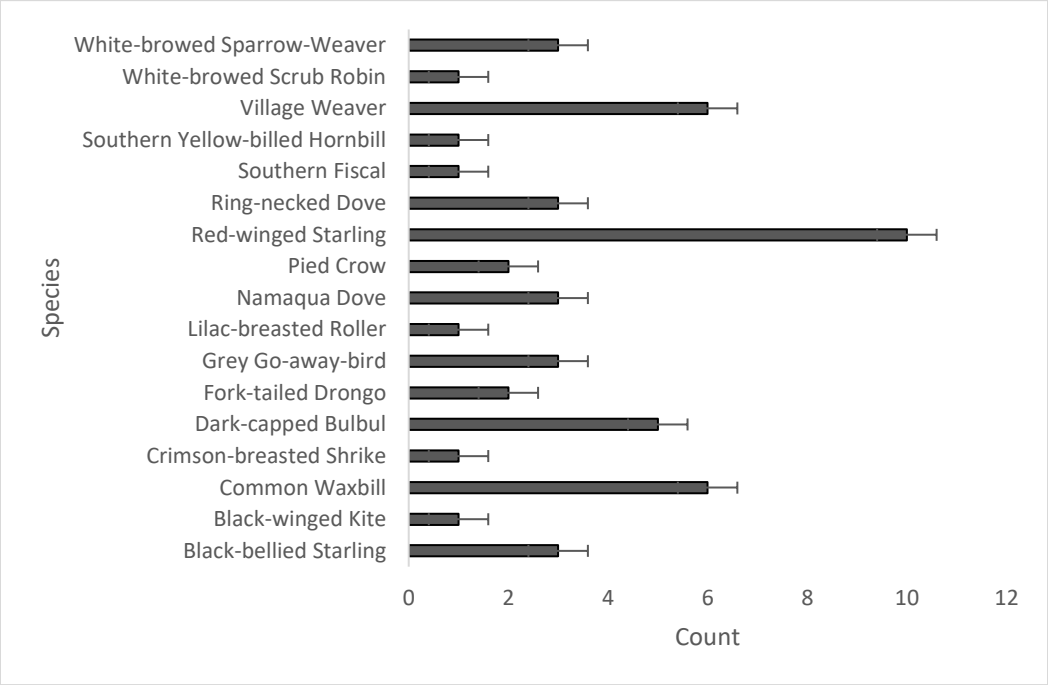

Figure 11: Encountered avifaunal species during vehicle-drive surveys.

Species abundance was mostly low for the different species with an extreme outlier of the Red-winged Starling and the Common waxbill.

Some important habitats observed within Mokopane are shown below (Figure 12). In addition to this, there are formally protected areas that the powerline will at some point, traverse (Figure 13). Although these areas are not listed under Important Bird and Biodiversity Areas (Figure 14), overall they serve a similar purpose, which is to conserve faunal species and their habitats.

Crested Barbet	Southern Yellow billed Hornbill
	
Witvinger Nature Reserve	Witvinger Nature Reserve

Dam near Ga Sekhaolelo

Mountanious habitat within Witvinger NR

Narrow river crossing in Uitloop

Dam near R101 crossing

Figure 12: Observed important habitats.

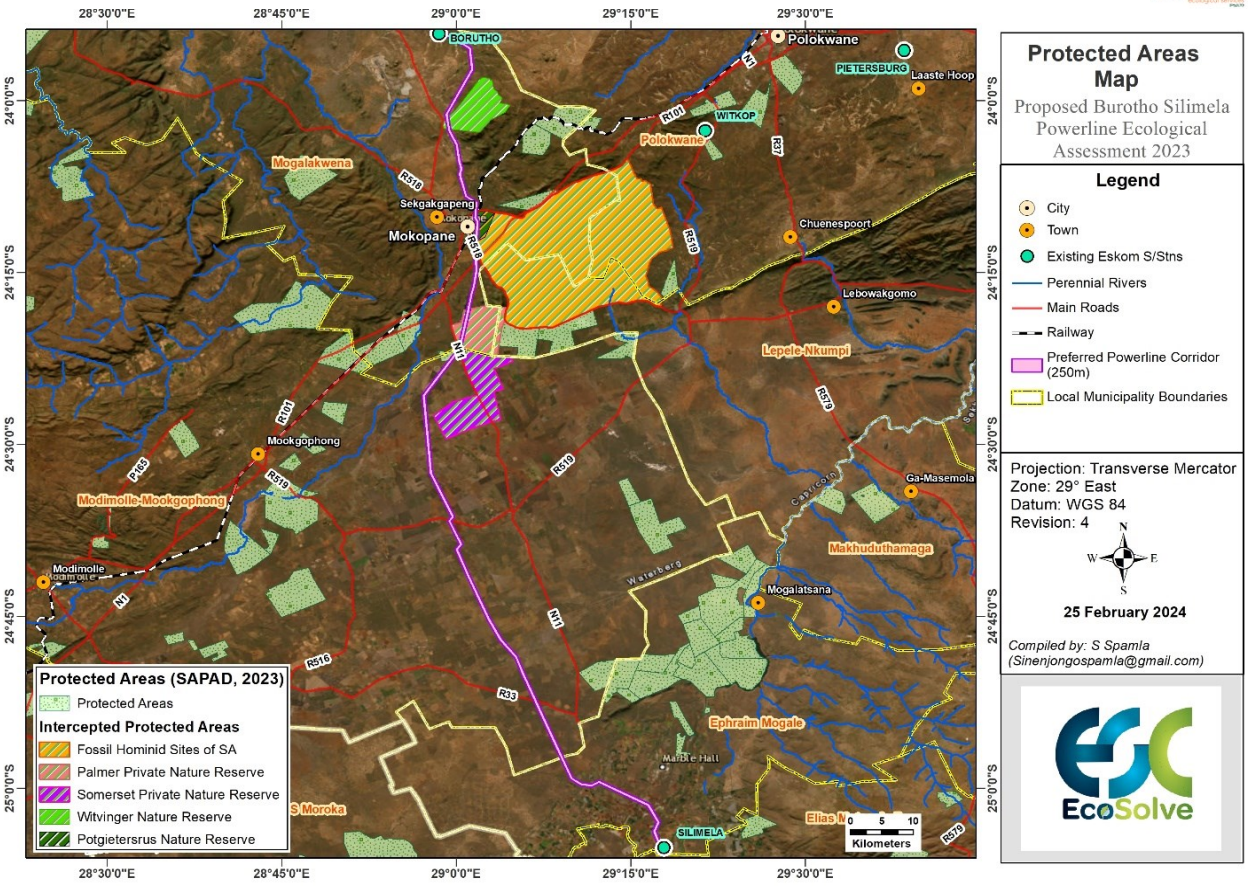

Figure 13: Protected areas map.

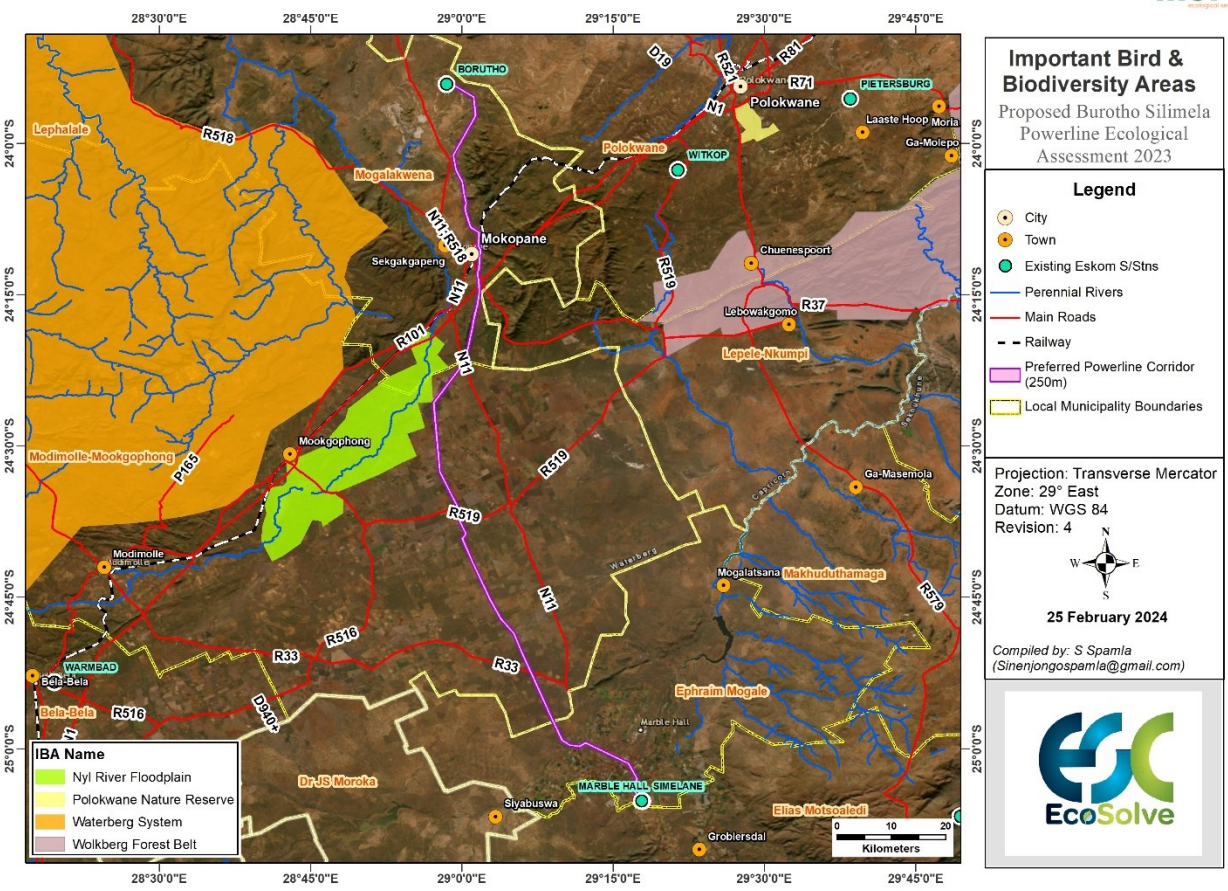

Figure 14: Important Birds and Biodiversity map.

Table 7. Recorded species and their abundance during assessments

No.	Species	Count
1	Black-bellied Starling	3
2	Black-winged Kite	1
3	Common Waxbill	6
4	Crimson-breasted Shrike	1
5	Dark-capped Bulbul	5
6	Fork-tailed Drongo	2
7	Grey Go-away-bird	3
8	Lilac-breasted Roller	1
9	Namaqua Dove	3
10	Pied Crow	2
11	Red-winged Starling	10
12	Ring-necked Dove	3
13	Southern Fiscal	1
14	Southern Yellow-billed Hornbill	1

No.	Species	Count
15	Village Weaver	6
16	White-browed Scrub Robin	1
17	White-browed Sparrow-Weaver	3

Results from the collected data indicate a moderate species diversity throughout the area. This is subject to the unequal abundance of a single species. An inconsistent diversity of the overall avifaunal population was observed.

IMPACTS OF ELECTRICITY TRANSMISSION DEVELOPMENTS ON AVIFAUNA

BirdLife, a dedicated bird-conservation organization in South Africa takes a strong position on the impact of distribution/transmission on birds, but not withstanding the countries technological advancements and developments. BirdLife's primary concern is the movement and removal of globally or nationally threatened birds, endemic or range-restricted species, or rare species from critical habitats. They are mostly concerned with the following impacts imposed by the development of powerlines:

1. The displacement of threatened species from important habitats;

2. Loss of habitat for resident species, especially where cumulative impacts exist;

3. The disturbance of resident species throughout construction, operation and maintenance;

4. Electrocution and collision at power line infrastructure;

5. New power line construction.

BirdLife suggests the following actions in terms of mitigating the impacts on birds:

- Undertaking sufficient pre-construction monitoring to determine the presence of threatened, rare, endemic or range-restricted species. SABAP2 data is recommended to supplement adequate field surveys.
- Constructing power lines and, if new lines are required, motivate the need for lines to be adequately marked with anti-collision devices and bird-friendly designs to prevent electrocution.
- Avoiding construction near large trees (e.g., in the Karoo) which serve as nesting and roosting sites for raptors and vultures.
- Not using chemicals/pesticides for the maintenance of land/vegetation and rather use mowing or grazing to retard vegetation growth.
- Constructing new power lines in such a way that they have minimal impact on birds (i.e., bird-friendly designs, appropriate wire marking devices).

- Deconstruction of the plant after the expected economic life span.

The impacts that were considered relevant to the proposed powerline have been included in the impact assessment ratings.

IMPACTS ASSESSMENT MATRIX

The methodology for assessing the impact ratings is included as Appendix A: Method of Environmental Assessment at the end of this report. The rating rankings for assessing impacts significance are as shown in Table 8 below. The findings of the impact assessment ratings are shown in the tables below. Table 9 is the impacts matrix used for scoring environmental significance and Table 10 is a summary of impacts ratings for the proposed powerline development and associated infrastructure using Appendix A.

Table 8. Impact rating scoring used for the avifaunal impact assessment at the proposed powerline construction.

Significance Points	Environmental Significance	Description
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

An impact assessment of all potential pre-construction, construction, operational and maintenance phase impacts associated with the activities pertaining to the proposed infrastructure developments are provided in Table 9.

Table 9. Avifaunal impact ratings for the proposed development and associated infrastructure.

Construction Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of priority avian species from important habitats	Mitigation: Minimize the construction footprint and reserve indigenous vegetation wherever possible. Construct development in shortest timeframe and control pollution
Magnitude:	6	4
Duration:	2	1
Extent:	1	1
Irreplaceable:	3	2
Reversibility:	3	2
Probability:	3	1
Total SP:	45	10
Significance rating:	Medium (M)	Low (L)
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of resident avifauna through increased disturbance	Mitigation: Minimize the construction footprint and reserve indigenous vegetation wherever possible. Construct development in shortest timeframe and control pollution
Magnitude:	6	4
Duration:	2	1
Extent:	1	1
Irreplaceable:	2	2
Reversibility:	2	1
Probability:	4	2
Total SP:	52	18
Significance rating:	Medium (M)	Low (L)

POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of important avian habitats e.g. wetlands and nesting sites	Mitigation: Use designated roads to access the site. Minimize the construction footprint and reserve indigenous vegetation wherever possible. Construct development in shortest timeframe and control noise pollution. Prohibit construction near nesting sites especially during the breeding season (summer). Rehabilitate area with indigenous flora
Magnitude:	6	6
Duration:	2	4
Extent:	1	1
Irreplaceable:	3	3
Reversibility:	3	3
Probability:	3	2
Total SP:	45	34
Significance rating:	Medium (M)	Low (L)
Operation Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of priority avian species from important habitats	Mitigation: Minimize the construction footprint and reserve indigenous vegetation wherever possible. Construct development in shortest timeframe and control pollution
Magnitude:	6	4
Duration:	2	1
Extent:	1	1
Irreplaceable:	3	2
Reversibility:	3	2
Probability:	3	1
Total SP:	45	10
Significance rating:	Medium (M)	Low (L)
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of resident avifauna through increased disturbance	Mitigation: Minimize construction footprint and reserve indigenous vegetation wherever possible. Construct development in shortest timeframe, control noise pollution
Magnitude:	6	2
Duration:	3	3

Extent:	1	1
Irreplaceable:	2	2
Reversibility:	2	2
Probability:	3	3
Total SP:	42	30
Significance rating:	Medium (M)	Low (L)
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Collisions with pylons leading to injury or loss of avian life	Mitigation: Ensure that bird flight diverters are installed along water crossings as they are considered collision risk areas. Conduct quarterly fatality monitoring assessments
Magnitude:	6	4
Duration:	3	3
Extent:	1	1
Irreplaceable:	2	2
Reversibility:	4	3
Probability:	3	2
Total SP:	48	26
Significance rating:	Medium (M)	Low (L)
Decommissioning Phase	**Preferred Alternative (Alternative 1)**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of priority avian species from important habitats	Mitigation: None required due to low significance
Magnitude:	4	4
Duration:	2	1
Extent:	1	1
Irreplaceable:	2	2
Reversibility:	2	2
Probability:	2	1
Total SP:	22	10
Significance rating:	Low (H)	Low (L)
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of resident avifauna through increased disturbance	Mitigation: None required due to low significance
Magnitude:	2	2
Duration:	2	2
Extent:	1	1
Irreplaceable:	2	2
Reversibility:	2	2
Probability:	2	2
Total SP:	18	18

Significance rating:	Low (H)	Low (L)
Post Decommissioning Phase	Preferred Alternative (Alternative 1)	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Cumulative displacement of priority avian species from important habitats	Mitigation: Minimize development footprint and habitat transformation, limit ongoing human activity to the minimum required for ongoing operation, control noise to a minimum, rehabilitate with native vegetation and retain indigenous vegetation throughout as far as possible, limit roadways and vehicle speeds; rehabilitate thoroughly post-decommissioning with locally native species
Magnitude:	6	4
Duration:	5	3
Extent:	2	2
Irreplaceable:	3	2
Reversibility:	3	2
Probability:	3	2
Total SP:	57	26
Significance rating:	Medium (M)	Low (L)
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Cumulative displacement of resident avifauna	Mitigation: Minimize development footprint and habitat transformation, limit ongoing human activity to the minimum required for ongoing operation, control noise pollution, rehabilitate with indigenous flora and reserve indigenous vegetation throughout as far as possible, limit roadways and vehicle speeds
Magnitude:	6	4
Duration:	2	2
Extent:	1	1
Irreplaceable:	2	2
Reversibility:	2	2
Probability:	2	2
Total SP:	26	22
Significance rating:	Low (L)	Low (L)

POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Cumulative loss of important avian habitats	Mitigation: Minimize development footprint and habitat transformation, rehabilitate with indigenous flora and reserve indigenous vegetation throughout as far as possible
Magnitude:	4	4
Duration:	4	3
Extent:	2	1
Irreplaceable:	2	2
Reversibility:	2	2
Probability:	3	2
Total SP:	42	24
Significance rating:	Medium (M)	Low (L)

Table 10. Summary of avifaunal impact ratings for the proposed development.

	Average impact rating	Significance class	Average mitigated impact	Significance class
Avifaunal impacts of the PV array and associated infrastructure	40.18	Medium (M)	20.73	Low (L)

MITIGATION REQUIREMENTS

Loss of priority avian species from important habitats

The area has been identified as 'High Animal Sensitivity' by DFFE's screening tool. The construction footprint must be minimized and indigenous vegetation should be reserved as much as possible. Construction should run for a shortest possible timeframe. Pollution should be controlled.

Loss of resident avifauna through increased disturbance

The resident avifaunal community has a moderate diversity. A biodiversity protocol and rehabilitation plan that will be implemented following the decommissioning phase should be in place.

Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats

Designated roads must be used to access the proposed development site. The construction footprint must be minimized and indigenous vegetation should be reserved as much as possible. Construction should run for a shortest possible timeframe. Pollution should be controlled and the area should preferably be rehabilitated using indigenous vegetation.

Collisions with infrastructure and electrocution can lead to injury or loss of avian life, which decreases avifauna species diversity.

Bird collision mortality associated with powerline infrastructure is a global conservation challenge. To avoid the impacts associated with collisions, demarcate sections requiring the installation of deterrents/flappers on all required sections of power line or directly adjacent to site. Additionally, quarterly fatality monitoring assessments should be conducted. Implementing these mitigations should reduce the significance by 59% and results in Negative medium impact ratings.

In summary, the majority of the mitigations listed in Table 10 above for the proposed development involve minimizing impact footprints during construction, limiting site access beyond direct disturbance zones, reducing noise pollution and using designated roads as much as possible. Implementing these mitigations reduces the significance by 35-50% which results in acceptable Negative low impact ratings.

The cumulative effects of the development area, combined with other similar projects, are a concern due to the rising number of proposed transmission project facilities in the broader area. Given that the vegetation and bird species on the property are typical of the Savanna Biome, the overall cumulative impact on avifauna from the development is expected to remain relatively minimal. This is contingent on identifying and maintaining suitable ecological corridors within the broader area to ensure the preservation of ecological connectivity between regions of higher conservation value.

In summary, the majority of the mitigations listed in Table 7 above for the proposed development involve minimising impact footprints during construction, limiting site access beyond direct disturbance zones, reducing noise pollution and using designated roads as much as possible. Implementing these mitigations reduces the significance by 35-50% which results in acceptable Negative low impact ratings.
Majority of the works on the associated substations will have very minimal impacts as there is an existing infrastructure and vegetation around the substations has already been transformed by previous activities and ongoing maintenance. Bird collisions are also expected to be low because resident avifauna is used to the existing infrastructure along the flight paths.

NO-GO AREAS, BUFFERS AND ALTERNATIVES

No no-go area is applicable to the project site from an avifaunal perspective provided that mitigations are followed.

CONCLUSION AND RECOMMENDATIONS

The proposed powerline development is situated in an area of High animal sensitivity. Acquired historical data indicated the dominance of Least Concern species with a very moderate diversity of individuals. As a result, from an avifaunal perspective, there is no objection to the development of the proposed powerline

development and associated infrastructure, provided that the recommended mitigation measures are strictly followed.

The overall impacts (including cumulative) for the project are considered to be Negative low should the mitigation recommendations be effectively implemented.

Specific conditions recommended for the EA from an avifaunal perspective

1. 1. It is recommended that the contractor installs EMB BF-1 Bird Flight Diverters along water crossings.
2. Bird Flight Diverters should be placed from tower/pylon to tower/pylon instead of 60% placement along river crossings.
3. Implement mitigation controls during the construction phase as specified in the mitigation requirements. Monitor and report on their effectiveness.
4. Implement mitigation controls during the operational phase as specified in the mitigation. Monitor and report on their effectiveness.
5. Monitoring of implementation of mitigation controls, along with reporting, should be undertaken at least quarterly throughout the construction phase, and bi-annually during the operational phase. Monitoring, at the minimum, should consist of a quarterly monitoring of the powerline area for evidence of collisions and electrocution risks.
6. Preserve as much of the natural habitat as possible during construction and operation to lessen the operational impacts and to reduce the irreversibility of impacts.
7. Effective restoration of the natural habitats that were intact before the development should be implemented and reported on after decommissioning.

Overall, there is no objection for the proposed powerline development to continue. It is the opinion of the specialist that the proposed powerline project be approved by the Competent Authority, provided that the mitigations and recommendations are adhered to.

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APPENDICES

Appendix A: Method of Environmental Assessment

For each potential impact, the EXTENT (Spatial scale), MAGNITUDE (degree of the impact), DURATION (time scale), PROBABILITY (occurrence), IRREPLACEABILITY (loss of resources) and the REVERSIBILITY (degree to which the proposed impact can be reversed) will be assessed by the EAP as well as the Specialists. The assessment of the above criteria will be used to determine the significance of each impact, with and without the implementation of the proposed mitigation measures. The scale to be used to assess these variables and to define the rating categories are tabulated in the Table 11 below.

Table 11. Evaluation components, ranking scales and descriptions (criteria)

Evaluation component	Ranking scale and description (criteria)
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	10 - Very high: Bio-physical and/or social functions and/or processes might be severely altered. 8 - High: Bio-physical and/or social functions and/or processes might be considerably altered. 6 - Medium: Bio-physical and/or social functions and/or processes might be notably altered. 4 - Low: Bio-physical and/or social functions and/or processes might be slightly altered. 2 - Very Low: Bio-physical and/or social functions and/or processes might be negligibly altered. 0 - Zero: Bio-physical and/or social functions and/or processes will remain unaltered
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	10 - Very high (positive): Bio-physical and/or social functions and/or processes might be substantially enhanced. MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale) 8 - High (positive): Bio-physical and/or social functions and/or processes might be considerably enhanced. 6 - Medium (positive): Bio-physical and/or social functions and/or processes might be notably enhanced. 4 - Low (positive): Bio-physical and/or social functions and/or processes might be slightly enhanced. 2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be negligibly enhanced. 0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain unaltered.
DURATION	5 - Permanent 4 - Long term: Impact ceases after operational phase/life of the activity > 60 years. 3 - Medium term: Impact might occur during the operational phase/life of the activity – 60 years. 2 - Short term: Impact might occur during the construction phase - < 3 years. 1 - Immediate
EXTENT (or spatial scale/influence of impact)	5 - International: Beyond National boundaries. 4 - National: Beyond Provincial boundaries and within National boundaries. 3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries. 2 - Local: Within 5 km of the proposed development. 1 - Site-specific: On site or within 100 m of the site boundary. 0 - None
IRREPLACEABLE loss of resources	5 – Definite loss of irreplaceable resources. 4 – High potential for loss of irreplaceable resources. 3 – Moderate potential for loss of irreplaceable resources. 2 – Low potential for loss of irreplaceable resources. 1 – Very low potential for loss of irreplaceable resources. 0 - None
REVERSIBILITY of impact	5 – Impact cannot be reversed. 4 – Low potential that impact might be reversed. 3 – Moderate potential that impact might be reversed. 2 – High potential that impact might be reversed. 1 – Impact will be reversible. 0 – No impact.

PROBABILITY (of occurrence)	5 - Definite: >95% chance of the potential impact occurring. 4 - High probability: 75% - 95% chance of the potential impact occurring. 3 - Medium probability: 25% - 75% chance of the potential impact occurring 2 - Low probability: 5% - 25% chance of the potential impact occurring. 1 - Improbable: <5% chance of the potential impact occurring.
Evaluation component	**Ranking scale and description (criteria)**
CUMULATIVE impacts	High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Low: The activity is localised and might have a negligible cumulative impact. None: No cumulative impact on the environment.

SPECIALIST DETAILS, CURRICULUM VITAE AND DECLARATION

The surveys and assessments were undertaken by Mokgatla Jerry Molepo, a competent avifaunal specialist.

CURRICULUM VITAE

EDUCATION:

- MSc Zoology, Nelson Mandela University (Percy FitzPatrick Institute of African Ornithology Centre of Excellence)

Research Project Topic: Foraging behaviour and thermal physiology in Cape Sugarbirds: sex-specific responses to temperature.

- BSc Honours in Zoology, University of Limpopo

Research Project Topic: Morphometrics and plumage variation in the South African Fiscal flycatcher *Sigelus silens* Shaw 1809.

- BSc Botany & Zoology, University of Venda
- Grade 12, Marobathota High School

CERTIFICATES:

- Environmental Monitoring, Van Walt UK
- SASS5 Aquatic Biomonitoring, GroundTruth
- Hydropedology and Wetland Functioning, Terra Soil Science & Water Business Academy
- Section 21 (c) & (i) Water Use Authorisation Training, Department of Water and Sanitation
- Basic Project Management, Hudisa Business School

PROFESSIONAL MEMBERSHIP:

- South African Council for Natural Scientific Professions (SACNASP) – Professionally registered as Professional Natural Scientist. **Registration number:** 009509
- British Ecological Society (BES). **Membership number**: 1010709
- Zoological Society of Southern Africa (ZSSA). **Membership number**: 691

WORK EXPERIENCE:

- MORA Ecological Services (Pty) Ltd: April 2018 – Current, I am an Environmental Specialist, and my duties include; (i) Conducting Biodiversity, Aquatic Impact Assessments, Rehabilitation (ii) Compilation of specialist reports.
- Arcus Consulting: May - November 2017, I was a subcontracted avifaunal surveyor for the proposed Highlands Wind Energy Farm, Somerset East, Eastern Cape.
- Centre for African Conservation Ecology (ACE), Nelson Mandela University: 2015 - 2016, I was a field guide/ environmental educator. Responsibilities: taking school learners on trial walks inside the Nelson Mandela University Nature Reserve.
- South African National Biodiversity Institute (SANBI): May – December 2014, I was a Zoological Systematics Technician. Responsibilities: (i) Insect identification and curation, and (ii) compiling the animal checklist of South Africa, (iii) Sourcing wildlife crime reports on endangered animals and plants for Barcode of Wildlife Project, (iv) Monitoring the bird population in the Botanical Garden.
- Department of Zoology, University of Venda: 2009 – 2013, I was a Research Assistant under Dr. T.C Munyai who was conducting a long-term research project which monitored the effects of climate change on biota and processes influencing ecosystem functioning and species diversity patterns.
- Percy FitzPatrick Institute of African Ornithology: March – April 2014, I was a Research Assistant under Dr. Rita Covas' Sociable Weaver Research Project. This is a long-term study which looks at the reproductive success of Sociable weavers at Benfontein Nature Reserve in Kimberley.

Key experience in specialist projects

Year	Project	Location:	Role(s)
2022	Specialist Avifaunal Assessment for Proposed 132kV Artemis MTS Powerline in the Free State Province	Free State	Avifaunal Specialist/Ornithologist
2022	Biodiversity Impact Assessment for the Proposed Prospecting Right Application on Farm Ximba 16505 within the ULundi Local Municipality	Ulundi, KwaZulu-Natal	Ecologist

Year	Project	Location:	Role(s)
2022	Avifaunal and Aquatic Assessment Report for Proposed 132kV Idutywa-Butterworth Powerline in the Eastern Cape Province	Eastern Cape	Ecologist
2022	Terrestrial Biodiversity Impact Assessment for the Proposed Student Housing Infrastructure on Erf 1733 Mmabatho Unit 6 within the Mahikeng Local Municipality	North-West	Ecologist
2022	Avifaunal Impact Assessment for the proposed 132kV for Musina-Makhado Special Economic Zone North Site	Musina, Limpopo	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed Khauta PV Solar including 44kV and 132kV Powerline	Welkom, Free State	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed NAOS PV Solar including 132kV Powerline	Free State	Avifaunal Specialist/Ornithologist
2022	Preconstruction Avifaunal Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Avifaunal Specialist/Ornithologist
2022	Preconstruction Botanical Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Ecologist
2022	Biodiversity Assessment, Land Capability and Veld Condition Assessment for PPC Cement SA Slurry	Slurry, North West	Ecologist
2021	Avifaunal Impact Assessment for the proposed Upington-Aries 2x 400kV	Upington, Northern Cape	Avifaunal Specialist/Ornithologist
2021	Habitat Assessment Post Rehabilitation for PPC Cement SA Dwaalboom Factory	Dwaalboom, Limpopo	Ecologist
2021	Habitat Assessment Post Rehabilitation for Gibson Bay Wind Energy Farm	Humansdorp, Eastern Cape	Ecologist
2021	Wetland Rehabilitation for the sewer pipeline construction in Daveyton	Ekurhuleni East College Campus, Daveyton, Gauteng	Wetland Ecologist

Year	Project	Location:	Role(s)
2021	12 Months Wetland Rehabilitation Supervision for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist