Appendix G.7

AVIFAUNA ASSESSMENT

Avifauna Scoping Assessment for the Proposed Verkykerskop WEF Cluster: Normandien WEF

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Report Name	**Avifauna Scoping Assessment for the Proposed Verkykerskop WEF Cluster: Normandien WEF**
Submitted to	**Normandien Wind Power (Pty) Ltd**
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

White Stork (*Ciconia Ciconia*)

DECLARATION

I, Tyron Clark, declare that:

- I act as the independent specialist in this application;
- I have performed 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 71 and is punishable in terms of Section 24F of the Act.

Tyron Clark (Pr. Sci. Nat. 121338)

Avifaunal Lead (Meraki Consulting Pty Ltd)

For: The Biodiversity Company

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1. Introduction

Due to the advance progress of the avifaunal monitoring program, this scoping report details key findings from both the scoping fieldwork as well as the first years-worth of avifaunal monitoring conducted for the proposed Normandien Wind Power (Pty) Ltd Wind Energy Facility (WEF). The Normandien WEF forms part of the Verkykerskop WEF Cluster (VWC). The VWC is situated in the Thabo Mofutsanyane District Municipality and Phumelela Local Municipality, near the town of Harrismith, in the Free State Province of South Africa near Verkykerskop, South Africa.

The VWC consists of three separate WEF applications each with their own 132 kV Grid Connections, within an area (Figure 1) spanning approximately 17958 ha in extent. The individual WEFs include Groothoek (6170 ha, 300 MW), Kromhof (5721 ha, 300 MW) and Normandien (6067 ha, 300 MW). The project triggers three species-specific best practice guidelines as published by BirdLife South Africa for (1) Cape Vulture (within 50 km of three roosts one of which breeding; Pfeiffer and Ralston-Paton, 2018), (2) Verreaux's Eagle (within 10 km of at least one confirmed nest; Ralston-Paton and Murgatroyd, 2021) and (3) Black Harrier (within suitable non-breeding foraging grounds; Simmons et al. 2020). Collectively these guidelines impose, *inter-alia,* two-years-worth of intensive pre-construction monitoring (including 72 hours of vantage point surveying by two observers per year).

The purpose of this scoping assessment was to highlight any potential flags associated with the Normandien WEF or the project as a whole and to establish and refine the sampling sites and survey protocol to be adopted for the pre-construction monitoring. The approach is designed to comply with all relevant global and national legislation and best practice standards. This includes, *inter alia*, the International Finance Corporation (IFC) Performance Standard 6 (IFC, 2019) and Equator Principles (EP4, 2020) but also leading global best practice standards specifically with regards to birds and wind energy particularly Jenkins et al. (2015). This scope of study caters to comply with the species-specific best practice guidelines for Cape Vulture (BLSA, 2018), Verreaux's Eagle (BLSA, 2017) and Black Harrier (BLSA, 2020). For reference purposes the Area of Influence or "AOI" as referred to in this study was defined so as to include all potential Cape Vulture roost sites within a 50 km radius of the project area and was refined to follow natural or man-made boundaries such as roads or escarpments. The term "region" refers to all areas within the greater Phumelela local municipality.

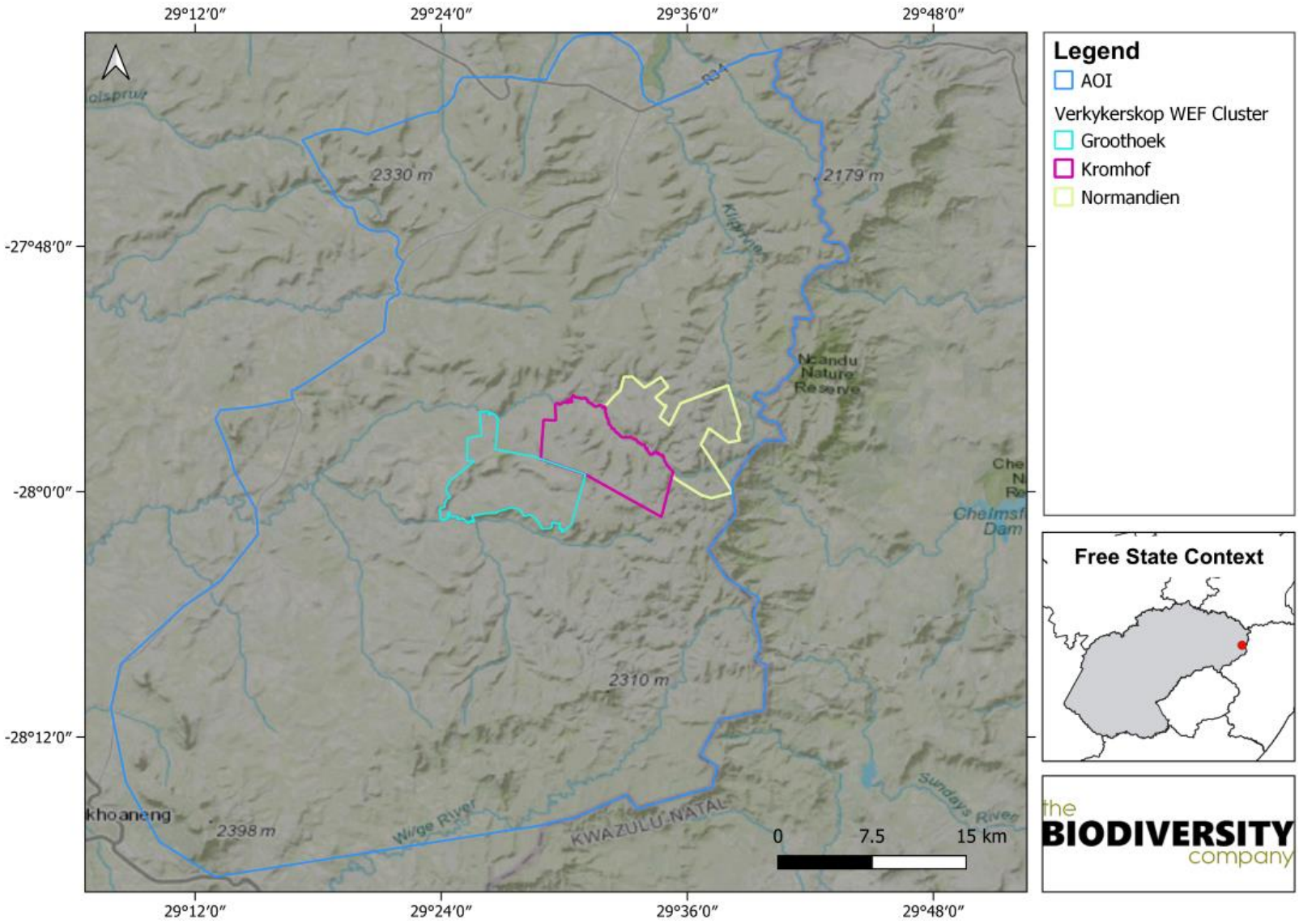

Figure 1-1 Overview of the location of the Normandien WEF in relation to the greater Verkykerskop WEF Cluster

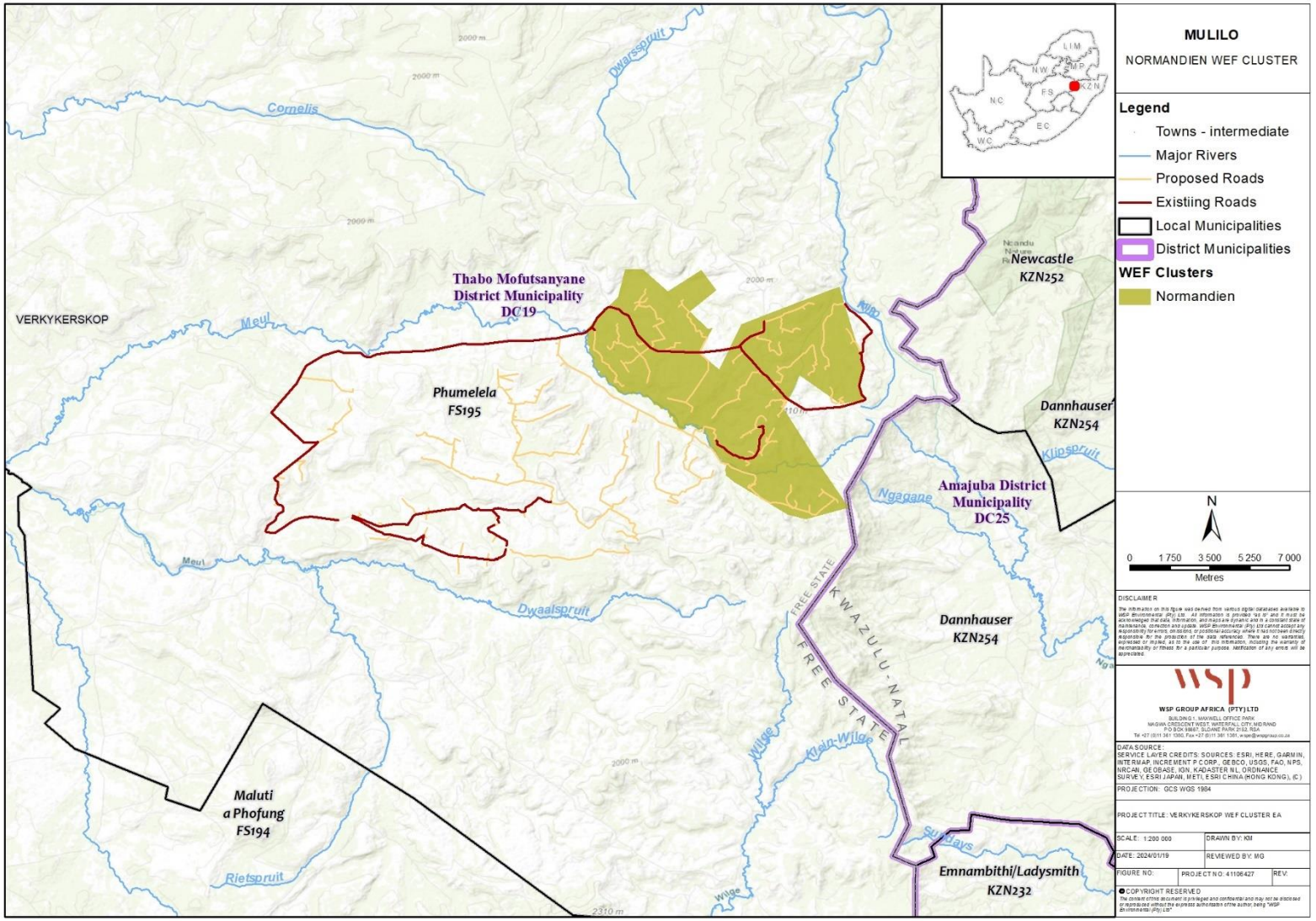

Figure 1-2 Location of the Normandien WEF

1.1 Project Description

The Normandien Wind Power Project is divided into two separate applications. The first being the WEF itself (up to 600 MW) which is subject to the full Scoping and EIA (S&EIA), The second is the Grid Connection (132 KV) which is subject to a Basic Assessment (BA) process. As such only the WEF will be considered for the purposes of the scoping assessment.

The WEF is situated in the west of the cluster and spans an area of 6067 ha. It covers 22 farm portions namely Christina No. 90, Mooiplaats No. 391, Brak Krans No. 554, Cecilia No. 579, Rooi Koppen No. 600, Goedgedacht No. 724, Kruger Wens No.1062, Scotland No. 1238, Lusthof No.1321, Remaining Extent of the Farm Welgelukt No. 1416, Inzicht No. 1428, Rooibeesberg No. 14898, Portion 1 of Farm Johanna No. 1395, Portion 1 of Farm Bull Hoek No. 329, Portion 1 of Farm Goede Hoop No. 982, Portion 2 of the Farm Driekoppen No. 485, Remaining Extent of portion 3 of the Farm Driekoppen No. 485, Portion 4 of Farm Driekoppen No. 485, Portion 5 of Farm Driekoppen No. 485, Remaining extent of Farm Johanna No. 1395, Remainder Farm Bull Hoek No. 329 and Remaining Extent of the Farm Driekoppen No. 485. At present, the Normandien WEF is planned to comprise:

- A total of up to 29 wind turbines with a rotor diameter of 200 m, a hub height of 140 m and a total height of 240 m. The hard standing area is < 0.8 ha per turbine;
- A reticulation network of 33kV cabling to connect the wind turbines to the onsite collector substations, to be laid underground where practical;
- A 132kV onsite collector substation (<2 ha);
- Concrete batching plant (1 ha);
- Construction camp and site office (4 ha);
- Materials laydown area (8 ha);
- Internal roads (8 m width); and
- O&M building (<1 ha).

1.2 Legislative Setting

The legislation, policies and guidelines listed below are applicable to the current project with regard to avifauna. The list below, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements relevant to these studies in the Free State

Region	Legislation
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973) African-Eurasian Waterbird Agreement (AEWA)
	Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 42946 (January 2020) The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 43110 (March 2020)

	The National Environmental Management Protected Areas Act (Act No. 57 of 2003) The National Environmental Management Biodiversity Act (Act No. 10 of 2004) The National Environmental Management: Waste Act, 2008 (Act 59 of 2008); The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations National Protected Areas Expansion Strategy (NPAES) Environmental Conservation Act (Act No. 73 of 1983) Natural Scientific Professions Act (Act No. 27 of 2003) National Biodiversity Framework (NBF, 2009) National Spatial Biodiversity Assessment (NSBA) National Heritage Resources Act, 1999 (Act 25 of 1999) Alien and Invasive Species Regulations, 2014 South Africa's National Biodiversity Strategy and Action Plan (NBSAP) Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) White Paper on Biodiversity South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.2020. Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998
Provincial	Free State Nature Conservation Ordinance 8 of 1969

1.3 Assumptions and Limitations

The following limitations should be noted for the assessment:

- Access was only arranged for survey work within the VWC;
- The number and locations of turbines within the turbine area has been provisionally provided but will only be finalised over the course of the two-year monitoring programme;
- No information has yet been provided on the location and length of access roads to the turbines for maintenance and construction; and
- The number of vantage points and their positions was carefully chosen based on the original WEF boundaries supplied by Mulilo in 2023 to ensure >75 % coverage assuming a 2 km 360° viewshed. Any changes to the extent of the original WEF boundaries supplied may be subject to a variation order to ensure adequate site coverage in line with best practice as outlined in Jenkins et al. (2015).

2. Methodology

This scoping report includes methodologies and key results from the first years-worth of avifaunal monitoring conducted at the Normandien WEF. The monitoring methodology was designed to comply with all relevant global and national legislation and best practice standards. In addition to the species-specific guidelines for Cape Vulture, Verreaux's Eagle and Black Harrier, this includes the International Finance Corporation (IFC) Performance Standard 6 (IFC, 2019) Equator Principles (EP4, 2020) and Jenkins et al. (2015).

2.1 Desktop Assessment

The following resources were consulted during the desktop assessment and for the compilation of the expected species list:

- Chittenden et al. (2016), Roberts Birds of Guide (2nd Edition.). The primary source for species identification, geographic range, life history information and birding routes in the AOI;
- Sinclair and Ryan (2010), Birds of Africa. Secondary source for identification;
- South African Bird Atlas Project (SABAP 2). Full protocol atlassing data from nine pentads cover the project area was used to construct the expected species list. These included 2755_2920, 2800_2920, 2755_2925, 2800_2925, 2750_2930, 2755_2930, 2800_2930, 2750_2935, 2755_2935;
- Taylor et al. (2015), Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Used for conservation status, nomenclature and taxonomical ordering;
- Birdlife South Africa website. For information on Important Bird Areas;
- Birds and wind energy best practice guidelines (Jenkins et al. 2015);
- Cape Vulture and wind farms best practice guidelines (BLSA, 2018);
- Verreaux's Eagle and wind farms best practice guidelines (BLSA, 2017);
- The National Web-Based Environmental Screening Tool DEA website (2022);
- South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna Protocols for environmental impact assessments in South Africa;
- South African National Biodiversity Institute, Pretoria. Version 1.2020; and
- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998.

2.2 Fieldwork

Fieldwork was conducted in line with the birds and wind energy best practice standards (Jenkins et al. 2015) as well as the species-specific guidelines for Cape Vulture (Pfeiffer and Ralston-Paton, 2018), Verreaux's Eagle (Ralston-Paton and Murgatroyd, 2021) and Black Harrier (Simmons et al. 2020). All data was logged on BirdLasser to standardise entries among observers and expedite data processing.

Sampling was conducted within an AOI spanning an area (281494 ha) from Memel in the north to Harrismith and Van Reenen in the south and from Verkykerskop in the west to the Great Escarpment in the east. However, the standardised, formal sampling (vantage points, walked transects, driven transects and point counts) was restricted to within the 17958 ha WEF Complex and specifically with regards to Normandien WEF this involved an area of 6067 ha . Sampling within the remainder of the AOI was limited to incidental observations of priority species and focal point surveys (primarily roost and nest investigations).

Sampling was always conducted by at least three observers at a time. Two observers were assigned to a vantage point while the third (floater) observer was tasked with conducting either walked transects, driven transects, point counts or focal points at the same time. Observer tasks were rotated to avoid fatigue. Aside from the eight-day scoping investigation, Year 1 monitoring effort involved six surveys typically 20-23 days each, (of which 7 days were reserved for Normandien WEF) representing a total

of 429 person days (ca. 126 person days for Normandien WEF) spanning a period from June 2022 - October 2023. Fieldwork was conducted primarily by Lloyd Mhlongu (PhD candidate), Susan Abell (MSc) and Tyron Clark (MSc). Additional contributors included Andre Van Tonder (MSc), Cheri Clark, Ernest Porter, Geoff Lockwood and Ryno Kemp (PhD candidate), Dr. Gareth Tate. Avifaunal surveys for the Verkykerskop project conducted up to the end of year 1 include:

- Pre-scoping:
    - Remotely Piloted Aircraft System (RPAS) survey of threatened bird nests near the eastern Drakensberg Escarpment Part 1: Verkykerskop and Potter's Hill: 23-27 May 2022. EWT (2022);
- Scoping:
    - Scoping: 8 days, 18-25 July 2022;
- Standard pre-construction monitoring surveys (completed and data considered in this report):
    - Survey 1: 20 days, 3-12 August and 15-25 August, winter (5 days for Groothoek WEF);
    - Survey 2: 20 days, 16-25 November and 28 November-07 December 2022 (5 days for Groothoek WEF);
    - Survey 3: 23 days, 1-10 February, 13-22 February and 15-17 March (5 days for Groothoek WEF);
    - Survey 4: 23 days, 11-20 April, 2-11 May and 17-19 May 2023 (5 days for Groothoek WEF);
    - Survey 5: 23 days, 3-12 July, 17-26 July and 4-6 August 2023 (5 days for Groothoek WEF);
    - Survey 6: 22 days 31July-8 Aug, 11-20 September and 26-28 September 2023 (5 days for Groothoek WEF);
- Supplementary Investigations:
    - Cape Vulture Roost Investigation Survey 1: 11-14 June 2023 Ryno Kemp (PhD candidate);
    - Cape Vulture Roost Investigation Survey 2: 12-14 October 2023 Tyron Clark; and
    - Martial Eagle Investigation: 12-14 October 2023 Tyron Clark.

Sampling was designed to account for seasonal variation in order to facilitate the detection of the best possible spectrum of migratory avifauna, including both Intra-African and Palearctic migrants. A map of the various sampling points and transects is given in Figure 2-2. Details on the specific protocol to be followed at or along each are discussed in greater detail below. Year 2 surveys completed but not included this year 1 summary and scoping report include:

- Survey 7, Year 2: Leg 1 (20-29 November 2023), Leg 2 (5-16 December 2023);
- Survey 8, Year 2: Leg 1 (19 February -1 March 2024), Leg 2 (6-15 March 2024);
- Survey 9 Year 2 Leg 1 (4 April -15 April 2024), Leg 2 (16-21 May 2024), Leg 3 (3-9 June);
- Survey 10 Year 2 Leg 1 (18 – 27 June 2024), Leg 2a (22 June -2 August 2024);
- Survey 11 Year 2: Leg1 (21-30 August), Leg 2 (3 -14 September 2024); and
- Survey 12 Leg1 (2-11 October), Leg 2 (14-25 October 2024).

Sampling was designed to account for seasonal variation in order to facilitate the detection of the best possible spectrum of migratory avifauna, including both Intra-African and Palearctic migrants. A map of

the various sampling points and transects is given in Figure 2-2. Details on the specific protocol to be followed at or along each is discussed in greater detail below.

2.2.1 Vantage Point Surveys

Six of the 18 VWC vantage points (including the control) were sampled for the Normandien WEF. These included VPs 9, 13, 14, 15, 16, 17. In accordance with the species-specific best practice guidelines for Cape Vulture, each vantage point was sampled by two observers for 72 hours per year (and will do so for two years). The position of these vantage points within the Normandien WEF is shown in Figure 2-1. Each VP was carefully selected using a combination of digital elevation models and GIS processing to ensure > 75% coverage of the developable area which is taken as the turbine footprint area (Figure 2-1). This was done in accordance with best practice requirements (Jenkins et al. 2015). This calculation assumes a maximum 2 km radial detection limit on each VP (also in accordance with best practice) with a 360° viewshed. Information recorded during vantage point surveys included, i*nter alia*, climatic conditions, wind speed, wind direction, visibility, species, counts, activity (perched, flying, on grounds, on water), flight direction, flight height, flight duration and flight path (mapped visually on Google Earth).

2.2.2 Walked Transects

One walked transect was conducted at each vantage point in the Normandien WEF as well as at the control site. The length of each transect differed slightly, but all were roughly 2 km long. The aim of the transects was to gather data on the diversity and relative abundance of birds on site, particularly with regard to smaller passerines that are not always adequately represented in the vantage point surveys which are designed to record flights.

2.2.3 Driven Transects

A total of two driven transects were sampled within the Normandien WEF (DT9 and 10) as well as one at the control site (DT Control). The total distance covered by the two driven transects within the WEF was 20.19 km with an average transect length of 10.1 km. The control driven transect was 17.3 km long. The variables recorded are the same as for walked transects. However, the primary objective of the driven transects was to cover ground in search of wide-ranging mobile species, such as large-bodied priority species such as cranes, bustards, korhaans, storks, eagles and vultures that are less easily encountered during the much shorter and more rigid walked transects.

2.2.4 Focal Point Surveys

Avifaunal abundance is hardly ever evenly distributed throughout a project area. Instead, birds tend to congregate in hotspots centred around prominent landscape features where primary productivity and moisture levels are higher, such as a pan, lake, dam, wetland or rocky outcrop. Sampling involved an adapted form of point count sampling for a more extended (yet fixed duration) at the same time of day during each site visit. The observer utilised either a spotting scope or binoculars to maximise detection and identification. Breeding areas for red-listed species or other key areas likely to support / attract significant congregations of local and migratory species were prioritised for the focal surveys. In Kromhof this involved monitoring of Southern Bald Ibis Roost 2 (FP2), Jackal Buzzard Nest 1 (FP3) and a large dam (FP1). Efforts were made to visit the various focal points at the appropriate time of day to maximise observation. For example vulture roosts were surveyed after 14:00 or before 09:00 (when most vultures are on the roost).

2.2.5 Point counts

Additionally, 34 standardised point counts were made throughout the Normandien WEF. The point counts were conducted to gather data on the species composition and relative abundance of species within the various habitats within the project area. Each point count is run over a 5 min period. The horizontal detection limit was set at 200 m. At each point the observer documented the date, start time

and end time, habitat, numbers of each species, detection method (seen or heard), behaviour (perched or flying) and flight direction and general notes on habitat and nesting suitability for conservation important species.

2.2.6 Incidental Searches

To supplement the species inventory with cryptic and illusive species that may not have been detected within the rigid point count protocol, diurnal incidental searches are also included. This involved opportunistic sampling of species between vantage points, transects focal points and point counts.

2.2.7 Cape Vulture Roost Investigation

Initial planning (conducted prior to scoping) involved utilising a combination of digital elevation data and satellite imagery to identify potential roost sites for Cape Vulture within a 50 km radius of the project area (defined as the Verkykerskop WEF cluster). During scoping and the course of the first pre-construction monitoring trip these sites were briefly visited to verify signs of vulture use. Three roost sites were identified (see Section 3). Contact was then made with Dr. Gareth Tate from the Endangered Wildlife Trust (together with Mulilo) to establish the extent of knowledge regarding the three roosts identified within the Area of Influence (AOI). Efforts were also made to organise permission from landowners to access the roost sites. Valuable insights were also obtained from land owners Rick Dillon and Graham Hobbs.

Fieldwork was conducted over two separate trips. It was decided that the first trip should take place in May-August (preferably June) to coincide with peak egg-laying and nest attendance. The first visit was conducted from 11-14 June 2023 by Ryno Kemp (The Biodiversity Company) and involved a visit to all three roosts. Tyron Clark (sub-contracted by The Biodiversity Company) conducted the second follow-up visit from 12-14 October 2023. The second trip focused on Nelson's Kop with the aim of assessing breeding success.

Most observation time was spent non-intrusively surveying roosting birds from a nearby vantage using a combination of spotting scopes and binoculars. Photographs were taken using both a 400 mm Canon telephoto lens on a Canon 7D DSLR Body and a 600 mm Sigma telephoto lens on a mirrorless camera body. Fieldwork was heavily contingent on suitable weather conditions, as clouds and mist can obscure entire roosts. Suspected breeding birds or active nests were more closely inspected using a DJI Mavic Pro.

2.2.8 Martial Eagle Nest Investigation

Mulilo requested that a high-level reconnaissance survey with the specific aim of searching suitable habitat and locating Martial Eagle Nests within the AOI surrounding the Verkykerskop development be conducted. This investigation was commissioned on the basis of the large potential implications for the wind farm should Martial Eagle nests be found in or in close proximity to the proposed development. Although ongoing incidental searches for priority species nests are carried out during the course of pre-construction monitoring surveys, the project area is exceptionally large and Martial Eagles are notoriously wide-ranging. Consequently, the chances of finding important nests such as this in between the rigorous survey protocol, without dedicating full-day target searches to the species is low.

In response, two full days were dedicated solely to finding and locating Martial Eagle Nests. The initial stages of the investigation were dedicated to collecting all known locality data on Martial Eagle Nests from the area. This involved collating data from the specialist's (T. Clark's) personal nest records as well as any information provided by locals. The rest of the field time was spent searching for new nests and visiting known nests.

2.2.9 Data Analysis

For the sake of this scoping report, only vantage points and general spatial data were analysed. Data from the BirdLasser cards was captured into Excel. Most statistical analyses were performed in the R statistical environment (R Core Team, 2024). Spatial analyses and models were performed in QGIS.

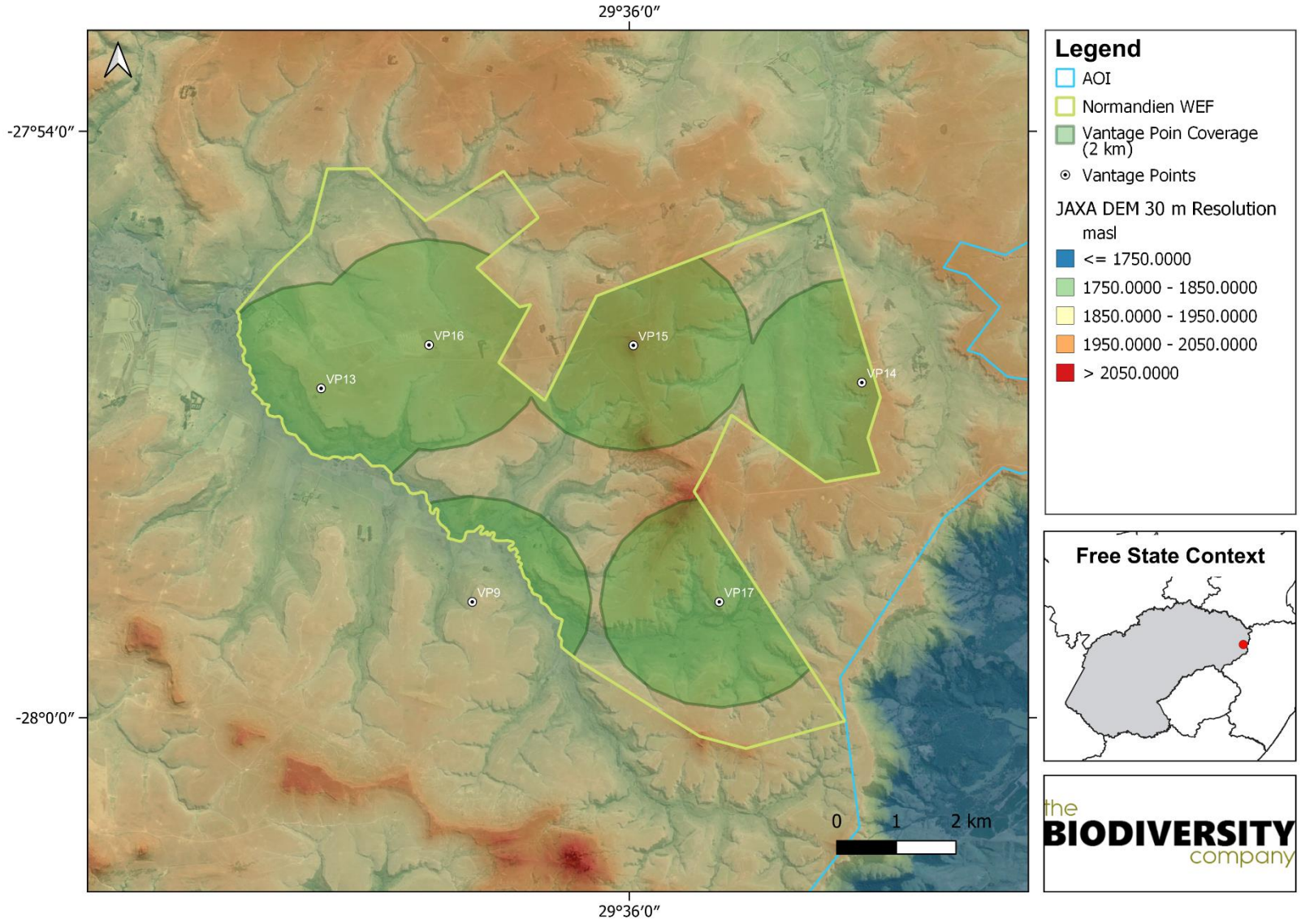

Figure 2-1 Spatial depiction of viewshed coverage from vantage points in relation to developable area (proposed turbine footprint area)

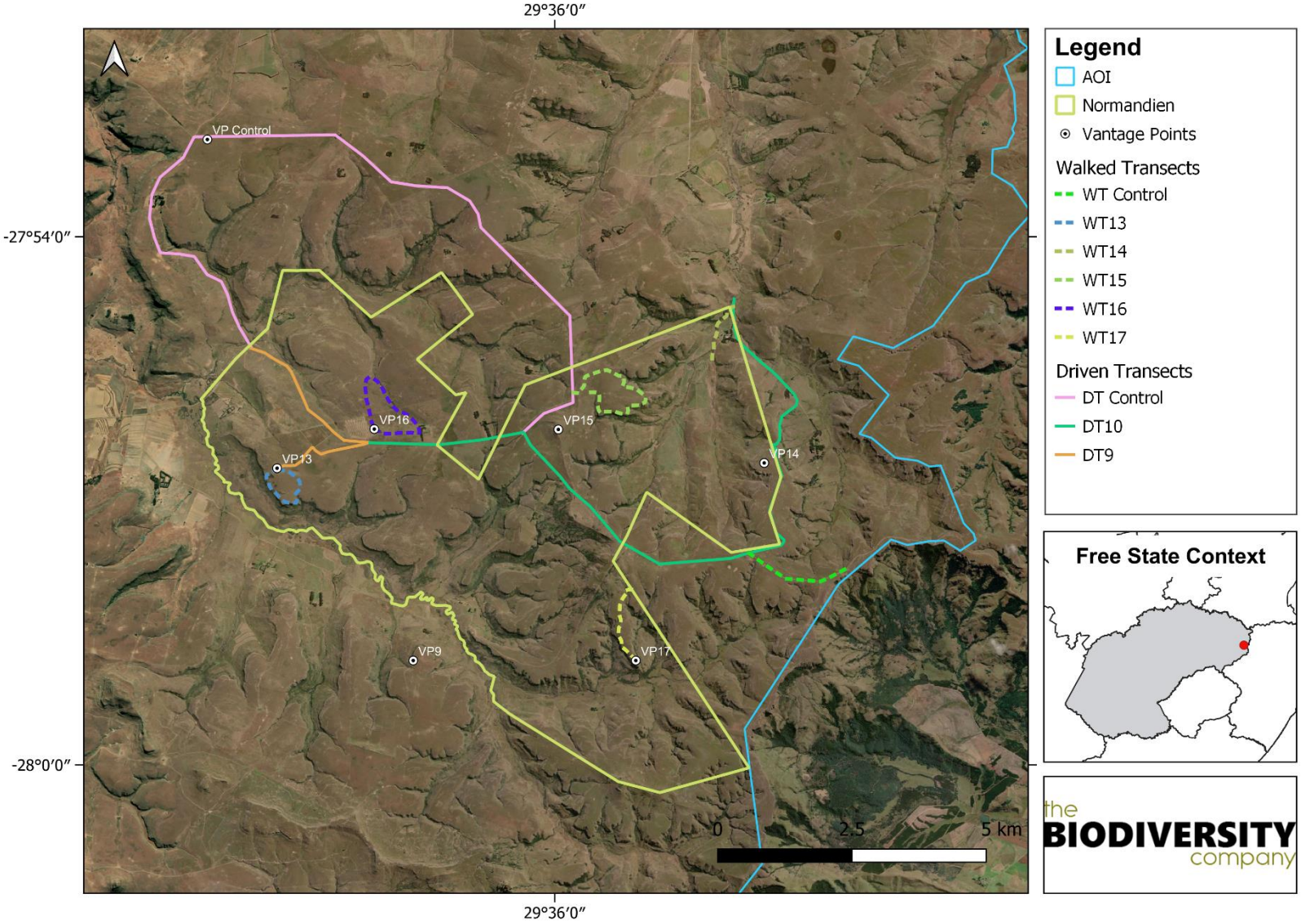

Figure 2-2 Location of walked and driven transects in relation to the vantage points

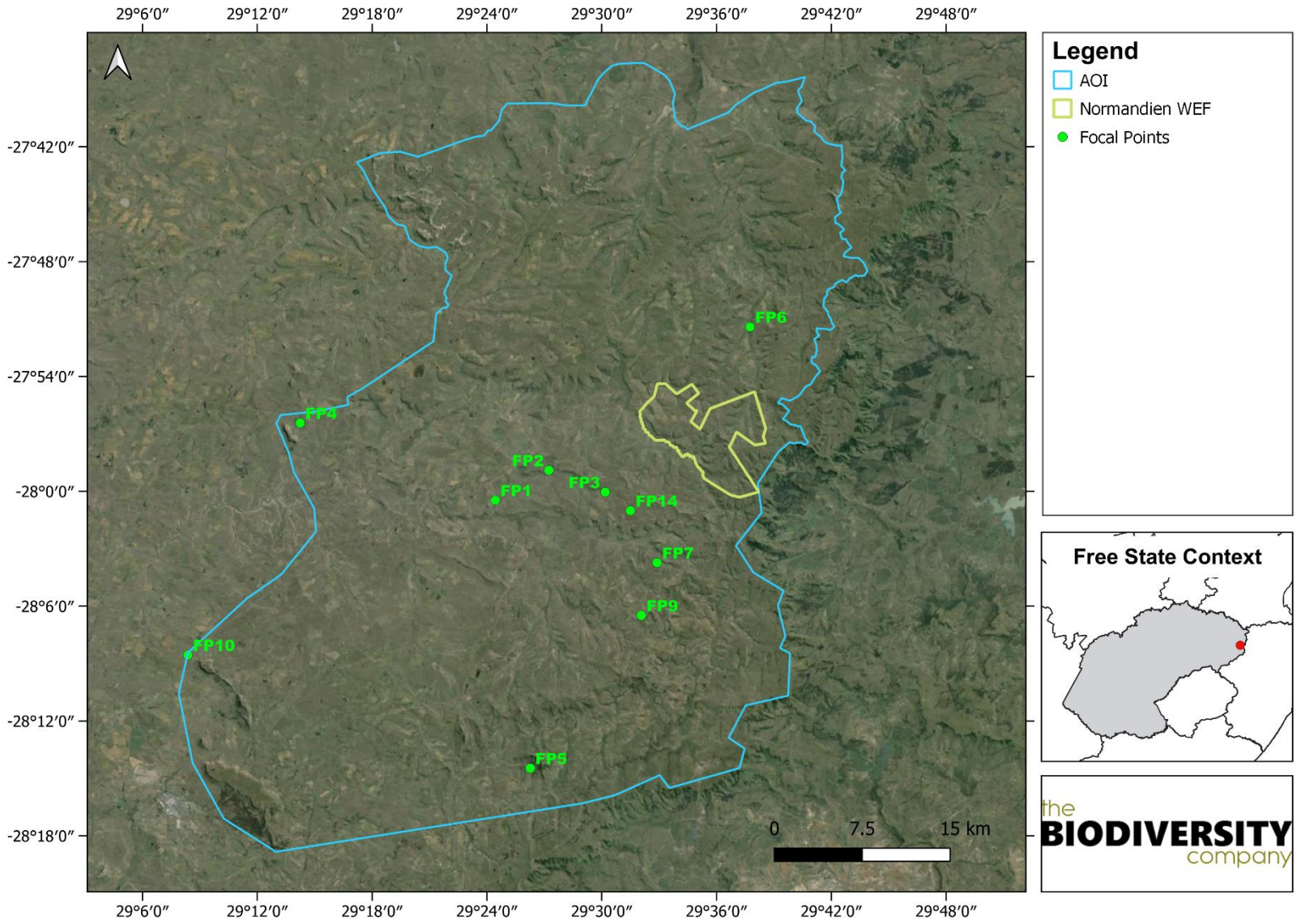

Figure 2-3 Spatial arrangement of key focal points in the AOI

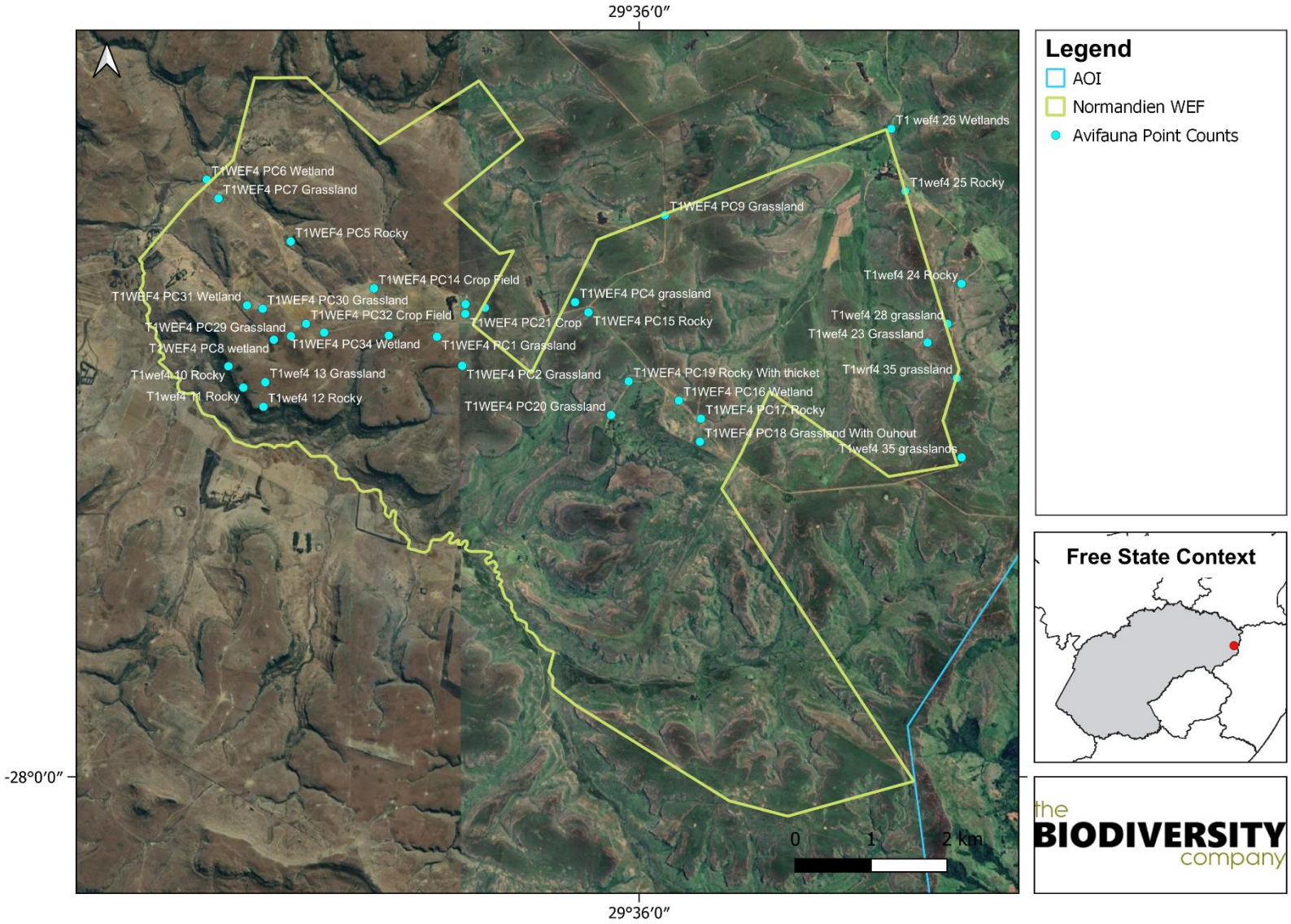

Figure 2-4 Spatial arrangement of the various point counts in the project area

3. Receiving Environment

The region is renowned for its birdlife. The greater AOI intersects with five IBAs and six statutorily protected areas. The Memel birding route (as described in Roberts Birds Application) traverses portions of the WEF cluster and AOI. The, birding route is highlighted as one of the best and most extensive habitats for high-altitude grassland endemics in South Africa (Chittenden et al.2017).

3.1 Free State Biodiversity Conservation Plan

At Normandien WEF the more pristine grasslands in the eastern half of the WEF closer to the Great Escarpment is classified as CBA while the more impacted (primarily by past crop cultivation) western half is classified as an ESA (Figure 3-1).

The Free State Biodiversity Conservation spatial layer was developed to illustrate the province's most Critical Biodiversity Areas. These areas need to be maintained to meet the province's biodiversity targets. The broad categories recognised are: Protected Areas (PA), Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONA), and Modified Areas.

CBAs represent areas of high biodiversity significance in the province (SANBI-BGIS, 2017).

ESAs are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).

ONAs consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs (SANBI-BGIS, 2017).

Degraded Areas (sometimes called 'transformed' areas) are areas that have been heavily modified by human activity so that they are by-and-large no longer natural, and do not contribute to biodiversity targets (SANBI-BGIS, 2017). Some of these areas may still provide limited biodiversity and ecological infrastructural functions but, their biodiversity value has been significantly, and in many cases irreversibly, compromised.

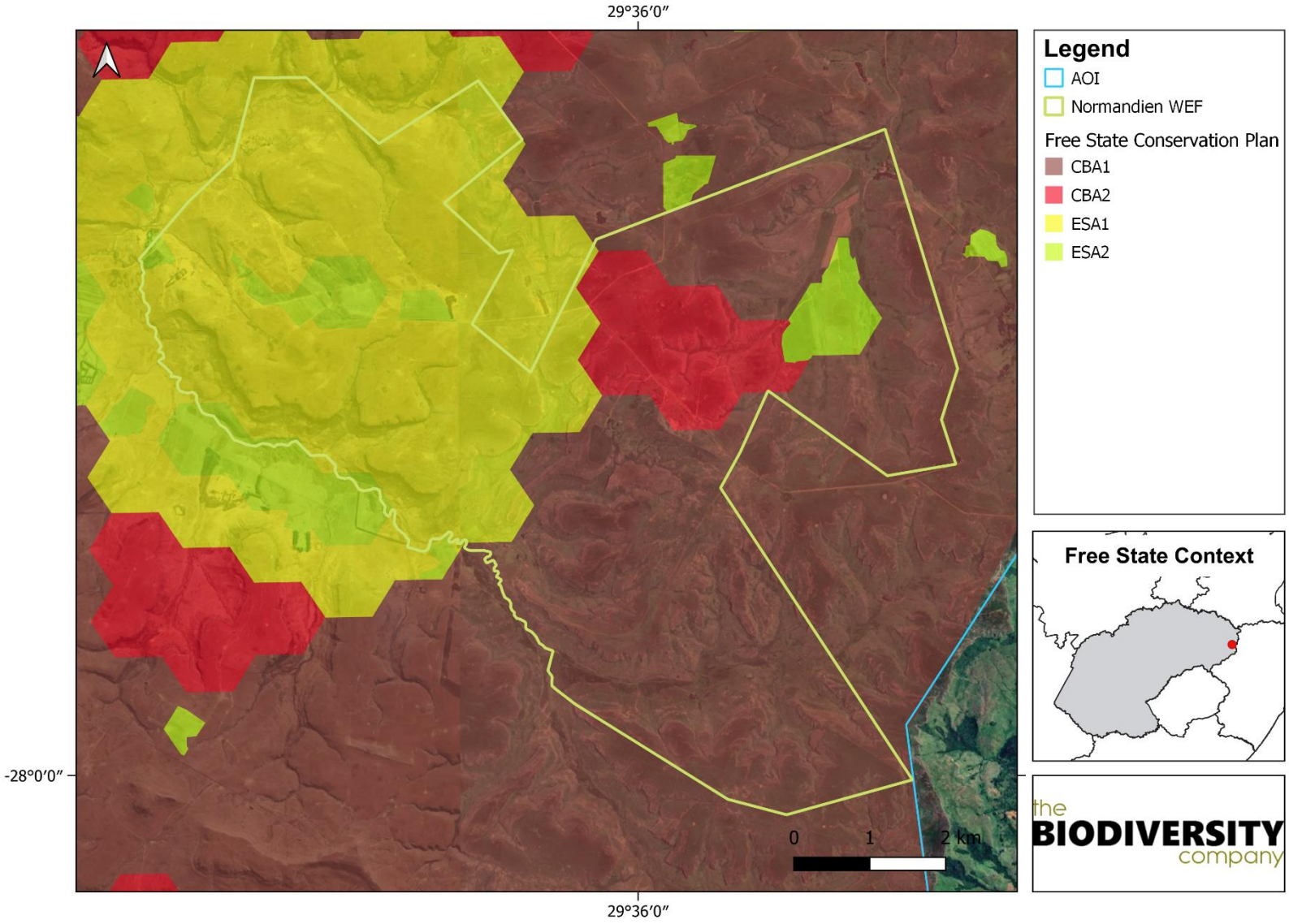

Figure 3-1 Project area in relation to the Free State Biodiversity Conservation Plan

3.2 National Environmental Screening Tool

The national environmental screening tool is a web-based application hosted by the Department of Environmental Affairs that allows developers to screen their prospective site for environmental sensitives. Importantly, this tool now serves as the first step in the environmental authorisation process as laid out in the gazetted assessment protocols for each environmental theme. Guidance towards achieving these protocols for terrestrial biodiversity is provided in the Species Environmental Assessment Guideline (SANBI, 2020) which, in turn, relies on the results of the screening tool to inform the level of assessment required. The screening tool was used to inform the desktop level assessment of the sensitivity of the AOI prior to fieldwork. There are four sensitivity layers produced by the screening tool that are of relevance for this study namely (1) Avian Theme (2) Animal Species Theme and (3) Terrestrial Biodiversity Theme and (4) Vulture Theme. The receptors triggering each sensitivity theme, their sensitivity rating and their mapped potential occurrence (i.e. modelled potentially suitable habitat) according to DFFE are summarised in Table 3-1 and spatially depicted in Figure 3-2 to Figure 3-6. The DFFE Avian Theme Screening Tool indicates the presence of a Vulture Restaurant within 20 km of the site but without information on its location or activity status.

Table 3-1 Receptors triggering each sensitivity theme according to the DFFE data at Normandien WEF

Receptor	Sensitivity	DFFE Mapped Occurrence (Project Area)
Avian Theme		
Within 20 km of Vulture Restaurants	High	Large radial buffer overlapping eastern portion of WEF
Areas beyond buffer on Vulture Restaurants	Low	All other areas
Animal Species Theme (Avifauna)		
Southern Bald Ibis (*Geronticus calvus*)	High	Ubiquitous. Most grassland areas, excluding cultivated lands.
Black Stork (*Ciconia nigra*)	High & Medium	Wetlands and grasslands.
Yellow-breasted Pipit (*Anthus chloris*)	High & Medium	High altitude grasslands, particularly the more pristine grasslands in the eastern half of the WEF closer to the Great Escarpment
Wattled Crane (*Grus carunculata*)	Medium	High altitude plateau grassland, wetlands and pans in central and eastern regions of WEF.
Grey Crowned Crane (*Balearica regulorum*)	High & Medium	Wetlands and grasslands in the west and north.
White-bellied Korhaan (*Eupodotis senegalensis*)	High & Medium	High altitude plateau grasslands.
Denham's Bustard (*Neotis denhami*)	High & Medium	High altitude plateau grasslands.
Martial Eagle (*Polemaetus bellicosus*)	High	Southern corner associated with escarpment
Lanner Falcon (*Falco biarmicus*)	High	Restricted. Incised topography with steeper slopes
Secretarybird (*Sagittarius serpentarius*)	High & Medium	Most areas, excluding actively cultivated lands.
Rudd's Lark (*Heteromirafra ruddi*)	Medium	Patchily distributed. High-altitude plateau grassland in north and western regions.
Bush Blackcap (*Sylvia nigricapillus*)	High & Medium	Scarp patches in south-eastern region closer to the escarpment.
African Grass Owl (*Tyto capensis*)	Medium	Wetland areas
Terrestrial Biodiversity Theme		
CBA 1	Very High	Eastern half of WEF closer to escarpment.
Vulture Species Theme		
Cape Vulture (*Gyps coprotheres*)	High	Affecting an area representing 10-20% of the population

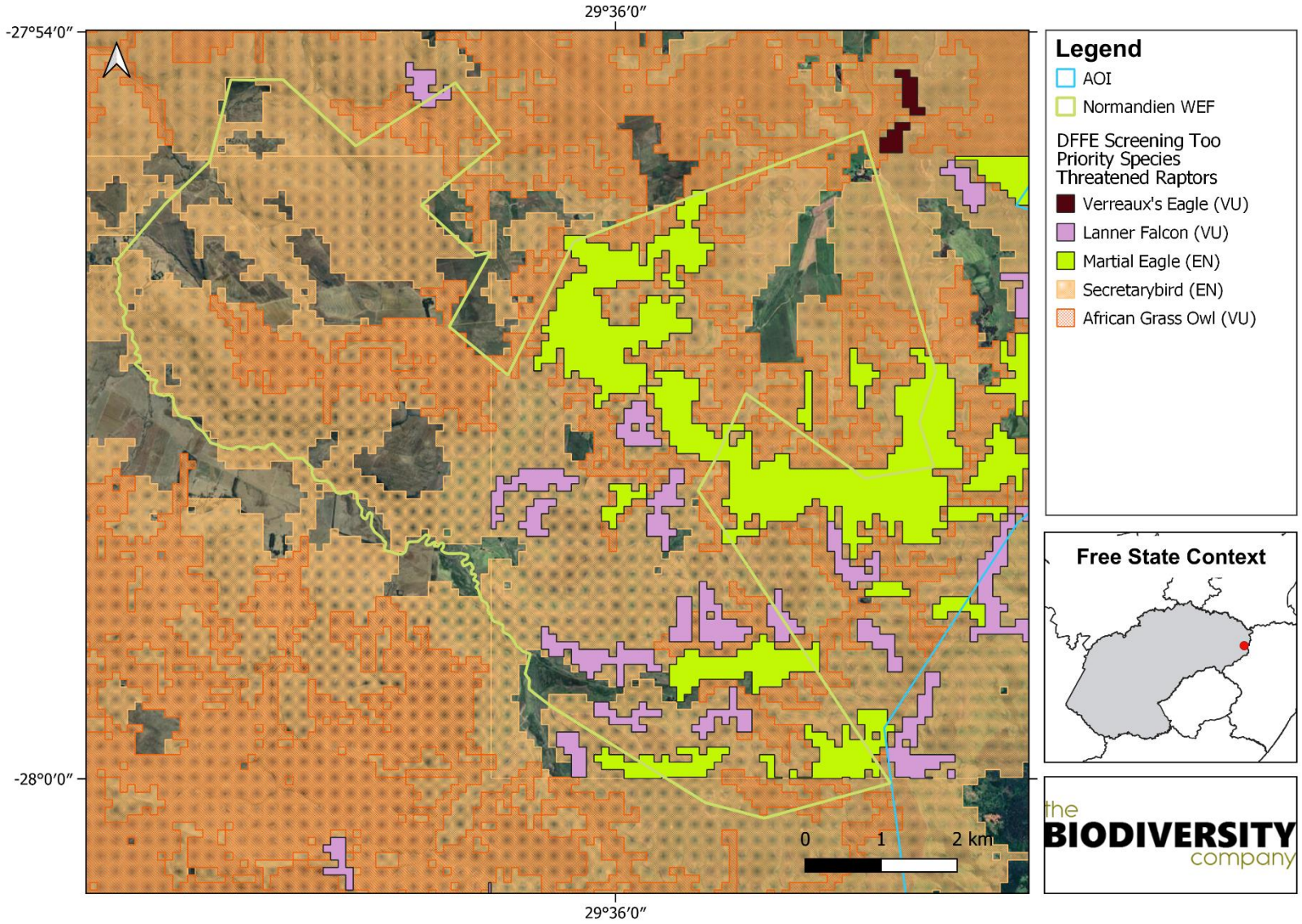

Figure 3-2 Modelled potential occurrence of threatened raptors in the project area as provided in the national screening tool (DFFE)

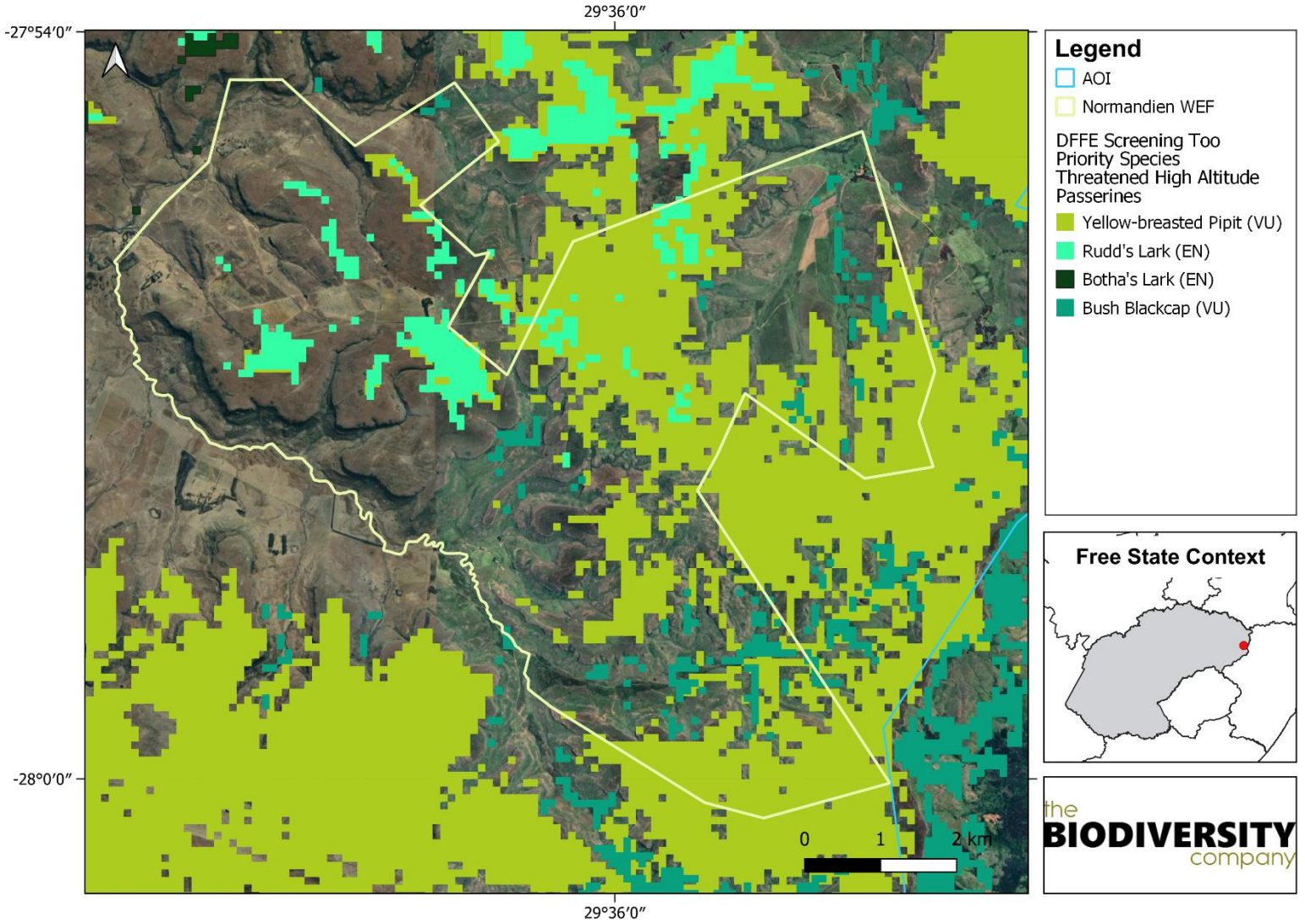

Figure 3-3 Modelled potential occurrence of threatened high altitude passerines in the project area as provided in the national screening tool (DFFE)

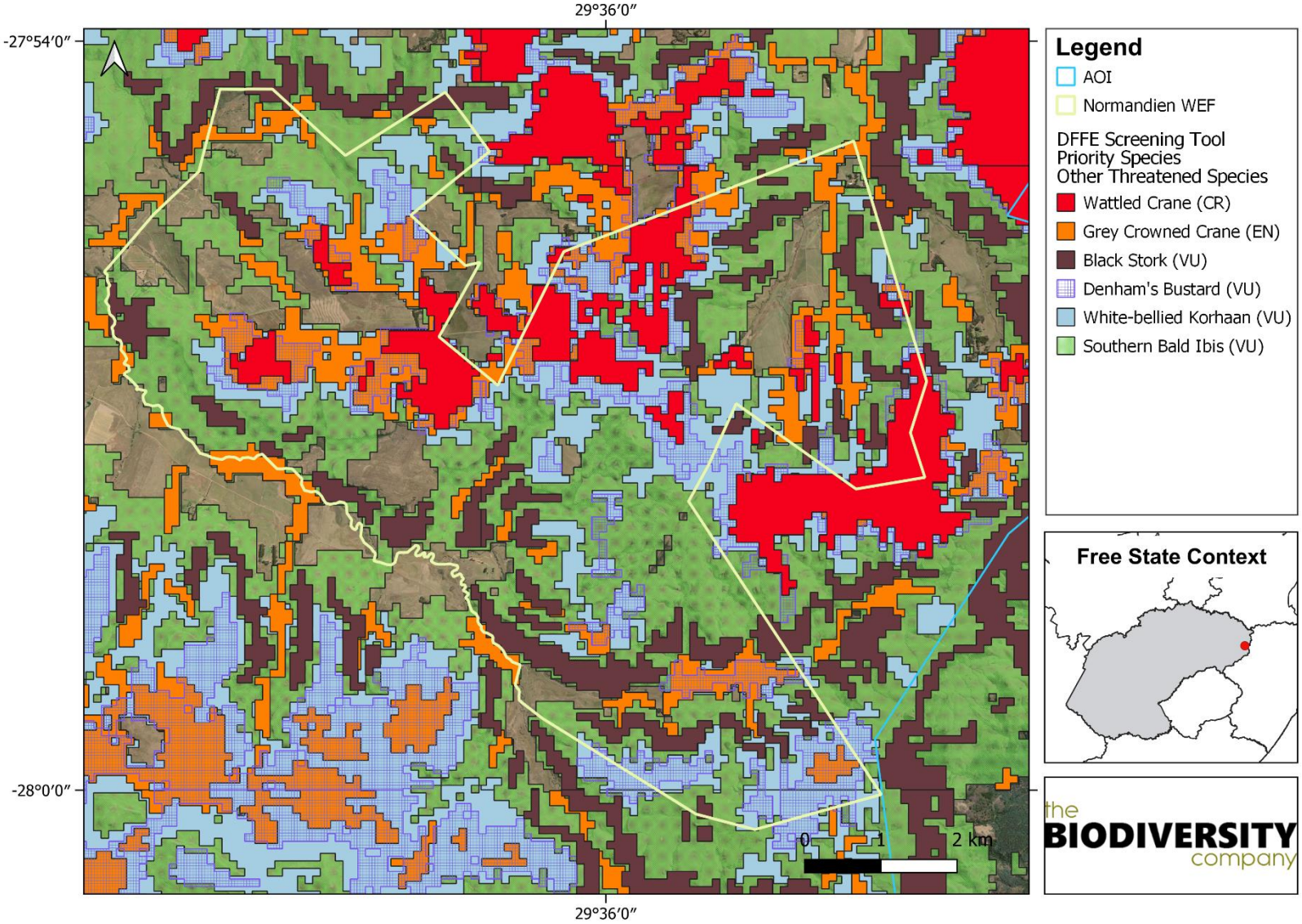

Figure 3-4 Modelled potential occurrence of other threatened avifauna in the project area as provided in the national screening tool (DFFE)

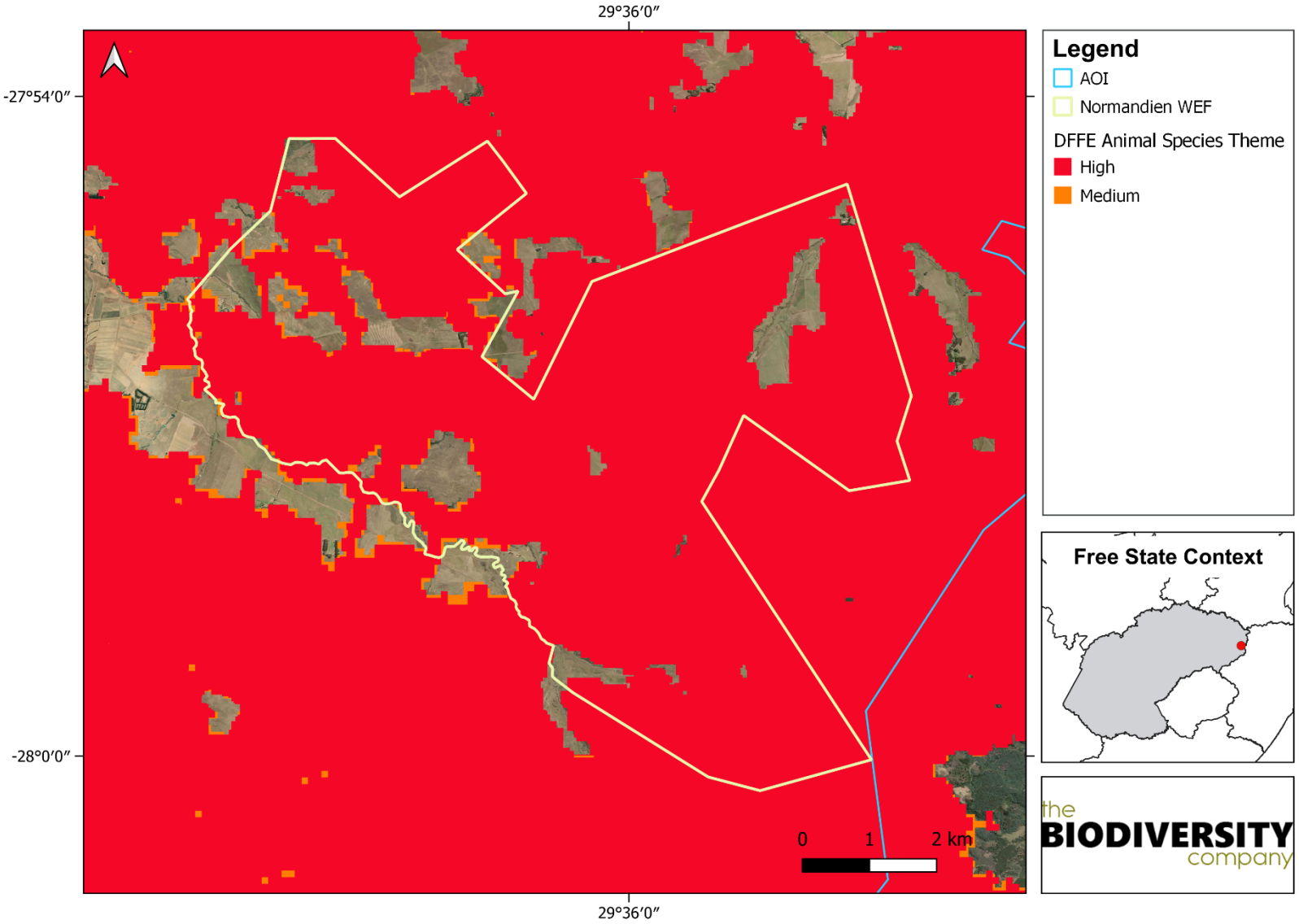

Figure 3-5 Visual representation of the DFFE Animal Species theme of the national screening tool sensitivities as applicable to avifauna

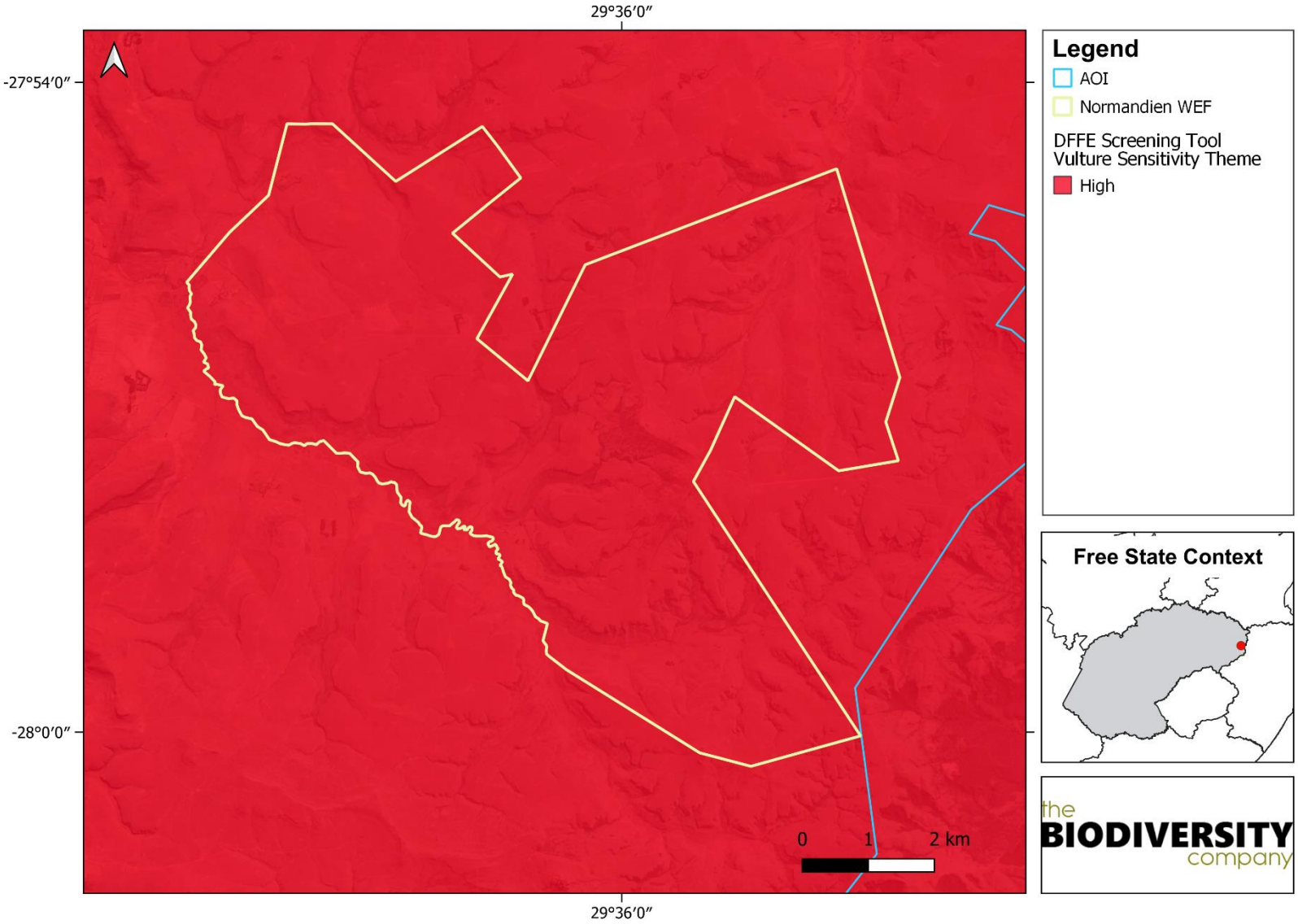

Figure 3-6 Visual representation of the DFFE vulture sensitivity theme of the national screening tool

3.3 Important Bird Areas

Important Bird and Biodiversity Areas (IBAs), represent a network of sites considered to be of global significance for bird and other biodiversity conservation. They are identified on a per-country basis using globally standardised, quantitative and scientifically agreed criteria (Birdlife International, 2022). It is important to note that a large portion of the northern end of the Normandien WEF overlaps an IBA (Grasslands IBA). Additionally, another four IBAs occur in the AOI.

3.3.1 Grasslands (SA020)

Overlaps the WEF in the north-east. A large area of higher altitude plateau to escarpment grassland encompassing the towns of Volksrust, Wakkerstroom and Memel. The area includes a number of reserves. Seekoeivlei (near Memel) is the closest and most relevant to the project area. The IBA is renowned for hosting the core populations of most of South Africa's Threatened and endemic grassland species. Most notably this includes most of the Endangered White-winged Flufftail *(Sarothrura ayresi*) population (three wetlands), all three of South African crane species (all Threatened), 85% of the global population of Rudd's Lark (*Heteromirafra ruddi*) and substantial breeding colonies of Southern Bald Ibis (*Geronticus calvus*). Many other red-listed species and high-altitude endemics occur. The larger wetlands in the IBA support globally significant congregations of local and migratory waterbirds.

3.3.2 Ingula Nature Reserve (SA043)

This high altitude (1700-1800 masl) IBA is centred on the private farms of Wilge River, Chatsworth and Bedford. It includes the pristine large Wilge River Floodplain wetland and surrounding grasslands of the Little Drakensberg. The IBA hosts some 280 bird species. It is renowned for supporting four of South Africa's Critically Endangered species, namely the White-winged Flufftail (*Sarothrura* ayresi), Wattled Crane (*Bugeranus carunculatus*), Rudd's Lark (*Heteromirafra ruddi*) and Eurasian Bittern (*Botaurus stellaris*). Importantly, the wetland hosts the largest single population of White-winged Flufftails in South Africa. Many of the escarpment's red-listed and endemic grassland species occur at Ingula including a breeding pair of Martial Eagles (*Polemaetus bellicosus*).

3.3.3 Alexpan (SA042)

This IBA is centred on a large (7.5 ha) pan in high altitude grassland 20 km NE of Harrismith. The IBA hosts an inventory of just over 100 species but is most reknowned for being one of the few places where Wattled Crane (*Bugeranus carunculatus*), Grey Crowned Crane (*Balearica regulorum*) and Blue Crane (*Anthropoides paradiseus*) regularly occur together. Excellent habitat occurs here for Rudd's Lark (*Heteromirafra ruddi*) and Botha's Lark (*Spizocorys fringillaris*).

3.3.4 Chelmsford Nature Reserve (SA059)

This IBA encompasses the Chelmsford Nature Reserve. The reserve is centred on the large Ntshingwayo Dam and protects a good example of Northern KwaZulu-Natal Moist Grassland. The reserve is frequently visited by Southern Bald Ibis (*Geronticus calvus*), Grey Crowned Crane (*Balearica regulorum*) and Blue Crane (*Anthropoides paradiseus*). Other wetland and grassland species of concern are African Marsh Harrier Circus ranivorus, Corn Crake (*Crex crex*), African Grass Owl (*Tyto capensis*), Secretarybird (*Sagittarius serpentarius*) and White-bellied Korhaan (*Eupodotis senegalensis*). The rocky outcrops hold Ground Woodpecker (*Geocolaptes olivaceus*).

3.3.5 Murphy' Rust (SA045)

The Murphy's Rust IBA is situated 20 km east of Harrismith. It is centred on a large *Phragmites* dominated palustrine wetland. The site was created to protect the White-winged Flufftail (*Sarothrura ayresi*).

3.4 Key Biodiversity Areas

Key Biodiversity Areas (KBAs) are sites which contribute most significantly to the global persistence of biodiversity in terrestrial, freshwater and marine ecosystems (IUCN, 2016). Both SANBI and BirdLife South Africa have recognised the importance of mapping, monitoring conserving these areas of global biodiversity importance through the implementation of the Key Biodiversity Areas Program. To date a network of 263 terrestrial KBAs have been identified and assessed against the global standard set by the IUCN. The areas will ultimately supersede IBAs as the main currency for identifying areas of high avian importance in the country. A large proportion of the WEF, particularly in the eastern half overlaps the Eastern Free State Escarpment KBA. This KBA is recognised primarily for its importance in supporting a high diversity of threatened and range-restricted avifauna. The KBA is classified as 100% irreplaceable. This KBA envelops the Grasslands and Alexpan IBAs (KBA Partnership, 2024).

3.5 Statutorily Protected Areas

The proposed development site does not intersect any protected areas. However, the AOI intersects with seven statutorily protected areas. The most significant of which being the Upper Wilge Protected Environment championed by BirdLifeSA. It is important to note that, based on communications with Birdlife SA, a request has recently been submitted to declare additional properties as part of the Sneeuberg Protected Environment in the area between the existing PE and the proposed Verkykerskop WEF Cluster.

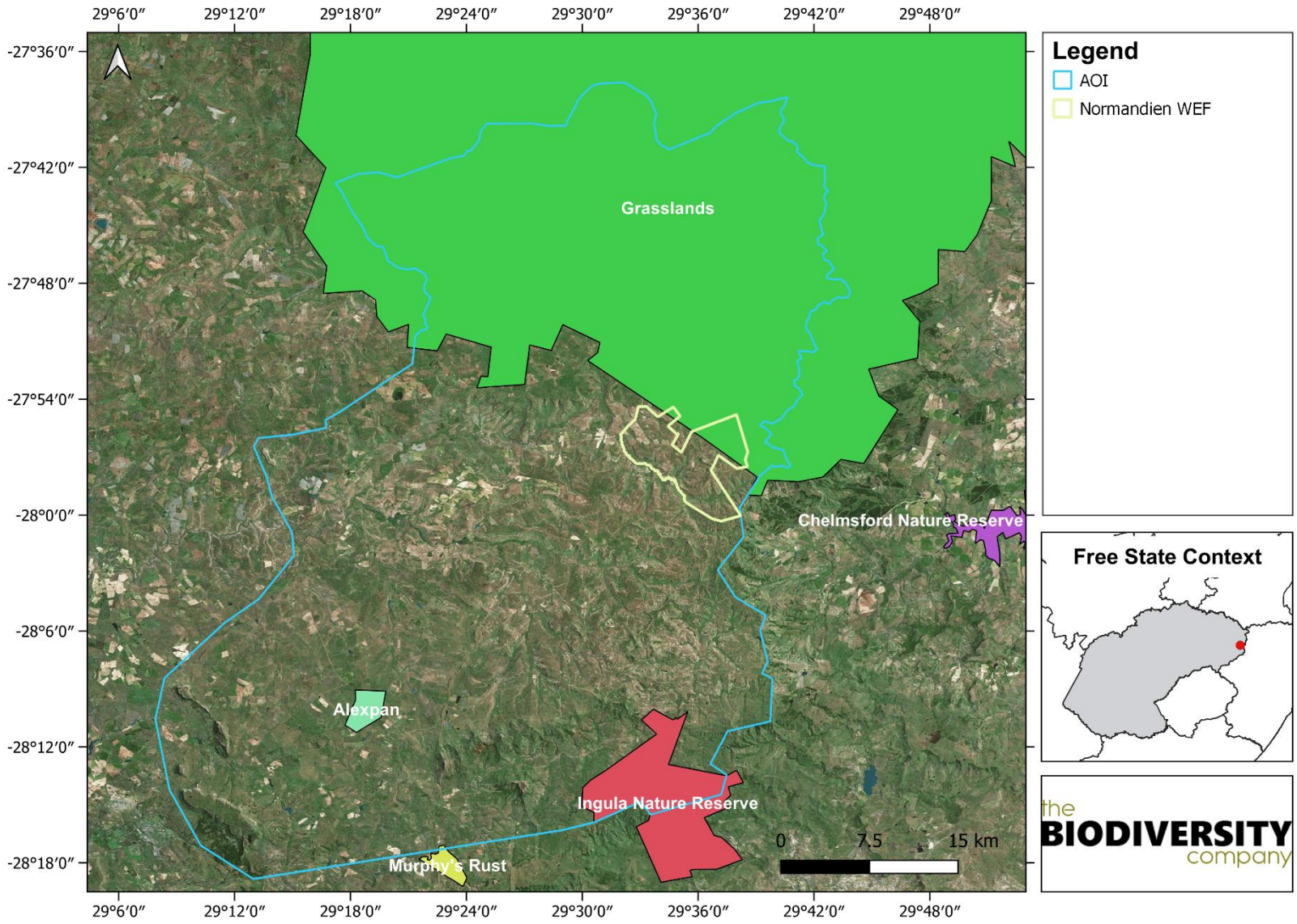

Figure 3-7 Important Bird and Biodiversity Areas in relation to the proposed WEF

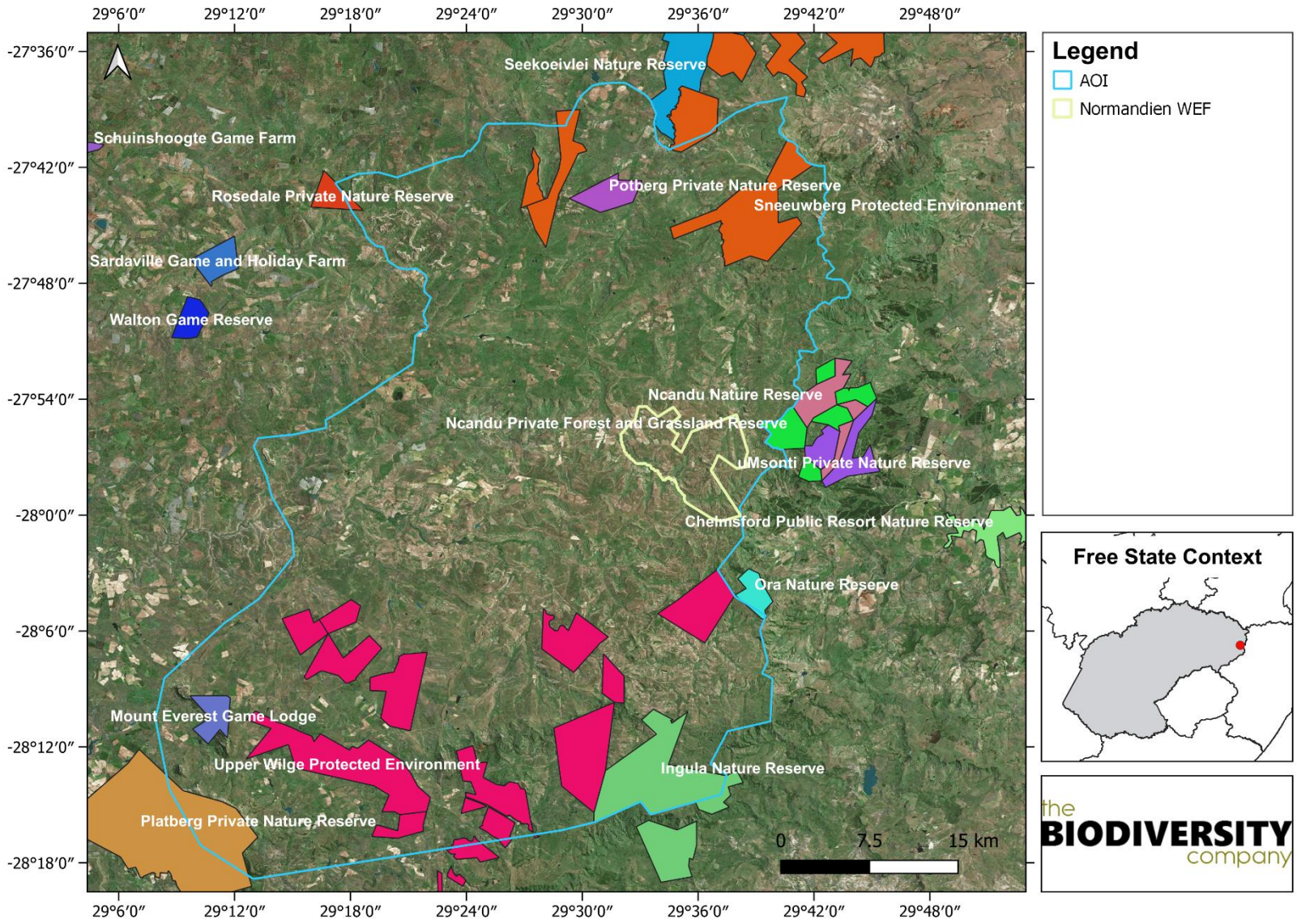

Figure 3-8 Position of nationally protected areas in relation to the proposed WEF

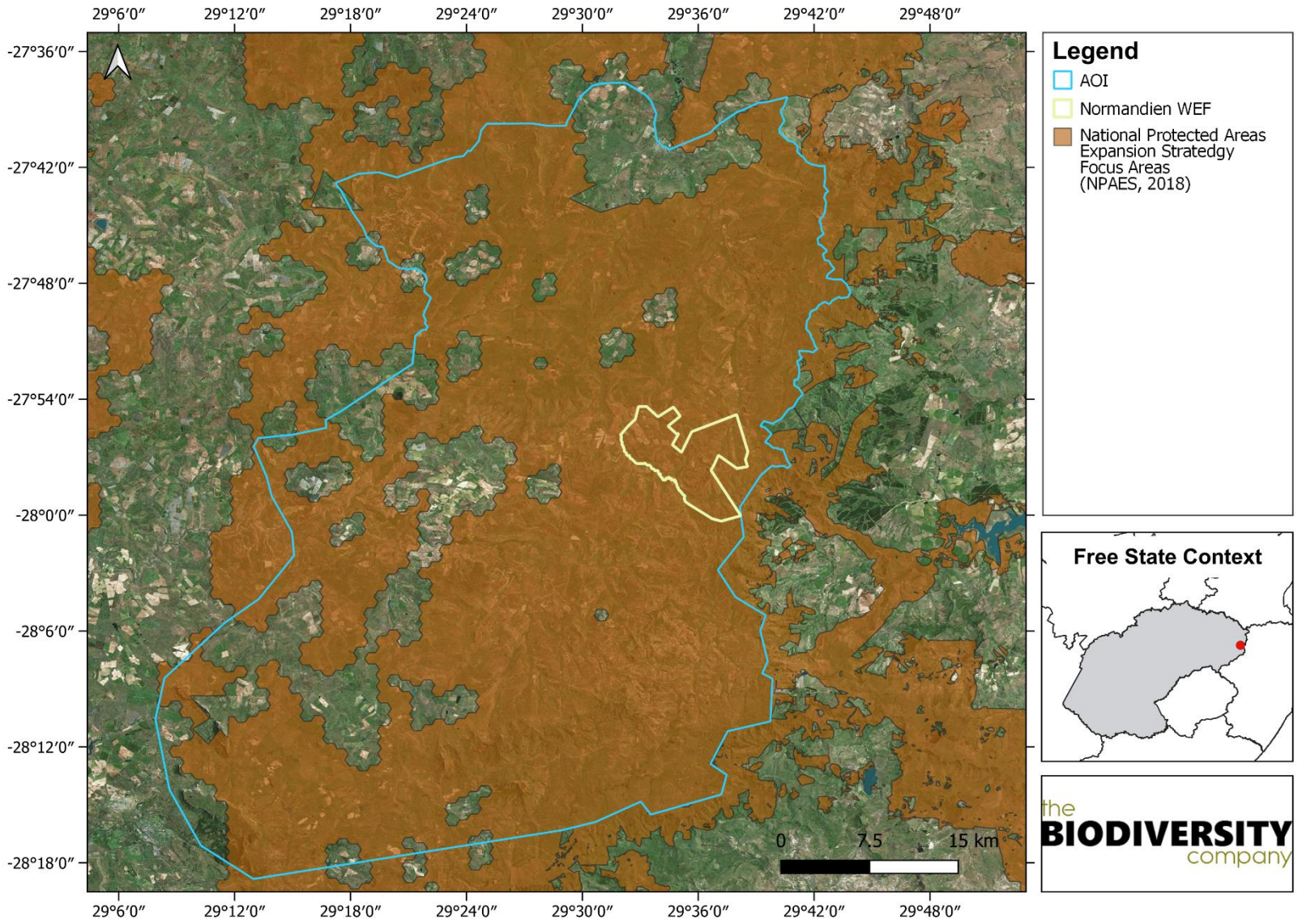

Figure 3-9 Extent of the national protected areas expansion strategy in relation to the proposed WEF

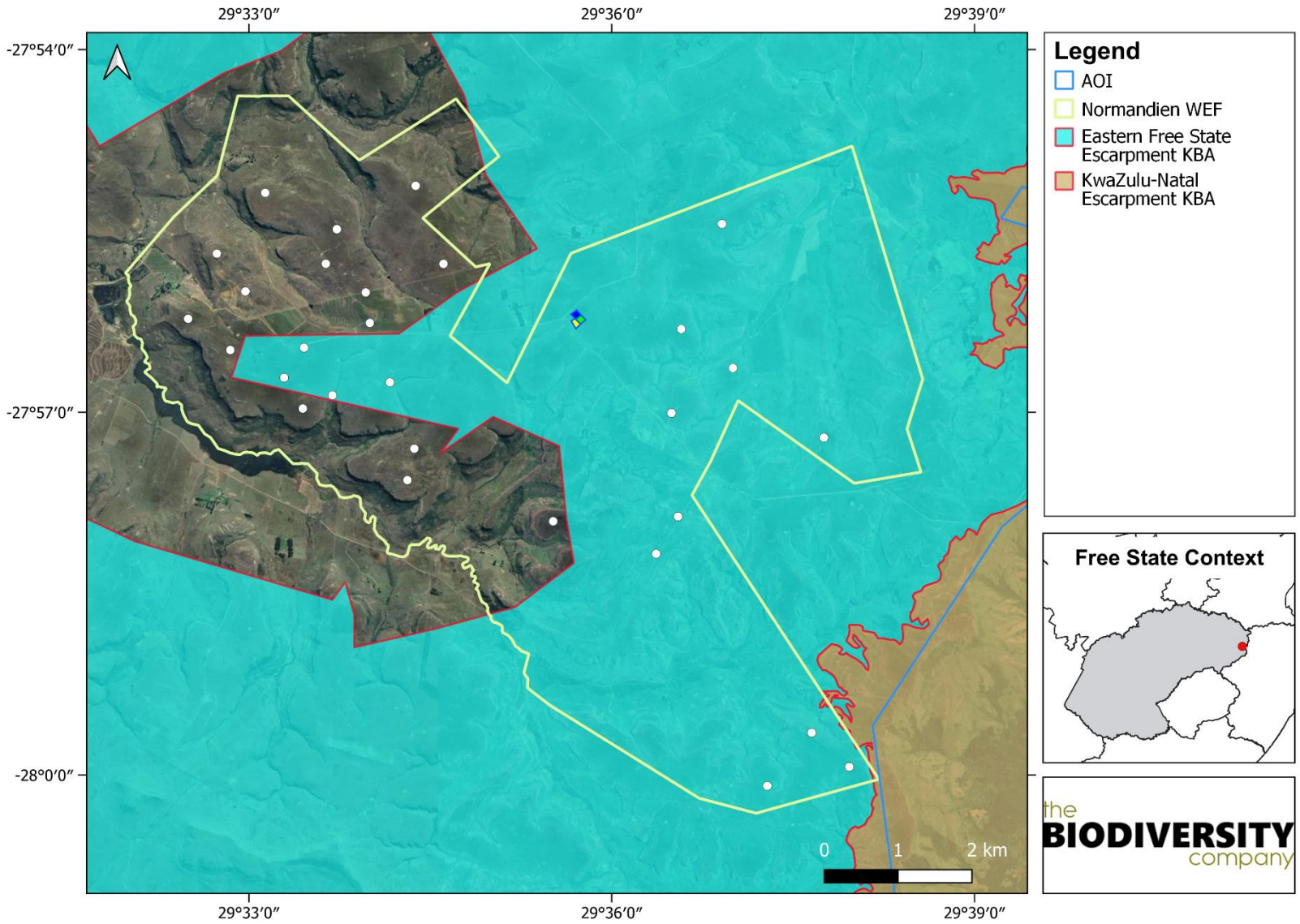

Figure 3-10 Project area in relation to Key Biodiversity Areas

4. Pertinent Findings (Scoping & Year 1)

4.1 Local Avian Diversity

4.1.1 Habitats

The Normandien WEF is large and spans a wide diversity of habitats including palustrine wetlands, bench wetlands, depressions, gorges, cliffs, crests, ridges and scrub forest. Due to its proximity to the Great Escarpment the eastern half of the WEF falls within a “mist belt” zone and receives considerably more rainfall than any other part of the VWC with a distinct floral and avifaunal assemblage. The land use is almost exclusively natural grasslands (under grazing). The prevailing biome is grassland. More specifically, Eastern Free State Sandy Grassland predominates (Mucina and Rutherford, 2006). At this stage at least four broad habitats as relevant to avifauna were identified. These included Open Grassland, Rocky Grassland, Wetlands and Croplands.

Figure 4-1 Examples of the three main natural avifaunal habitats identified in the project area; A) Rocky Grassland, B) Wetlands and C) Open Grassland

4.1.1.1 Open Grassland

The dominant habitat at Normandien WEF is high altitude grassland. A distinct climatic gradient is present from the drier grasslands in the west to the moist, mist-laden grasslands near the escarpment

drop off in the east. Additionally, there exists an altitudinal gradient from the taller, rank grasslands in the valleys to the shortly cropped, alpine grassland on the plateaus. The eastern grasslands are noticeably cooler and wetter, more reminiscent of those to be found elsewhere on the Drakensberg. The eastern grasslands are often shrouded in mist are some of the only places within the VWC that *Protea roupelliae* occurs, which attracts Gurney's Sugarbird (*Promerops gurneyi*). The Plateau grasslands are likely to support most of the regionally occurring high altitude endemics and red-listed species. These grasslands, especially around VP 14 also support breeding populations of Rudd's Lark (*Heteromirafra ruddi*) and Yellow-breasted Pipit (*Anthus chloris*) and also regularly support flocks of Blue Crane (*Anthropoides paradiseus*) and Southern Bald Ibis (*Geronticus calvus*). Of particular significance was a single record of Botha's Lark *(Spizocorys fringillaris*) from the grasslands near VP16. In the summer large flocks of Amur Falcon (*Falco amurensis*) forage over these grasslands.

4.1.1.2 Rocky Grassland

The Rocky Grassland habitat typically occurs in areas with a slope gradient of more than 20 %. This habitat includes boulder strewn mid to upper slopes as well as crests which support sandstone cliff and scarp-like *Leucosidea*-dominated forest-scrub. At Normandien WEF, the scrub is notably more species rich than other areas of the VWC. Structural complexity, vegetation diversity, food, cover and microclimatic niche differentiation is highest in this habitat type. This habitat is likely important in terms of supporting rupicolous high-altitude endemics, raptors and cliff-nesting species. These scrub-forests seasonally support Bush Blackcap (*Sylvia nigricapillus*) and Barrats Warbler (*Bradypterus barratti*) in summer. However, these scrub-forests appear to lack the structural complexity frequented by most of the true forest specialists such as Cape Parrot (*Poicephalus robustus*) and White-starred Robin (*Pogonocichla stellata*). In addition to the scrub-forest, the rocky grasslands at Normandien WEF are important in terms of supporting rupicolous high-altitude endemics such as African Rock Pipit (*Anthus crenatus*). Flight paths of most of the regionally occurring red-listed raptor species are strongly associated with the deeply incised Rocky Grassland and associated cliffs habitat, especially in areas with a slope gradient of >20%. These include Cape Vulture (*Gyps coprotheres*), Martial Eagle (*Polemaetus bellicosus*), Verreaux's Eagle (*Aquila verreauxii*), Lanner Falcon and White-necked Raven (*Corvus albicollis*). Black Stork (*Ciconia nigra*) also occurs in these areas, especially in summer.

4.1.1.3 Wetlands

The main wetland is a tributary of the Muel River floodplain that flows east to west along the southern boundary of the WEF. This habitat is likely to be most significant in terms of supporting wetland specialists as well as cranes and harriers. The Muel floodplain is very broad wetland with a shallow longitudinal gradient and as such, has an extremely high channel sinuosity. Consequently, the floodplain supports an abundance of well-developed oxbow lakes, back water depressions and floodplain levees, lined by extensive sedge-dominated seeps which provide together provide the type of habitat conditions typically frequented by Critically Endangered White-winged Flufftail. These Critically Endangered birds are known to occur in at least large palustrine wetlands in the region directly to the north and south of the VWC near Memel and Ingula respectively. The size of the Muel floodplain with its abundance of sedges also provides suitable habitat for Critically Endangered Wattled Crane. However, this wetland habitat has been threatened by the construction of a large dam wall near the western boundary of the WEF. Wattled Crane has been observed in the WEF at a depression wetland on plateau grasslands near VP16. Other wetlands include channelled and unchanneled valley-bottoms but also hillslope seeps, bench (or plateau) seeps and depressions and mountain streams. This habitat is likely to be most significant in terms of supporting wetland specialists as well as cranes and harriers. Striped Flufftail (*Sarothrura affinis*) may well occur in some of the high-altitude wetland areas. Suitable breeding habitat for African Grass Owl (*Tyto capensis*) in the form of dense and tall, *Imperata cylindrica* dominated grassland appears to be lacking. Indeed, no signs of their presence have been found to date in the greater VWC and it would appear that their occurrence in the region is marginal. The perennial streams at Normandien WEF especially along Walking Transect 14 support Half-collared Kingfisher (*Alcedo semitorquata*).

4.1.1.4 Croplands

Croplands occur on some of the flatter hilltop plateaus and lower lying areas, particularly in the western regions of the project area where the topography becomes more gently undulating as gets further from the escarpment. These croplands mostly produce fodder crops for livestock (mainly cattle), typically maize and oats. This habitat also includes patches of seeded pasture lands. This habitat supports a high abundance but low diversity of birds comprising mainly seed-eaters.

4.1.2 Expected Site Diversity

A total of 218 bird species have been recorded during atlassing surveys (SABAP2, 2022) within the nine pentads that overlap the VWC (see figure below). This inventory is considered to be a relatively accurate, if not slightly under-representative, portrayal of regional diversity. Consequently, this list was supplemented with additional species known to occur based on Chittenden et al. (2016) and expert knowledge of avifauna from the region. This integrated inventory, totalling 294 species, was used as the basis for the project's species probability list as presented in Appendix A.

Of these regionally occurring species, around 245 are considered highly likely to occur on a regular basis in the Normandien WEF. However, when considering seasonal variation in species assemblages and local movements, the number of species likely to be encountered on any day in the project area is typically to be < 130 species.

4.1.3 Observed Site Diversity

Over the course of the Year 1 pre-construction monitoring, a total of 175 bird species were recorded by the project team within Normandien WEF (which represents 78% of the 224 species recorded in the AOI). This inventory will gradually increase over time but should be considered a good representation of the typical bird assemblage in the project area. Although this represents moderate diversity in the South African context it is important to remember that a very high proportion are red-listed and / or endemic species.

4.2 Priority Species

Table 4-1 provides a list of the 70 regionally occurring priority species along with their likelihood of occurrence within the project area. This list also details their level of endemism and conservation status at global, national and provincial levels. The birds in

Table 4-1 have been short-listed as priority species based on a combination of their conservation status, level endemism, rarity, degree of habitat specialisation and potential susceptibility to impacts from wind energy developments. To date, 41 of the 70 regionally occurring priority species have been recorded in the Normandien WEF (see LO column in

Table 4-1).

The GPS location of each Year 1 priority species sighting has been documented in a database for the entire VWC of 1620 point localities with a total count of 7748 individuals. This point locality data is shown in Figure 4-13 and represents the basis of the kernel density model which was used to map hotspots for priority species as portrayed in Figure 4-14. Priority species are concentrated in at least six main hotspot areas throughout the VWC, of which one occurs in the Normandien WEF. This data was later used in the delineation of core habitat areas for threatened high altitude, wetland and raptor species. This core habitat area for threatened high-altitude species occupies a large portion of the of the project area.

Table 4-1 List of present and potentially occurring priority species

Common Name	Scientific Name	Conservation Status					Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity				
White-winged Flufftail	*Sarothrura ayresi*	CR	CR		PG		3			
Bearded Vulture	*Gypaetus barbatus*	NT	CR	CR	PG		2		x	
Wattled Crane	*Grus carunculata*	VU	CR	CR	PG		1	x	x	x
Grey Crowned Crane	*Balearica regulorum*	EN	EN	EN	PG		2	x	x	x
Black Harrier	*Circus maurus*	EN	EN		PG	NE	2	x	x	x
Martial Eagle	*Polemaetus bellicosus*	EN	EN	EN	PG		1	x	x	x
Rudd's Lark	*Heteromirafra ruddi*	EN	EN		PG	E	1	x	x	x
Botha's Lark	*Spizocorys fringillaris*	EN	EN		PG	E	1	x	x	x
African Marsh Harrier	*Circus ranivorus*	LC	EN		PG		2	x	x	x
Yellow-billed Stork	*Mycteria ibis*	LC	EN		PG		2	x	x	
Cape Vulture	*Gyps coprotheres*	VU	EN	EN	PG		1	x	x	x
Secretarybird	*Sagittarius serpentarius*	EN	VU		PG		1	x	x	x
Maccoa Duck	*Oxyura maccoa*	EN	NT		PG		2		x	
African Grass Owl	*Tyto capensis*	LC	VU		PG		4			
White-bellied Korhaan (Bustard)	*Eupodotis senegalensis*	LC	VU		PG		1	x	x	x
Striped Flufftail	*Sarothrura affinis*	LC	VU		PG		1	x	x	
Verreaux's Eagle	*Aquila verreauxii*	LC	VU		PG		1	x	x	x
Lanner Falcon	*Falco biarmicus*	LC	VU		PG		1	x	x	x
Black Stork	*Ciconia nigra*	LC	VU		PG		1	x	x	x
Short-tailed Pipit	*Anthus brachyurus*	LC	VU		PG		3			
Southern Bald Ibis	*Geronticus calvus*	VU	VU	VU	PG	E	1	x	x	x
Bush Blackcap	*Sylvia nigricapillus*	VU	VU		PG	E	1	x	x	x
Yellow-breasted Pipit	*Anthus chloris*	VU	VU		PG	E	1	x	x	x
Blue Crane	*Grus paradisea*	VU	NT	PS	OG		1	x	x	x
Red-footed Falcon	*Falco vespertinus*	VU	NT		PG		1	x	x	x
Denham's Bustard	*Neotis denhami*	NT	VU	VU	PG		2	x	x	x
Crowned Eagle	*Stephanoaetus coronatus*	NT	VU		PG		4			
Ground Woodpecker	*Geocolaptes olivaceus*	NT	LC		PG	E	1	x	x	x
Blue Korhaan	*Eupodotis caerulescens*	NT	LC		PG	E	1	x	x	x
Forest Buzzard	*Buteo trizonatus*	NT	LC		PG	E	3			x
Sentinel Rock Thrush	*Monticola explorator*	NT	LC		PG	E	1	x	x	x
Black-winged Pratincole	*Glareola nordmanni*	NT	NT		PG		4			
Pallid Harrier	*Circus macrourus*	NT	NT		PG		3			
Half-collared Kingfisher	*Alcedo semitorquata*	LC	NT		PG		1	x	x	x
Abdim's Stork	*Ciconia abdimii*	LC	NT		PG		3			
Marabou Stork	*Leptoptilos crumenifer*	LC	NT		PG		4			
African Rock Pipit	*Anthus crenatus*	LC	NT		PG	E	1	x	x	x
Grey-winged Francolin	*Scleroptila afra*	LC	LC		OG	E	1	x	x	x
Cape Eagle-Owl	*Bubo capensis*	LC	LC		PG		2	x	x	x
Spotted Eagle-Owl	*Bubo africanus*	LC	LC		PG		1	x	x	x
Marsh Owl	*Asio capensis*	LC	LC		PG		1	x	x	
Black-bellied Bustard	*Lissotis melanogaster*	LC	LC		PG		3		x	
African Cuckoo Hawk	*Aviceda cuculoides*	LC	LC		PG		4			
Black-winged Kite	*Elanus caeruleus*	LC	LC		PG		1	x	x	x

Common Name	Scientific Name	Conservation Status					Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity				
African Fish Eagle	*Haliaeetus vocifer*	LC	LC		PG		2	x	x	x
Black-chested Snake Eagle	*Circaetus pectoralis*	LC	LC		PG		3			x
Brown Snake Eagle	*Circaetus cinereus*	LC	LC		PG		4			x
Montagu's Harrier	*Circus pygargus*	LC	LC		PG		2			
African Harrier-Hawk	*Polyboroides typus*	LC	LC		PG		1	x	x	x
Little Sparrowhawk	*Accipiter minullus*	LC	LC		PG		1	x	x	
Rufous-breasted Sparrowhawk	*Accipiter rufiventris*	LC	LC		PG		1	x	x	x
Black Sparrowhawk	*Accipiter melanoleucus*	LC	LC		PG		1	x	x	x
Common (Steppe) Buzzard	*Buteo buteo*	LC	LC		PG		1	x	x	x
Jackal Buzzard	*Buteo rufofuscus*	LC	LC		PG	NE	1	x	x	x
Booted Eagle	*Hieraaetus pennatus*	LC	LC		PG		2	x	x	
Lesser Kestrel	*Falco naumanni*	LC	LC		PG		1	x	x	x
Rock Kestrel	*Falco rupicolus*	LC	LC		PG		1	x	x	x
Greater Kestrel	*Falco rupicoloides*	LC	LC		PG		1	x	x	x
Amur Falcon	*Falco amurensis*	LC	LC		PG		1	x	x	x
Eurasian Hobby	*Falco subbuteo*	LC	LC		PG		3			
White Stork	*Ciconia ciconia*	LC	LC		PG		1	x	x	x
White-necked Raven	*Corvus albicollis*	LC	LC				1	x	x	x
Barratt's Warbler	*Bradypterus barratti*	LC	LC		PG	NE	1	x	x	x
Melodious Lark	*Mirafra cheniana*	LC	LC		PG	NE	1	x	x	x
Cape Rock Thrush	*Monticola rupestris*	LC	LC		PG	E	1	x	x	x
Chorister Robin-Chat	*Cossypha dichroa*	LC	LC		PG	E	4			x
Sickle-winged Chat	*Emarginata sinuata*	LC	LC		PG	NE	2	x	x	
Forest Canary	*Crithagra scotops*	LC	LC		PG	E	2			x
Yellow-billed Kite	*Milvus aegyptius*	LC	LC		PG		2	x	x	x
Peregrine Falcon	*Falco peregrinus*	LC	LC		PG		1	x	x	

Key: Pa = Project Area; AOI = Area of Influence. Status: CR = Critically Endangered; DD = Data Deficient; EN = Endangered; LC = Least Concern; NA = Not Assessed; NT = Near Threatened; OG = Ordinary Game; PG = Protected Game; PS = Protected Species; VU = Vulnerable. Likelihood of Occurrence (LO): A – anecdotal; 1 = Confirmed to occur; 2 = High; 3 = Moderate; 4 = Low / None; X = observed during SABAp2 surveys. Sources: Taylor et al. (2015); BirdLife South Africa (2016); SABAP 2 (2022)

*Only when in large murmuration flocks exceeding several hundred individuals.

4.2.1.1 Red-listed Species

A total of 37 red-listed species are known to occur in the region based on a combination of distribution data provided in Chittenden et al. (2016), the 9 pentads covering the VWC (SABAP2, 2024) and expert knowledge. Of these, 28 species are considered highly likely to occur in the project area based on habitat suitability. This represents a high number of red-listed species in the South African context. To date, 21 red-listed species have been recorded in the Normandien WEF. Particularly noteworthy observations from the Normandien WEF include:

- Wattled Crane (Critically Endangered):
    - During S4 three adults were observed at FP 6 along upper reaches of the Klip River catchment, 4.4 km north of project area (in the proposed Goedehoop WEF area).
    - During S5 the species was observed for the second time, this time a single adult was observed at a dam (Point Count T1 Wef4 PC3 Wetland: -27.93718; 29.57933). The individual stayed at the dam for two days before moving off.

- Cape Vulture (Endangered):
    - The most significant Y1 observation for Normandien WEF was recorded during S3 when 35 individuals were recorded circling over VP 14 at 08:30 for 34 minutes (collectively 20.24 hours);
    - Another significant record for Normandien WEF was the flight of 31 individuals over VP 15 for three minutes (collectively 1.55 hours); and
    - Cape Vulture flights were most frequently recorded at VP 15.
- Martial Eagle (Endangered):
    - During S5, adult observed commuting at rotor sweep height at VP17 during twilight.
- Rudd's Lark (Endangered):
    - During S3, this species was observed at two localities in Normandien WEF. One near VP 14 (-27.944334°; 29.641075°) and the other between VP16 and VP15 (-27.943033°; 29.574417°); and
    - During S5 a single adult bird was predated upon by a Southern Fiscal which at VP 16 which hung it on a fence. This winter observation confirms residency.
- Secretarybird (Endangered):
    - Observed regularly in areas between VP14 and VP 15. Suspected nest in Krip River valley.
- Yellow-breasted Pipit (Vulnerable):
    - Observed on multiple occasions in grasslands around VP13 and 14 during summer.
- Verreauxs' Eagle (Vulnerable):
    - Frequently observed from VP13 flying along crests of the Muel River valley.
- White-bellied Bustard (Vulnerable):
    - Most frequently encountered between VP 15 and 16. Appears to be resident.
- Half-collared Kingfisher (Vulnerable):
    - Resident breeding pair occurs along stream on WT14 (upper catchment reaches of Klip Rivier).
- Amur Falcon (Least Concern):
    - During Survey 3, a very large migratory flock (numbering over a thousand birds) was observed moving across the project area in a dense swarm; and
    - Migratory flocks of this size are of global significance. The potential for a significant collision event is a distinct possibility and represents a considerable risk in terms of wind farm development.
- Melodious Lark:
    - Observed displaying at VP16.
- Rufous-breasted Sparrowhawk:
    - Observed during driven transects near VP15 and near VP4. Nest locations uncertain.
- Marsh Owl:

- First record for project. Date 04 May 2023.

The following noteworthy additional observations were made by the bat specialists (Inkululeko Wildlife Services) during the fieldwork in the greater VWC:

- The observation of an estimated 200 Cape Vultures at 28,04783 S, 29,52242 E within the Cluster. During IWS site visits, vultures were observed utilising a variety of habitats and flying in and out of rotor sweep whilst flying above ridges, between ridges, and down from ridges into the central valleys;
- More than 25 Cape Vultures were observed near Biggs' Farm at 28,04455 S, 29,54404 E, soaring above the ridge, utilising updraughts/thermals, and moving continually within turbine rotor sweep height;
- Martial Eagle was seen near Mount Pelan Auction Kraals; and
- Two Black Harrier were observed on the R35 outside Memel.

4.2.1.2 Cape and Bearded Vulture

At present five Cape Vulture roosts (of which one is a confirmed breeding colony) and one Bearded Vulture nest have been confirmed to occur in the AOI (all within 50 km of the VWC). Initially, during scoping fieldwork, three Cape Vulture roosts on three distinct inselbergs were identified to the south of VWC. Due to the proximity of the VWC to the roosts and in accordance with the BirdLife's Cape Vulture and wind energy best practice guidelines, the specialist recommended that the status of these roosts (in terms of breeding and seasonal occupancy) be thoroughly investigated. However, completing an investigation of this nature was difficult to achieve during the pre-construction monitoring surveys due to the to the exceptionally tight fieldwork schedule and the vast distances involved in traveling between roosts on bad roads and the general remoteness of the roosts. As such a dedicated vulture roost investigation was motivated and subsequently conducted for the proposed VWC. The need for the investigation was raised during a meeting between TBC and Mulilo and a decision was made for a basic, high level, dual season investigation of the breeding status of these roosts to be carried out.

Roosts were visited and with the exception of Nelson's Kop tentatively ascribed as non-breeding natural roosts which are used regularly. This section summarises the findings of the vulture roost investigations to date. Photographs are given in Figure 4-2 and each roost / nest is described in Table 4-2 along with its proximity to the closest boundary on Normandien WEF.

Table 4-2 Vulture roost details

Number	Inselberg	Description	Closest Distance	Buffer Implications
CV Roost 1	Arend's Kop	Cape Vulture Roost (large, regular non-breeding). Inselberg near Harrismith. Roost is on west facing aspect on north-western end of inselberg.	36.6 km WSW	Yes
CV Roost 2	Scheurklip	Cape Vulture Roost (regular non-breeding). On large distinctive (lobster claw-shaped cliff) inselberg closest to project area. Roost is on north aspect.	19 km SSW	Yes
CV Roost 3	Nelson's Kop	Cape Vulture Breeding Roost (large colony) and Bearded Vulture Nesting Site. Roost is on the southern aspect of the north-western buttress of Nelson's Kop.	30 km SW	Yes
CV Roost 4	Witkoppe	Cape Vulture Roost (regular non-breeding). Situated on the eastern most spur of the Witkoppe Inselberg. Roost is on north facing aspect of spur.	21. km NW	Yes
CV Roost 5	Verkykerskop	Cape Vulture Roost (small non-breeding). Situated on the western aspect of Verkykerskop Inselberg. Roost is on north facing aspect of spur.	30.1 km W	Yes
BV Nest 1	Nelson's Kop	Bearded Vulture Nest on Nelson's Kop. Breeding Pair.	30 km SW	No

Note: Another roost occurs just beyond 50 km on Rensburgskop near Manyenyeza Peak and the Love Alive Lions Sanctuary (Vulpro pers. comm. 2025)

Following several detailed visits to the roosts, evidence of breeding has only been recorded at Nelson's Kop. The remaining roosts appear, at this stage, to be non-breeding "spillover" roosts. The first official vulture roost investigation carried out in June 2023 and subsequent fieldwork in April 2024 yielded no evidence of breeding at any roosts other than Nelson's Kop. Of the non-breeding roosts Arend's Kop is the more significant. It is apparent, based on multiple season observations (focal point counts from the R722 road) that Arend's Kop roost is utilised very regularly throughout the year. The inselberg was hiked during preconstruction Survey 5 (27 July 2023). However, upon closer inspection no active nests or signs of breeding (nesting material, mating birds, eggs, chicks) were observed, although suitable nest leges do occur (although limited) and the possibility for breeding once the colony reaches critical mass should not be conclusively ruled out (Geoff Lockwood pers. comm). At Nelson's Kop, during the June 2023 vulture investigation, two breeding birds (Figure 4-4) were found to be incubating after reassessing the photographs. Approximately 200 birds were observed roosting at Nelson's Kop that trip.

The second follow-up visit to Nelson's Kop was carried out over two days. The first was a reconnaissance day (information gathering from local landowners and general scoping of the greater inselberg from afar). The second day involved a full day hike to the base of the vulture colony and a detailed count. Noteworthy findings were as follows:

- Cape Vulture breeding status: One of the two nests (that were observed on 13 June 2023) has yielded a chick (Figure 4-3). The nest is situated towards the top left-hand side of the main roost (when facing north). The chick is currently in a transition phase from downy to feathered plumage with an approximate age 50 days (as of 13 October 2023 and depending on hatch date). The chick is tended by both parents and is actively guarded. The attempt made by the second incubating pair appears to have been unsuccessful, but the pair still sit faithfully at the failed nest site. Recently the number of Cape Vultures breeding at Nelsonskop has increased to an estimated 7 nests (based on expert input received from Sonja Krueger and Brent Coverdale (Ezemvelo KZN Wildlife) during a visit in November 2024;

- Cape Vulture colony size: A detailed afternoon inbound count conducted on 13 June 2023 yielded 131 adult birds. It is, however, likely that more birds may have landed on other parts of the inselberg not visible at the time of the count and it is likely that the colony regularly supports well over 200 birds;

- Bearded Vulture breeding: A particularly significant finding was that Bearded Vulture (*Gypaetus barbatus*) breed at Nelson's Kop. The species is listed as Critically Endangered in South Africa. Nelson's Kop represents the most northerly breeding site for the species in the country and the only one away from the main Drakensberg escarpment. The nest has been monitored on an *ad hoc* basis since 2006 by Rick Dillon with the last successful breeding attempt (**Error! Reference source not found.**) documented in 2014 by R. Dillon and Sonja Kruger. BirdLife South Africa also monitors the nest annually on behalf of the Bearded Vulture Task Force. Following a period where no birds were present, they have returned in recent years (est. around 2021 or 2022) and have shown definite breeding behaviour even though a specific nest could not be located (BirdlifeSA pers. comm. 2024) Another nest was, however, found on the western face which may represent a new nest site.

- Vulture restaurants: At present the only confirmed vulture restaurant is situated at Nambiti Game Reserve 57 km south-east of Nelson's Kop. However, the vultures have been observed feeding on carcasses in the VWC and AOI on numerous occasions;

- Black Stork: A single individual was observed flying over the Cape Vulture colony. It is suspected that the species may be nesting on the northern aspect of Nelson's Kop;

- Lanner Falcon: A pair were observed actively fending off any birds which came to close to the western cliff face. It is suspected that they have an active nest on Nelson's Kop;
- Verreaux's Eagle: A single adult bird flew over Nelson's Kop; and
- Barrat's Warbler: A pair was heard calling from a Yellowwood tree at the base of the cliff.

Overall, the Cape Vulture roost investigation highlights the importance of Nelson's Kop in supporting breeding populations of several threatened cliff-nesting species which include Bearded Vulture (Critically Endangered), Cape Vulture (Endangered), Lanner Falcon (Vulnerable) and Black Stork (Vulnerable). The other four roosts appear, at this stage, appear to be non-breeding "spillover" roosts. The project's spatial dataset has been updated to include the Bearded Vulture nest and its recommended 10 km Very High exclusion buffer as well as the two new roosts at Verkykerskop and the Witkoppe. The VWC (and therefore Normandien WEF) falls outside of the 18 km Very High buffer zone as stipulated by BirdLife South Africa for breeding colonies of Cape Vulture. However, it does fall within the 50 km High sensitivity buffer of all five roosts. Although the VWC falls beyond the 10 km suggested buffer radius for Bearded Vulture (Brink, 2020), their presence is a cause for concern given their wide-ranging nature. The sporadic occurrence of Bearded Vulture, particularly juveniles in the project area is supported by locality records as provided in Reid et al (2015). Overall, Normandien WEF and the VWC is situated within an area likely to be frequently used by >200 Cape Vultures and infrequently used by at least a pair of Bearded Vulture from Nelson's Kop as well as their dispersing juveniles but other birds may also visit the site from the Central and Northern Drakensburg.

Figure 4-2 Photographs of the three Cape Vulture roosts; A) Roost 1 Arendskop, B) Roost 2 Scheurklip, C) Roost 3 Nelson's Kop, D) Roost 4 Witkoppe

Figure 4-3 ***Photographs of the Nelson's Kop roost taken during the second follow up visit in October 2023 showing A) the location of the two breeding pairs. Note only CVN1 successfully hatched a chick, B) The chick at CVN1 and C) the nest cup of CVN1.***

Figure 4-4 ***Photographs of Bearded Vulture taken at Nelson's Kop. The first column represents observations of the currently presumed nest location (A and C) and the recently observed adult (E and G) while the second column represents observations of the known breeding location (B and D) and birds including the 2014 fledgling (F and H).***

4.2.1.3 Martial Eagle

Overall, five Martial Eagle nests were documented in the AOI (Table 4-3). The nests are labelled as "Martial Nests 1-5" in the project's Priority Species Nests shapefile. Of these, the most significant with regards to the VWC and Normandien WEF cluster is Martial Eagle Nest 2**.** The nest borders on farm Bath and has considerable implications for the Normandien WEF, essentially covering most of it. A single juvenile fledged from the nest in October 2023. The presence of the nest was suspected to occur from flight activity patterns observed during Survey 6. As mentioned in the general progress above, two adults were seen hovering in this area (Farm Bath) mostly in rotor sweep height for 4 hours. The male has since been captured and fitted with a GPS tracker by Dr. Gareth Tate of EWT who provisionally plans to go back out to site in August 2024.

Table 4-3 Martial Eagle nest details

Nest	Description	Status	Buffer implications for WEF
1	Nest ca 12 m high in poplar tree in a Eucalyptus bushclump on Clan Leslie Estates farm, private property. Approximately halfway between Verkykerskop and Warden.	Active, last documented activity, single juvenile flew from nest November 2022	No
2	Nest ca. 18 m high in tallest tree of Eucalyptus bushclump on land bordering Farm Bath.	Active, last documented activity, single juvenile flew from nest October 2023	No
3	Nest in *Eucalyptus* bushclump	Active, breeding success uncertain	No
4	Nest in escarpment forest in Ingula Nature Reserve.	Active, pair have successfully fledged juveniles	No
5	Nest in Eucalyptus tree at headwaters of wetland	Active	No

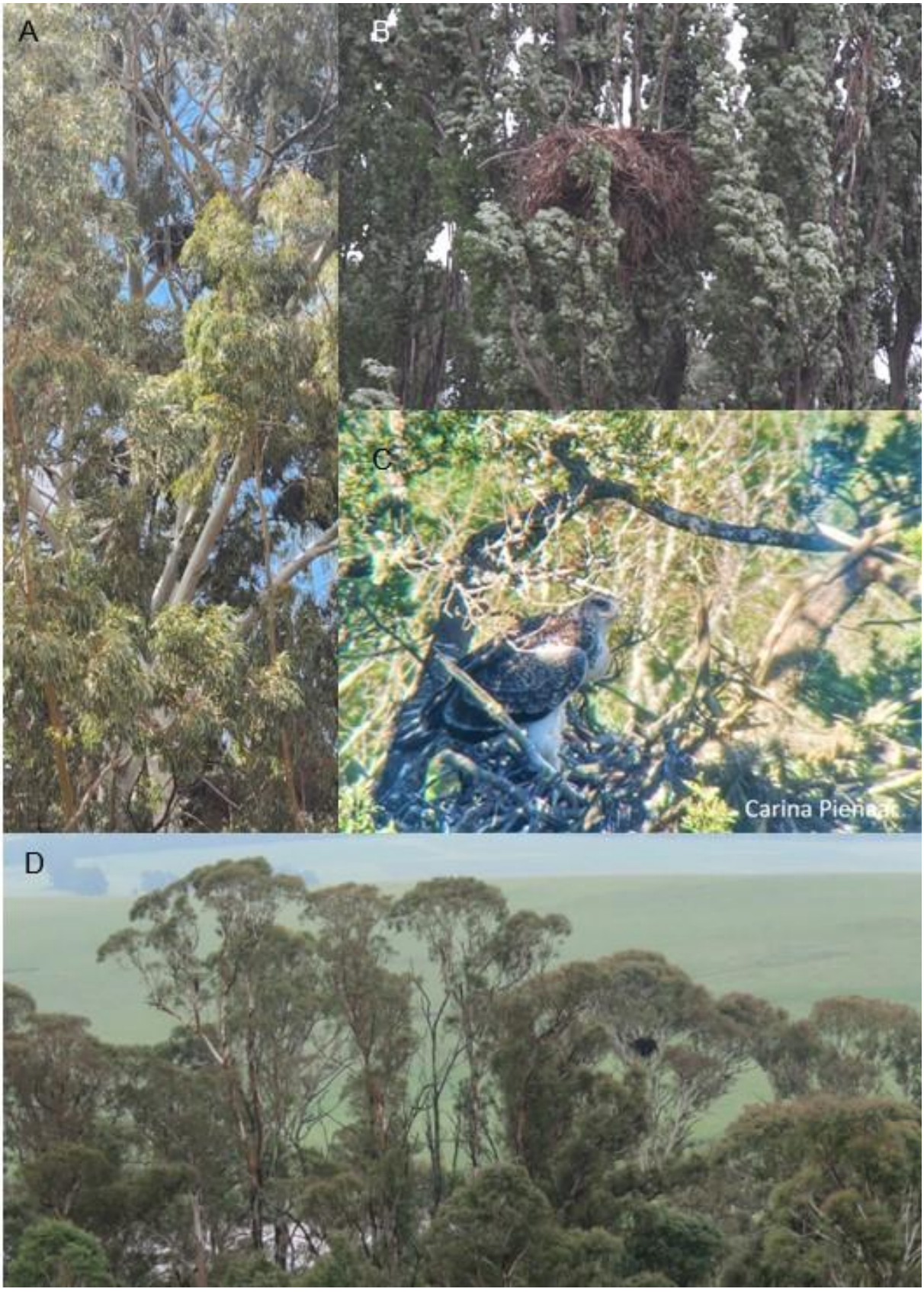

Figure 4-5 Photographs of Martial Eagle nests A) 2, B) 1, C) 4 and D) 3

4.2.1.4 Southern Bald Ibis

To date 11 Southern Bald Ibis roosts have been found within the AOI. The most significant of which being roosts 8 and 9 on the Witkoppe inselberg approximately 20 km north-west of the project area, which hosts the largest breeding colony of Southern Bald Ibis in the world. No roosts have been found within the Normandien WEF and none of the others in the AOI have buffer implications for the WEF. Based on the high number of foraging individuals encountered within the project area (considerably higher than the number of birds observed roosting at night in the project area) it would appear that many individuals make regular foraging excursions to the grasslands in WEF.

Table Southern Bald Ibis nest details

Roost	Description and Status	Significance	Buffer implications for WEF
1	Uncertain. Likely breeding roost but unconfirmed. Situated in sheltered crag on Waterkop near Markgraaf's Rest WEF.	Medium	No
2	Breeding roost. Inactive. Evidence of nesting, but erratic. Approximately 8 birds.	High	No
3	Non-breeding roost. No breeding observed to date. Situated on crag on entrance road to farm Bath on Markgraaf's Rest WEF.	Low	No
4	Non-breeding roost behind residence.	Low	No
5	Breeding roost. Nesting observed 2022 but not 2023. On cliffs along river.	High	No
6	Breeding roost large. Active. Breeding confirmed. At least 17 individuals. Two nests observed. Pair of chicks on one and pair of eggs on other. In small gorge.	High	No
7	Breeding roost. Four birds observed sitting on nests. Roost monitored by Renette Steyn and Carina Nel Meissie.	High	No
8	Breeding roost. Active breeding colony. Witkoppe Inselberg. Part of largest in the world.	Very High	No
9	Breeding roost. Witkoppe Inselberg. Largest in world.	Very High	No
10	Breeding roost. Active. Breeding confirmed. Cliff over river near low level bridge on R722.	High	No
11	Breeding roost. Active. Breeding confirmed. One nest with two chicks. Centrally situated on portion land between Groethoek, Kromhom and Markgraaf's Rest WEFs	High	No
12	Breeding roost. Two nests with adults sitting and potential baby	Very High	No
13	Breeding roost. One adult on nest	Very High	No
14	Non-breeding roost. No breeding observed to date.	Low	Yes
15	Breeding roost. Significant Southern bald ibis roost and breeding spot - 22 birds counted	Very High	No
16	Non-breeding roost. No breeding observed to date.	Low	Yes
17	Uncertain breeding status. No breeding observed to date.	Low	Yes
18	Non-breeding roost. No breeding observed to date.	Low	Yes
19	Breeding Roost. Breeding erratic.	High	No

Figure 4-6 Evidence of Southern Bald Ibis breeding activity; A) adult tending nest, B) eggs on nest, C) downy chick, D) feathered chicks, E) adult incubating, F) courtship

4.2.1.5 Verreaux's Eagle

Three Verreaux's Eagle nests occur within the AOI, none of which are in the Normandien WEF. Of these, breeding has only been confirmed at Nest 3 on Verkykerskop, 28 km west of the Normandien WEF. This nest is actively tended by a pair and signs of breeding include the construction of an inner wreath. The occupancy and breeding status of the remaining two remains uncertain due to the remoteness and inaccessibility of their locations. Verreaux's Eagle Nest 2 on Mont Pelaan (although likely has not yet been positively confirmed as a Verreaux's Eagle nest). This nest has marginal buffer implications for the Normandien WEF.

Table 4-4 Verreaux's Eagle nest details

Name	Description	In WEF	Buffer Implications for WEF
Verreaux's Eagle Nest 1	Uncertain	No	No
Verreaux's Eagle Nest 2	Inactive	No	Yes
Verreaux's Eagle Nest 3	Active	No	No
Verreaux's Eagle Nest 4	Inactive, but signs of recent use	No	Yes

4.2.2 Endemic Species

A total of 15 South African endemics occurs in the region. Non-red listed include Grey-winged Francolin (*Scleroptila afra*), Forest Buzzard (*Buteo trizonatus*) Cape Rock Thrush (*Monticola rupestris*), Buff-streaked Chat (*Campicoloides bifasciata*) and Pied Starling (*Lamprotornis bicolor*). All except, Forest Buzzard were recorded during Year 1 monitoring. Except for Pied Starling (which is ubiquitous) all of these species tend to frequent the higher altitude Plateau Grassland and Rocky Grassland habitat.

4.2.3 Migratory Species

Many large flocks of migratory birds move across the project area in early summer, the most notable of which being a globally significant migratory flock of Amur Falcons (numbering over a thousand individuals which moved along the Muel River valley for several days (observed from VP 13).

4.2.4 Other keystone species

Another 10 raptor nests have been found in the AOI. Of these, none have buffer implications for the Normandien WEF.

Table 4-5 Other priority species nest details

Name	Description	Buffer Implications for WEF
African Harrier-hawk Nest 1	Active	No
Black Sparrowhawk Nest 1	Active	No
Black Sparrowhawk Nest 2	Status Uncertain	No
Black Sparrowhawk Nest 3	Inactive	No
Black Sparrowhawk Nest 4	Inactive	No
Jackal Buzzard Nest 1	Active	No
Jackal Buzzard Nest 2	Inactive	No
Jackal Buzzard Nest 3	Active	No
Lanner Falcon Nest 1	Active	No
Secretarybird	Active	No

Figure 4-7 ***Nests of cliff-nesting raptors A) Jackal Buzzard Nest 3, Lanner Falcon Nest 1, Jackal Buzzard nest 1 with eggs, D) Verreaux's Eagle Nest 3***

Figure 4-8 ***Photographs of red-listed raptors observed in the AOI;A) Cape Vulture, B) Bearded Vulture, C) Martial Eagle carrying a Denham's Bustard, D) Verreaux's Eagle, E) Secretarybird, F) Lanner Falcon***

Figure 4-9 ***Photographs of small to medium-sized red-listed species observed in the AOI; A) Rudd's Lark, B)Yellow-breasted Pipit, C) African Rock Pipit, D) Ground Woodpecker, E) Bush Blackcap, F) Maccoa Duck, G and H) Southern Bald Ibis***

Figure 4-10 ***Photographs of large-bodied priority species observed in the AOI; A) Blue Crane, B)Grey Crowned Crane, C) Wattled Crane, D) Denham's Bustard, E) Black-bellied Bustard, F) Blue Korhaan, G) White Stork, H) Black Stork***

Figure 4-11 ***Photographs of other priority raptor species observed in the AOI; A) Amur Falcon, B) Peregrine Falcon, C) Juvenile Jackal Buzzard, D) African Harrier-hawk, E) Rufous-breasted Sparrowhawk, F) Black-winged Kite***

Figure 4-12 ***Photographs of other generally rare or illusive speciesobserved in the AOI; A) African Crake, B) Sickle-winged Chat, C) Barrat's Warbler, D) Black-winged Lapwing, E) Cape Rock Thrush, F) Grey-winged Francolin***

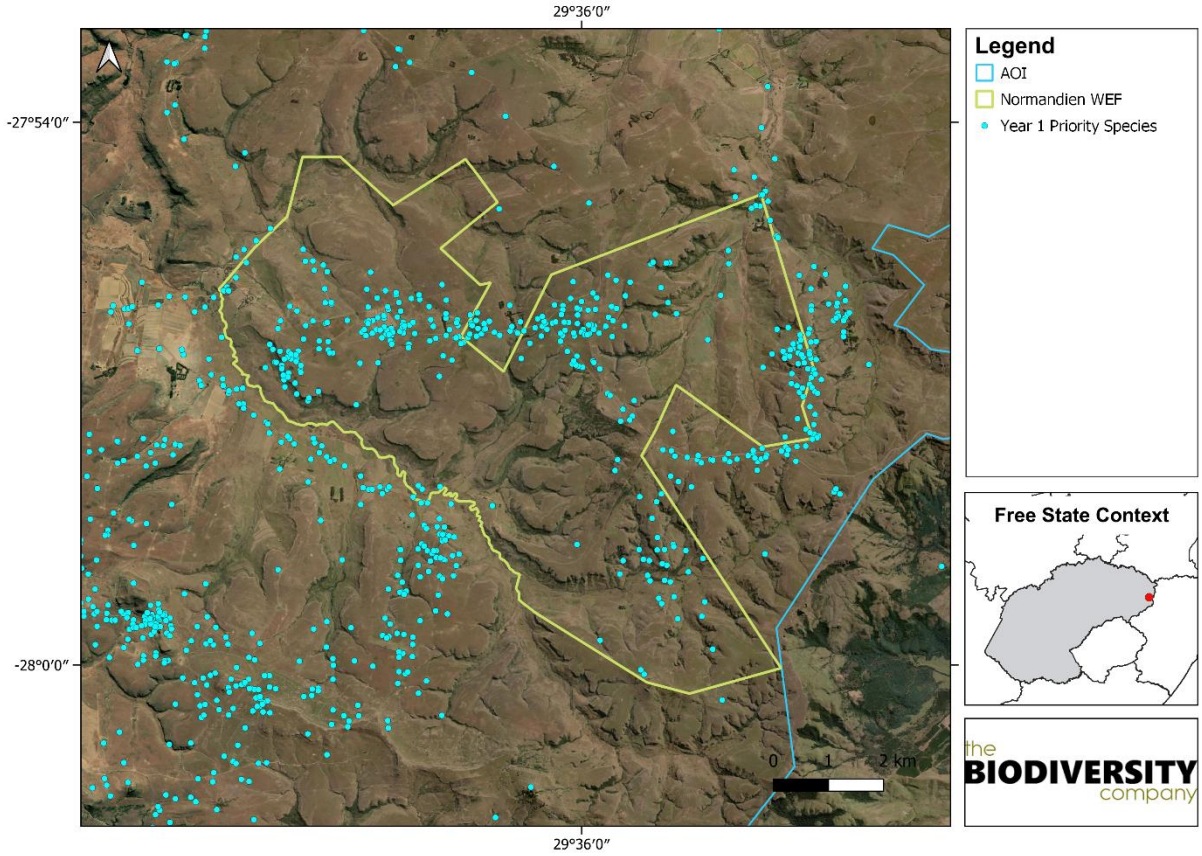

Figure 4-13 Point localities of year 1 priority species observations

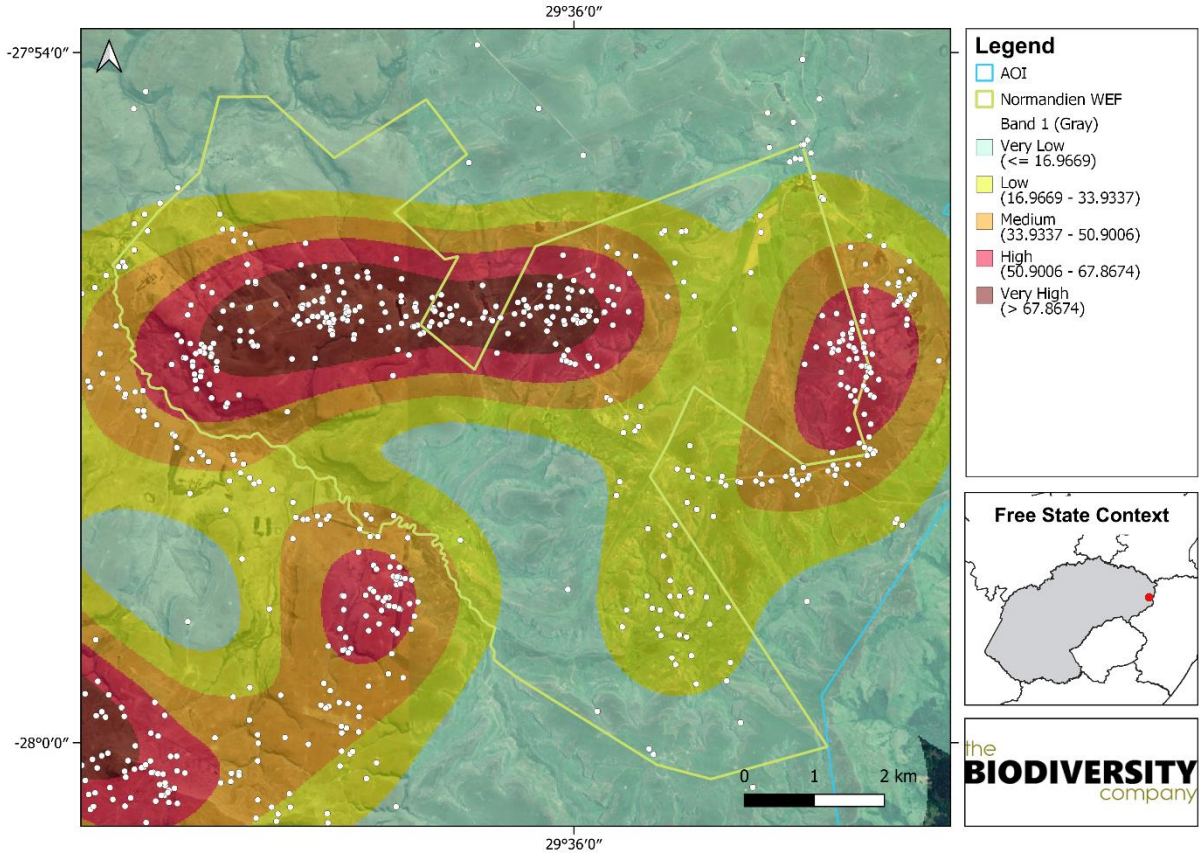

Figure 4-14 Kernel density model portraying hotspots of priority species occurrence.

4.3 Flight Activity

4.3.1 All Priority Species

Year 1 flight activity data for the Normandien WEF (n= 6 VPs, 12-hours per VP over 6 surveys totalling 72 hours per VP per year) and the control site (1 VP for the same period) for all priority species and Cape Vulture are summarised in the table below. Overall, 432 hours of observations from six vantage points in the Normandien WEF yielded a total of 1257 flights of priority species, totalling 151.6 hours with a passage rate of 2.91 birds^{-hour}. A large proportion of these flights are due to the seasonal influx of migrating Amur Falcon (n=661). Excluding Amur Falcon, the passage rate for priority species is 1.53 birds^{-hour}. Nevertheless, this passage rate is still considerably more than that observed at the control site (0.97 birds^{-hour}). For the sake of this scoping report and project planning purposes, Cape Vulture was singled out for further analysis on flight activity, see Section 4.3.2 below for details.

Table 4-6 Summarised Year 1 flight activity data from both the WEF and the control site (for all priority species and Cape Vulture)

Site	Variable	VPs (n)	Surveys/Year	Hours	Hours/VP	No. Fly. Ind.	Passage Rate	Flight Hours
Normandien WEF	Priority Species	6	6	432	72	1257	2.91	151.573
Normandien WEF	Cape Vulture	6	6	432	72	121	0.28	15.819
Control	Priority Species	1	6	72	72	66	0.92	7.453
Control	Cape Vulture	1	6	72	72	1	0.01	0.017

When comparing passage rates of priority species among VPs per survey VP13 emerges as a noticeable outlier with a mean annual passage rate of 9.15 birds^{-hour}. This is more than three orders of magnitude higher than the next highest VP passage rate of 2.51 birds^{-hour} (VP15). This extraordinarily high passage rate is accounted for by the inbound passage of a large migratory flock of Amur Falcon during the summer survey (S3) which saw a flock commute along the Meul River valley. The next highest mean passage rate of priority species is VP15 (2.51 birds^{-hour}) which, in contrast, is mainly due to the high counts of Cape Vulture (n=31) and Southern Bald Ibis (n=40) at this VP during the summer survey (S3).

When considering variation among surveys, a marked phenological response in priority species activity is revealed. It is clear that the highest passage rates are encountered from Summer through Autumn with a considerable peak in Summer (S3, 12.7 birds^{-hour}). This is expected given the higher activity associated with increased primary productivity (and consequently insect, seed and other food availability) during this time in this summer rainfall region, breeding and influx of migrants. This period was not only characterised by an influx of Palearctic and intra-African migrants but was found to also be also strongly influenced by altitudinal migration from several Southern African residents (species which move away from these colder highlands to warmer, moister regions below the escarpment and nearer the coast during winter.

Table 4-4-7 Passage rates of priority species among VPs per survey

	Passage Rate						
Survey	S1	S2	S3	S4	S5	S6	Mean
Season	Winter	Spring	Summer	Autumn	Winter	Spring	
Control	0.08	0.08	5.08	0.25	0.00	0.00	0.92
9	0.83	2.50	1.17	0.42	2.50	1.83	1.54
13	0.92	0.08	50.92	0.75	1.17	1.08	9.15
14	0.33	0.58	9.67	0.42	0.17	0.67	1.97
15	0.58	1.50	9.17	1.25	1.58	1.00	2.51
16	1.00	1.17	1.83	0.92	0.25	1.08	1.04
17	0.00	0.00	3.25	1.00	2.17	1.00	1.24

Mean	0.61	0.97	12.67	0.79	1.31	1.11	

When comparing passage rates among the 31 priority species observed over the six surveys, four species emerge as having notably higher passage rates than any other. These include Amur Falcon (1.53 birds^{-hour}), Cape Vulture (0.28 birds^{-hour}), Jackal Buzzard (0.17 birds^{-hour}), Southern Bald Ibis (0.51 birds^{-hour}). Autumn and Winter are characterised by a noticeable reduction in the diversity and abundance of large terrestrial birds such as cranes, ibises, korhaans and bustards. Most notable was the reduction in the prevalence of Blue and Crowned Cranes showed notable reduction in on-site prevalence (to almost zero). It was subsequently established that most of the regional crane populations that occur in the project area during summer leave the project area to aggregate and overwinter, in large non-breeding flocks (several 100 birds), at one of the two known congregation sites situated on Farm Nugget near Verkykerskop and the dairy farm near Memel. Exclusively summer visitors include Booted Eagle, Common Buzzard, Denham's Bustard, Lesser Kestrel, Little Sparrowhawk, Wahlberg's Eagle, Bush Blackcap and Barrat's Warbler.

Table 4-8 Passage rates among the 31 priority species observed over the six surveys

Common Name	Winter	Spring	Summer	Autumn	Winter	Spring	Mean
	S1	S2	S3	S4	S5	S6	
African Harrier-Hawk				0.056			0.009
Amur Falcon			9.181				1.530
Black Harrier							
Black Sparrowhawk							
Black-winged Kite	0.028					0.014	0.007
Blue Crane	0.083	0.028	0.167		0.014	0.097	0.065
Booted Eagle							
Cape Vulture	0.028	0.236	1.111	0.014	0.153	0.139	0.280
Common Buzzard		0.042	0.014				0.009
Denham's Bustard							
Greater Kestrel			0.014	0.014	0.042		0.012
Grey Crowned Crane							
Ground Woodpecker							
Jackal Buzzard	0.153	0.097	0.083	0.222	0.417	0.069	0.174
Lanner Falcon	0.028	0.083		0.083	0.083	0.069	0.058
Lesser Kestrel				0.014			0.002
Little Sparrowhawk					0.028		0.005
Martial Eagle	0.028		0.014		0.042	0.028	0.019
Melodious Lark		0.028				0.014	0.007
Peregrine Falcon					0.028		0.005
Rock Kestrel	0.042	0.111	0.042	0.083	0.125	0.056	0.076
Rudd's Lark			0.014				0.002
Rufous-breasted Sparrowhawk				0.028			0.005
Secretarybird	0.014				0.014		0.005
Southern Bald Ibis	0.167	0.347	1.875	0.167	0.167	0.333	0.509
Verreaux's Eagle	0.014			0.028	0.028	0.056	0.021
Wahlberg's Eagle							
White-necked Raven	0.028		0.153	0.083	0.153	0.236	0.109
Yellow-billed Kite							
Yellow-billed Stork							
Yellow-breasted Pipit					0.014		0.002

Flight activity was also found to be influenced by time of day with trends in daily activity patterns having varied significantly among the four main time slots. Early mornings (06:30-09:30), as would be

expected, are characterised by a peak in total species richness and abundance (particularly with regards to small-passerines). Late mornings (09:30-12:30) are associated with a timeous and drastic increase in the prevalence of soaring birds, which appears related to an increased in temperature and subsequently wind speed (particularly above 10 km/h). Early afternoons (12:30-15:30) are considerably quieter with bird activity decreasing drastically. Late afternoon (15-30-18:30) bird activity starts slow before a last increase in priority species flights towards nightfall with peak activity around and just after sunset as many species (particularly Bald Ibis and large raptors) begin their commute back to their roosts / nests.

Flight paths of all priority species observed during vantage point surveys within the WEF are mapped in Figure 4-15. To better understand the spatial distribution of flights over the project area a flight path intersection density model was made (Figure 4-16). This model (essentially a form of kernel density estimation applied to intersecting lines) subsequently formed the basis of the flight corridors sensitivity layer included in the sensitivity assessment. From this figure it is apparent that flights by priority species are concentrated in at least one main “hotspot” around the highlands of VP 14 and 15.

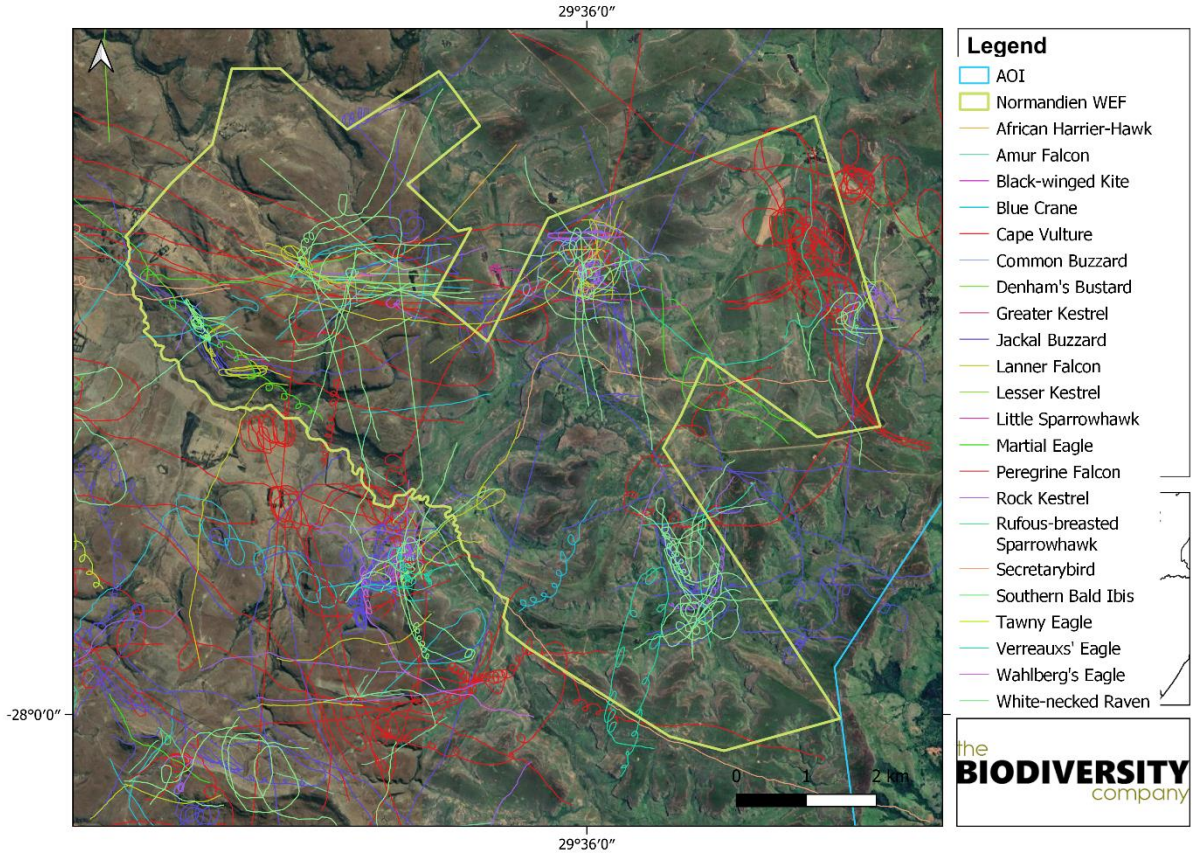

Figure 4-15 Flight paths of priority species

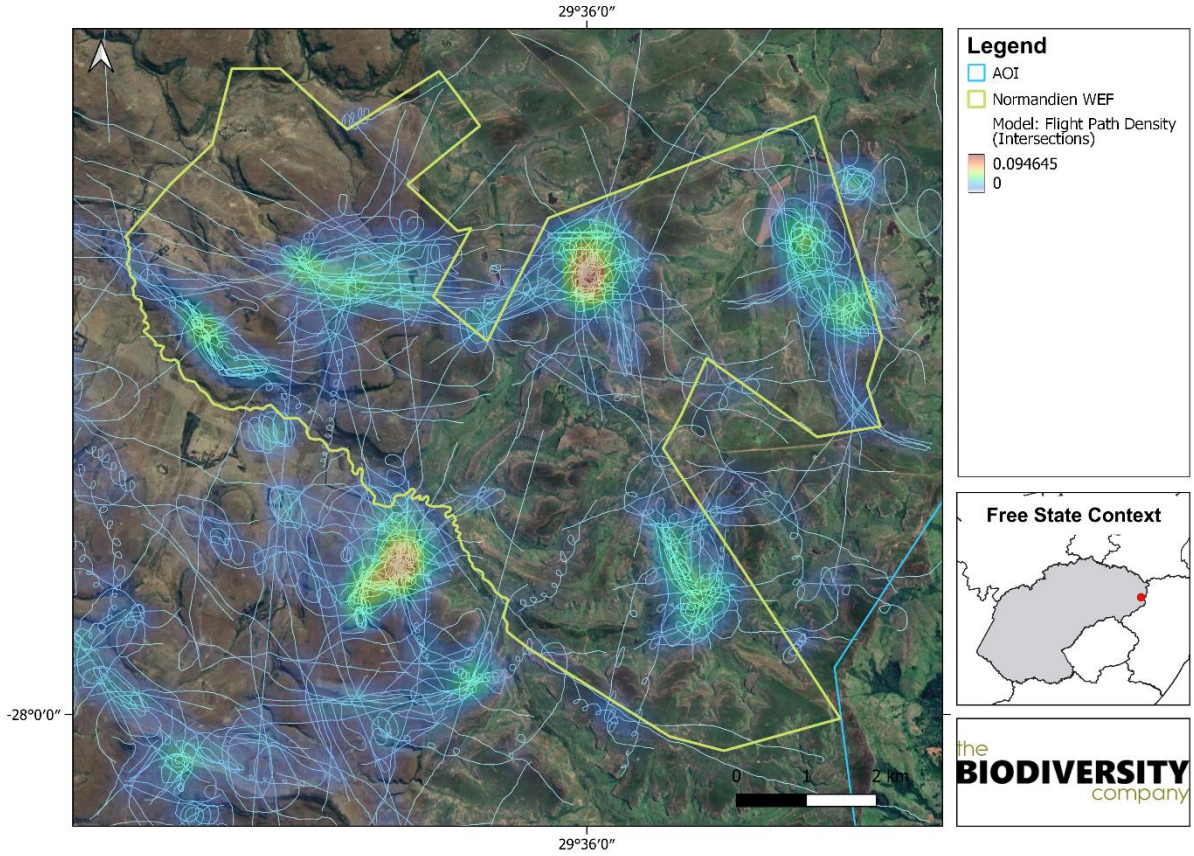

Figure 4-16 Flight path density model

4.3.2 Cape Vulture

At Normandien WEF a total of 121 individual Cape Vulture passages were recorded from the six on-site vantage points (n= 432 hours) during the Year 1 monitoring. Each flight path across the Normandien WEF is represented spatially in Figure 4-15. This represents an average annual passage rate of 0.28 birds^{-hour} similar to the average for the VWC as a whole. Cape Vulture are present year-round in the WEF, and no strong seasonal variation in passage rate was observed. It is important to remember although the passage rate data provides information on the regularity and frequency of vulture flights it does not account for the duration and time spent flying at rotor height nor the spatial variation thereof.

Table 4-9 Cape Vulture flight time below, within and above rotor sweep height (n=119 flights).

Zone	Flight Hours	Mean	SD	SE
H1 (below)	0.1	0.008	0.009	0.0008
H2 (within)	19.36	0.16	0.1368	0.01244
H3 above)	10.553	0.0872	0.107	0.0098

The above table shows that the Cape Vultures collectively spent a total of 30.02 hours flying over the Normandien WEF. Noteworthy is that, 64% (19.36 hours) of this time was spent flying at potential rotor height. Both parametric (one-way ANOVA) and non-parametric (Kruskal-Wallis) tests revealed that this observation was highly statistically significant (p<2e-16). Flight time spent at the various turbine height classes (below, within and above rotor sweep) is visualised in the figure below. Cape Vulture typically fly low along the gorges and cliff lines until they reach the WEF. As the day warms and thermal activity increases the groups begin to circle and gradually ascend using the ridges around VP 15 to gain lift as they leave the project area usually in a northerly to north-westerly direction towards the Witkoppe Mountains or Arend's Kop. Full day focal points at the various roost sites show that vultures tend to start returning to their roosts from midday with most having returned by around 15:30 in summer.

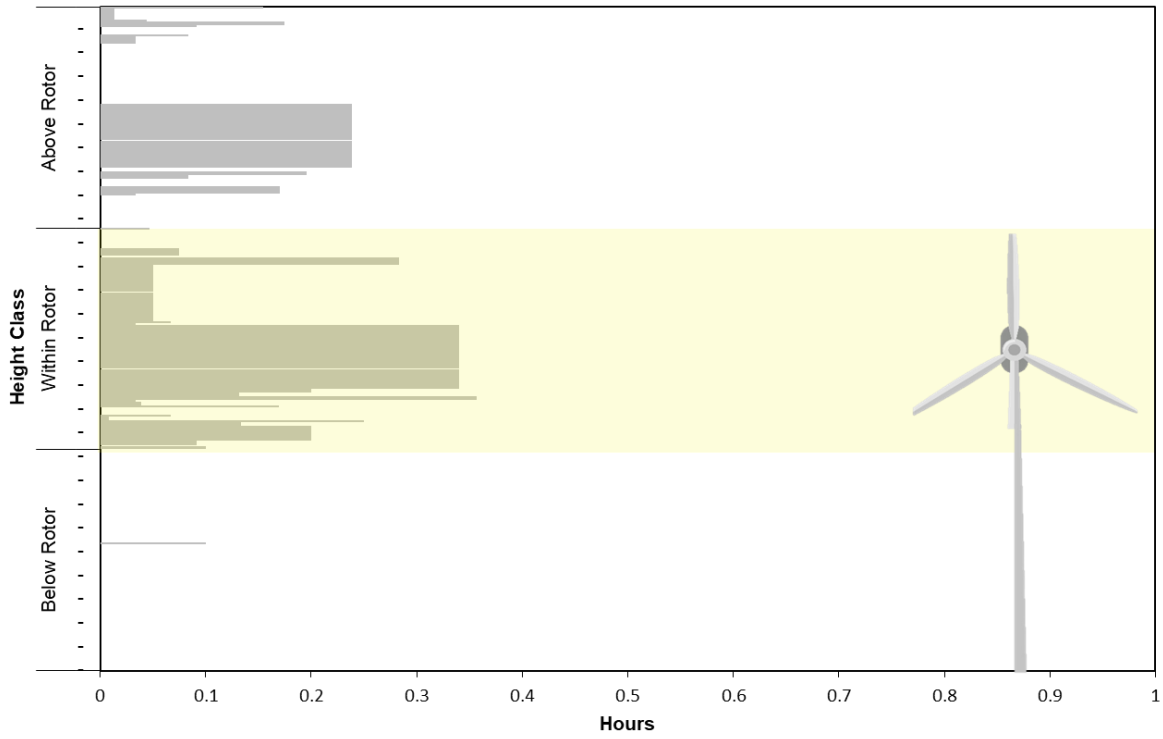

Figure 4-17 Cape vulture flight hours below, within and above rotor sweep heights

Cape Vulture were recorded from all six Normandien WEF VPs and the Control (Figure 4-17). However, considerable variation in flight time at rotor height was observed among the VPs with VPs 14 and 15 showing significantly longer flights at rotor height than other VPs in the WEF. The differences in mean flight time at rotor height per VP are shown in Figure 4-18. This reflects their use of the orographic winds generated by the ridges in this area to gain lift. Another contributing factor is the large carrion base provided by the cattle farming in this area.

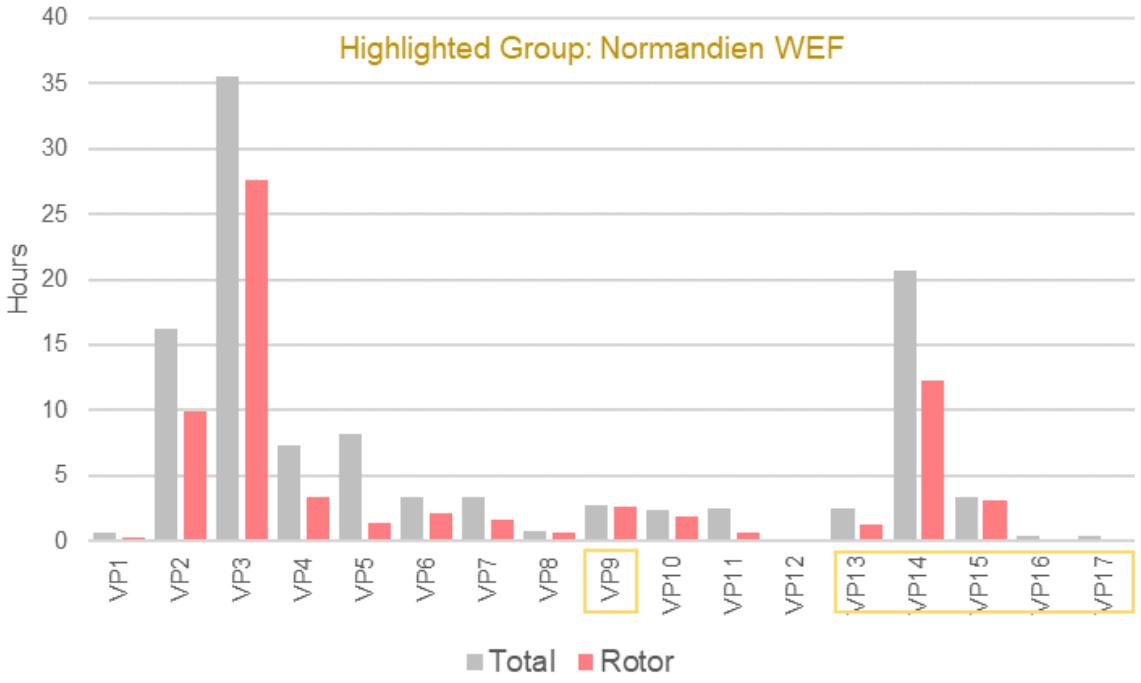

Figure 4-18 Duration of Cape Vulture flights in total and at rotor sweep height per VP

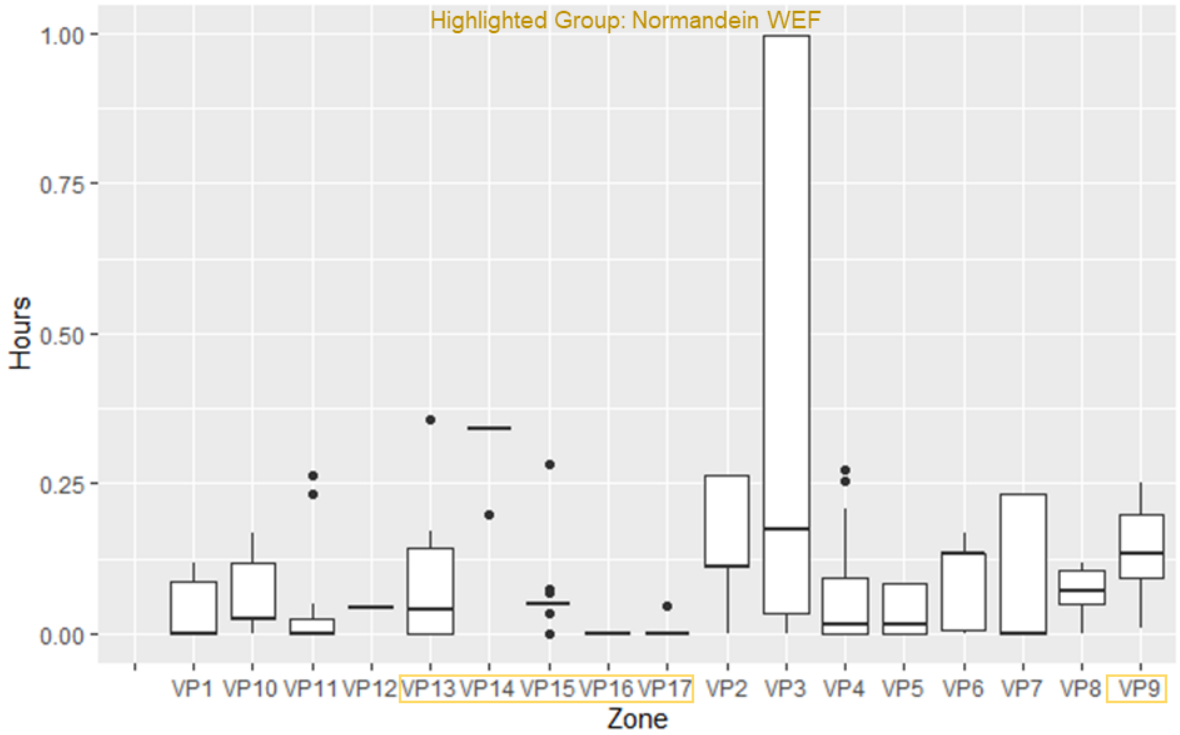

Figure 4-19 Boxplot of mean Cape Vulture flight time at rotor sweep height per VP

5. Site Sensitivity Verification and Preliminary Sensitivity Assessment

At a regional scale, the VWC is surrounded by five IBAs (within 30 km radius) including one that marginally overlaps the north-eastern corner of the VWC (Grasslands SA020). Additionally, several well-established birding routes traverse the AOI. At a local scale the Normandien WEF intersects 19 nest / roost buffers of priority species (highlighted in red in the table below). These include Blue Crane Nest 2, Cape Vulture Roosts 1-5, Ground Woodpecker Nest 1 and 2, Half-collared Kingfisher Nest 1, Lanner Falcon Nest 3, Rock Kestrel Nest 1, Southern Bald Ibis Roost 14-18 and Verreaux's Eagle Nest 2 and 4.

At a local scale the Normandien WEF overlaps two near pristine plateau grassland areas which were identified as hotspots for Threatened high altitude species. Most of these plateau grasslands especially in the east are classified as a global KBA. The largest and most sensitive patch of plateau grassland occurs between VP15 and 16 as it supports breeding Rudd's Lark, a resident population of White-bellied Korhaan, regular large flocks of foraging Southern Bald Ibis and considered particularly important for being the only grassland in the VWC from which Botha's Lark and Wattled Crane have been recorded. The other core habitat for these species occurs on the prominent plateau along the eastern boundary of the WEF along Grootpoort Pass (near Mvemve Lodge) where Rudd's Lark and Yellow-breasted Pipit breed. In this area (Farm Welgelukt) the headwaters of the Klip River are patrolled by a breeding pair of Vulnerable Half-collared Kingfishers. Another core habitat for Threatened waterbirds was identified along the Muel River floodplain based on habitat suitability for wattled Crane and White-winged Flufftail.

Additionally, three flight corridors for priority species were identified over the project area. The first is along the Muel River floodplain which represents an important flyway for both local and migratory birds as it represents a major break in the topography facilitating passage over the Great Escarpment. This corridor regularly funnels large flocks of migrating Amur Falcons in summer. The second flight corridor is associated with the high-lying central ridge (around VP 15) which supports two pyramidal peaks which generate significant orographic winds (regardless of wind direction) and are frequently used by a diverse array of raptors to gain lift. The third flight corridor is associated with the crests and slopes of the Klip River catchment, a large wetland which ultimately drains into Seekoeivlei Nature Reserve. These core habitats and flight corridors should be considered infrastructure exclusion zones and be avoided outright from a development perspective. The WEF also supports an abundance of rugged terrain with a slope greater than 20% which was identified as important habitat for threatened raptors. The key receptors underpinning the sensitivity map (Figure 5-1), the sensitivity ratings and justifications are given in Table 5-1 below. These areas of avifaunal sensitivity area spatially depicted in Figure 5-1.

Table 5-1 Receptors underpinning the prescribed buffers and justification within the AOI and their Implications for Normandien WEF

Name	Description	Buffer1[1] (m)	Buffer2[2] (m)	Buffer3[3] (m)	Justification	Buffer Implications for Normandien WEF
African Harrier-hawk Nest 1	Active	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
African Harrier-hawk Nest 2	Status Uncertain. Presumed African Harrier-hawk	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Bearded Vulture Nest 1	Inactive as of October 2023, new nest suspected. Only one bird observed over last two months. Status of second bird uncertain either gone or tending nest. Last known chick fledged in 2014 but requires more investigation as nest has not been comprehensive	5500	10000	0	Krueger, S & Amar, A. (2021). The Ecology and Management of a Critically Endangered Population of Bearded Vultures. Imperilled: The Encyclopaedia of Conservation 10.1016/B978-0-12-821139-7.00168-9.	No
Black Sparrowhawk Nest 1	Active	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Black Sparrowhawk Nest 2	Status Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Black Sparrowhawk Nest 3	Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Black Sparrowhawk Nest 4	Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Black Sparrowhawk Nest 5	Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Black Sparrowhawk Nest 6	Status Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	Yes
Black Sparrowhawk Nest 7	Status Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	Yes
Black Sparrowhawk Nest 8	Status Uncertain	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Blue Crane Nest 1	Active. Two eggs November 2023. On ground in grassland no nest material.	150	300	0	DFFE stipulation.	No
Blue Crane Nest 2	Active. Two eggs found November 2023. Nest significant mound in permanent zone of wetland	150	300	0	DFFE stipulation.	Yes
Blue Crane Nest 3	Chicks hatched and moved on. Nest on ground in grassland no nest material	150	300	0	DFFE stipulation.	No
Blue Crane Nest 4	Active chicks hatched December 2023 and moved off. Nest on ground in grassland no nest material.	150	300	0	DFFE stipulation.	No

[1] Very High sensitivity, Infrastructure exclusion zone
[2] High sensitivity, turbine and other infrastructure minimisation and intensive mitigation zone
[3] High sensitivity zone applied to 50 km radial buffer on Cape Vulture roosts. Turbine mitigation zone.

Cape Vulture Roost 1	Non-breeding Roost	0	0	50000	Cape Vulture species-specific guidelines (BLSA, 2018) for all colonies and roosts. Field Verified.	Yes
Cape Vulture Roost 2	Non-breeding Roost	0	0	50000	Cape Vulture species-specific guidelines (BLSA, 2018) for all colonies and roosts. Field Verified.	Yes
Cape Vulture Roost 3	Breeding Roost one chick as of October 2023	18000	0	50000	Cape Vulture species-specific guidelines (BLSA, 2018) for all colonies and roosts. Field Verified.	Yes
Cape Vulture Roost 4	Non-breeding Roost	0	0	50000	Cape Vulture species-specific guidelines (BLSA, 2018) for all colonies and roosts. Field Verified.	Yes
Cape Vulture Roost 5	Non-breeding Roost	0	0	50000	Cape Vulture species-specific guidelines (BLSA, 2018) for all colonies and roosts. Field Verified.	Yes
Grey Crowned Crane Nest 1	Adult on nest	1000	0	0	Specialist recommendation. Endangered species.	No
Ground Woodpecker Nest 1	Confirmed nest hole	150	300	0	Specialist recommendation. Endangered species.	Yes
Ground Woodpecker Nest 2	Confirmed nest hole	150	300	0	Specialist recommendation. Endangered species.	Yes
Half-collared Kingfisher Nest 1	Active nest hole in upper Klip River catchment tended by resident pair.	1000	0	0	Pairs typically defend a 1-3 km reach of river (Chittenden et al. 2016). Threatened Species.	Yes
Jackal Buzzard Nest 1	Active	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Jackal Buzzard Nest 2	Inactive	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Jackal Buzzard Nest 3	Active	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Jackal Buzzard Nest 4	Status Uncertain. Presumed Jackal Buzzard Nest.	750	0	0	Specialist recommendation. Some flexibility typically allowed.	No
Lanner Falcon Nest 1	Active	1000	3000	0	Core turbine exclusion of 1000 m based on specialist recommendation and industry best practice. High sensitivity 3000 m buffer based on DFFE avian theme sensitivity.	No
Lanner Falcon Nest 2	Lanner Falcon	1000	3000	0	Core turbine exclusion of 1000 m based on specialist recommendation and industry best practice. High sensitivity 3000 m buffer based on DFFE avian theme sensitivity.	No
Lanner Falcon Nest 3	Active. Pothole on cliff. Two chicks tended by both adults.	1000	3000	0	Core turbine exclusion of 1000 m based on specialist recommendation and industry best practice. High sensitivity 3000 m buffer based on DFFE avian theme sensitivity.	Yes
Martial Eagle Nest 1	Active	5000	0	0	DFFE stipulation and Brink, R. (2020).	No
Martial Eagle Nest 2	Active chick fledged October 2023	5000	0	0	DFFE stipulation and Brink, R. (2020).	No
Martial Eagle Nest 3	Currently Inactive as of 2024	5000	0	0	DFFE stipulation and Brink, R. (2020).	No
Martial Eagle Nest 4	Active, location approximate	5000	0	0	DFFE stipulation and Brink, R. (2020).	No
Martial Eagle Nest 5	Active	5000	0	0	DFFE stipulation and Brink, R. (2020).	No

Rock Kestrel Nest 1	Rock Kestrel	750	0	0	Specialist recommendation. Based on industry best practice. Some flexibility typically allowed.	Yes
Secretarybird Nest 1	Active	500	1000	0	Specialist recommendation. Based on industry best practice.	No
Southern Bald Ibis Roost 1	Uncertain. Likely breeding roost but unconfirmed	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 2	Breeding roost. Inactive. Breeding confirmed but irratic	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 3	Non-breeding roost. No breeding observed to date.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 4	Non-breeding roost.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 5	Breeding roost. Nesting observed 2022 but not 2023.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 6	Breeding roost large. Active. Breeding confirmed. At least 17 individuals. Two nests observed. Pair of chicks on one and pair of eggs on other.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 7	Breeding roost. Four birds observed sitting on nests. Roost monitored by Renette Steyn and Carina Nel Meissie.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 8	Breeding roost. Active breeding colony, part of largest in the world	1000	5000	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 9	Breeding roost. Largest in world	1000	5000	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 10	Breeding roost. Active. Breeding confirmed.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 11	Breeding roost. Active. Breeding confirmed. One nest with two chicks.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 12	Breeding roost. Two nests with adults sitting and potential baby	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 13	Breeding roost. One adult on nest	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 14	Non-breeding roost. No breeding observed to date.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	Yes
Southern Bald Ibis Roost 15	Breeding roost. Significant Southern bald ibis roost and breeding spot - 22 birds counted	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Southern Bald Ibis Roost 16	Non-breeding roost. No breeding observed to date.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	Yes
Southern Bald Ibis Roost 17	Uncertain breeding status. No breeding observed to date.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	Yes
Southern Bald Ibis Roost 18	Non-breeding roost. No breeding observed to date.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	Yes

Southern Bald Ibis Roost 19	Breeding Roost. Breeding erratic.	1000	2500	0	Specialist recommendation and consultation with Albert Froneman.	No
Verreaux's Eagle Nest 1	Uncertain	3700	5200	0	Verreauxs' Eagle species-specific guidelines (BLSA, 2017) for all nests (including alternate nests).	No
Verreaux's Eagle Nest 2	Inactive	3700	5200	0	Verreauxs' Eagle species-specific guidelines (BLSA, 2017) for all nests (including alternate nests).	Yes
Verreaux's Eagle Nest 3	Active	3700	5200	0	Verreauxs' Eagle species-specific guidelines (BLSA, 2017) for all nests (including alternate nests).	No
Verreaux's Eagle Nest 4	Inactive, but signs of recent use	3700	5200	0	Verreauxs' Eagle species-specific guidelines (BLSA, 2017) for all nests (including alternate nests).	Yes
White-necked Raven Nest 1	Active. Adult on nest.	750	0	0	Specialist recommendation.	No

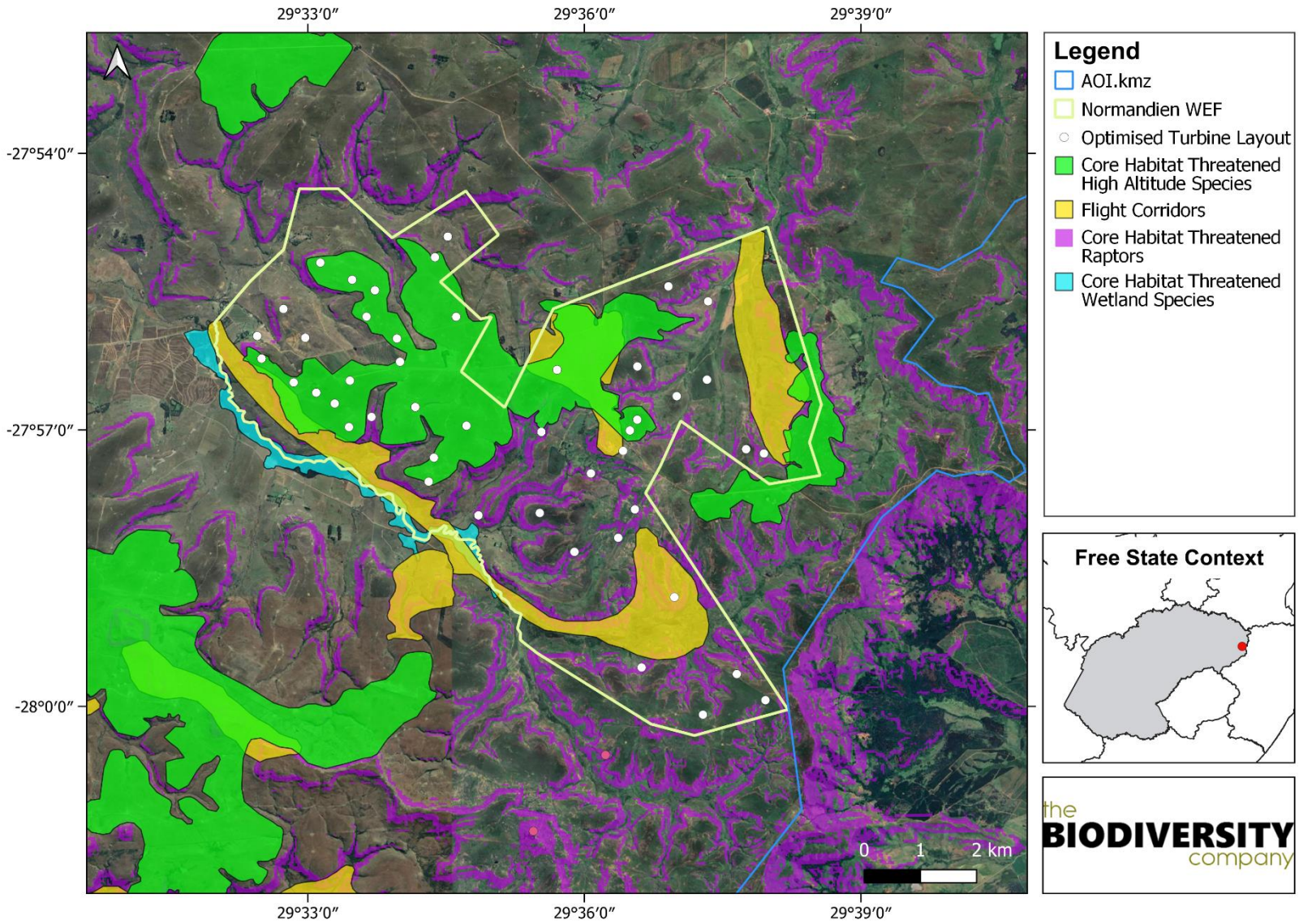

Figure 5-1 Map depicting key flight paths and core habitats for threatened high altitude, wetland and raptor species

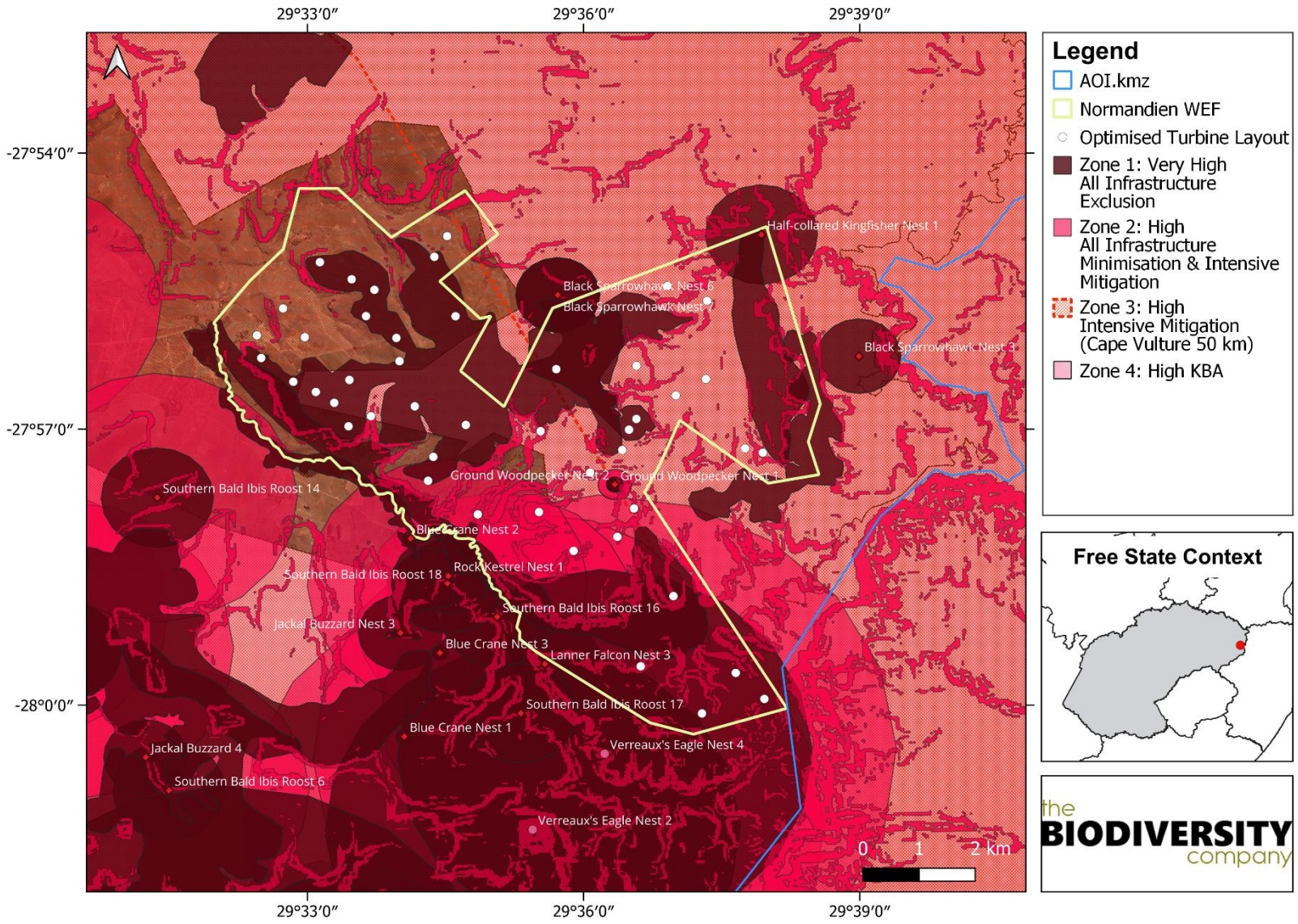

Figure 5-2 Preliminary Avifaunal sensitivity map for Normandien WEF

6. Identification of Impacts

6.1 Existing Impacts

The following existing impacts were observed:

- Livestock Grazing. The predominant livestock is beef cattle but sheep and horses also occur. The grazing intensity is moderate with most grasslands being kept shortly cropped;
- Crop Cultivation. A few areas have been set aside in most of the flatter plateau areas for fodder production for the cattle. Most fields are under a specific maize cultivar tailored for silage production. Other crops include oats and radish. These croplands displace natural grassland habitat;
- Perennial Pastures. In addition to commercial crop cultivation large areas of grassland have been converted to perennial pastures. These pastures are fenced off from the cattle and are cut and bailed regularly for hay production. Pastures also displace natural grassland habitat;
- Fences. The project area is criss-crossed by a multitude of well-maintained cattle fences (many of which are 8-stranded). These pose a risk of collision and entrapment for many bird species, particularly large-terrestrial species, such as the Secretarybird;
- Powerlines. Many powerlines occur throughout the WEF. The most significant of which is a large transmission line that runs along the eastern region of the Normandien WEF, which traverses several wetlands and mountain slopes. No bird flappers have been installed on the earth cables along this line;
- Erosion. Most of the larger valley-bottom wetlands and many of the hillslope seeps are deeply eroded. Longstanding head cut erosion (from overgrazing) has led to the formation of very large galleys. Insufficiently designed dams in some wetlands have exacerbated the erosion, especially when they fail following high rainfall events;
- Roads. There are many sand roads in the WEF. The main roads service Normandien and Collin's Passes but also run towards Verkykerskop and Memel. These are large busy sand roads which pose a direct collision risk to many birds especially small seed-eating passerines; and
- Dust. Large amounts of dust are generated from the strong winds moving over fallow croplands and from vehicles moving along the sand roads.

6.2 Preliminary Anticipated Impacts

As this is a scoping report only a very preliminary and cursive indication of some of the more significant potential impacts of the proposed development are identified below. The full impact assessment will be compiled after year 2 of the pre-construction monitoring has been completed. As per WSP stipulation these scoping level impacts are rated for pre-mitigation significance only.

6.2.1 Construction

6.2.1.1 Loss or Alteration of Habitat

6.2.1.1.1 Impact Description

Habitat loss from wind farm developments is mainly associated with the construction of access roads, the turbine footprint itself, the electrical transmission infrastructure and the Battery Energy Storage Facility. However, the proposed turbine field is large (up to 100 turbines) with difficult access in steep, largely pristine terrain which, without mitigation and avoidance has the potential to result in a significant impact for range-restricted or threatened grassland species. The most susceptible in this regard are the resident Threatened high-altitude grassland species currently occupying the area such as Rudd's Lark, Botha's Lark, Yellow-breasted Pipit. All of these species, show a high degree of habitat specialisation tending to be restricted to small patches of more intact, high rainfall, plateau grassland. The occurrence of these species is patchily distributed throughout the region. Consequently, an effort was made to identify "hotpots" or core habitat areas for these species through a combination of kernel density distribution modelling, slope analysis and visual delineation using satellite imagery. In total four core habitats were identified and mapped within the VWC (Figure 5-1). These areas were associated with a considerably higher abundance of these and other red-listed, grassland species such as Denham's Bustard, White-bellied Bustard, Blue Korhaan, Southern Bald Ibis African Rock Pipit, Ground Woodpecker and Sentinel Rock Thrush. Consequently, even relatively small habitat losses or alterations in these areas could have a significant impact on these highly range restricted and rare habitat specialists. The Normandien WEF overlaps two of these core habitat areas for Threatened high altitude grassland species. The consequence of this impact is highest in these areas (see Figure 5-1) which should be regarded all infrastructure exclusion zones. Another potential impact is the possible degradation of wetland integrity for threatened wetland species through sedimentation from road and turbine construction, especially the Muel River floodplain. The pre-mitigation impact is therefore anticipated to be of **High** significance.

Table 6-1 Scoping-level, pre-mitigation impact significance rating for loss or alteration of habitat.

Impact	Probability	Consequence	Significance
Loss or Alteration of Habitat	4	3	High

6.2.1.1.2 Preliminary Mitigation

- Complete spatial avoidance of the identified core habitat areas for threatened high altitude species;
- Effective and gazetted conservation of these and other remaining natural grasslands through conservation stewardship and appropriate land management practices could reduce the residual impact significance;
- Offsetting. Compilation and implementation of a biodiversity offset strategy with key focus on the conservation of high-altitude plateau grassland for threatened and / or endemic avifauna through appropriate land management practices; and

- Based on TBC's recommendation Mulilo has recently commissioned Dr. Robin Colyn of Afri-Avian to conduct detailed habitat modelling and acoustic monitoring for White-winged Flufftail. Additionally, Afri-Avian have been tasked with conducting detailed habitat suitability modelling for several selected threatened species. It is recommended that these additional modelling exercises should include as a minimum species such as such as Rudd's Lark, Botha's Lark, Yellow-breasted Pipit, Denham's Bustard, Southern Bald Ibis and Wattled Crane.
- Consult the Birdlife 6 October 2022 Guidance Note: Minimising the impacts of infrastructure development on Secretarybirds *Sagittarius serpentarius.* The main tenets being the minimisation of large tracts of contiguous grassland habitat, respecting nest buffers and conserving habitat between nest sites and optimal foraging habitat.

6.2.1.2 Roadkill and other mortalities

6.2.1.2.1 Impact Description

The influx of people and motor vehicle movement during construction will invariably result in an increase in bird-vehicle collision. This can, however, be mitigated to a large degree through signage warning of bird hotspots along the access road and enforcing speed limits of staff and contractors in the project area and educating them on bird sensitivities during inductions. Vehicle movement particularly on farm Markgraaff is at present, fairly frequent and the birds on site appear fairly well adapted to vehicle movement. A slightly more pressing threat would be the destruction of nestlings of ground-nesting species during access road construction. Overall, the pre-mitigation impact is anticipated to be of **Low** significance.

Table 6-2 Scoping-level, pre-mitigation impact significance rating for roadkill and other mortalities.

Impact	Probability	Consequence	Significance
Roadkill and other mortalities	2	2	Low

6.2.1.2.2 Preliminary Mitigation

- Signpost the entry of roads into areas zoned as core habitat for threatened high altitude species as "Environmentally Sensitive Area Reduce Speed"; and
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.

6.2.1.3 Sensory Disturbance

6.2.1.3.1 Impact Description

At Normandien WEF, the greatest and most potentially direct construction-related sensory threat would be the potential disturbance of breeding Rudd's Lark, Yellow-breasted Pipit and potentially Botha's Lark (breeding of Botha's Lark yet unconfirmed). It is also highly probable that large species such as cranes, korhaans, bustards and Secretarybirds may be displaced during construction. Disturbance associated with construction is expected to be short term and the effects largely temporary, although effects on Martial Eagle Nest 2, Lanner Falcon Nest 1 and Southern Bald Ibis Roost 6 may be more long-lasting. Most birds on site are however already subject to sounds and operation of heavy farming machinery (e.g. tractors, combine harvesters and graders).

Table 6-3 Scoping-level, pre-mitigation impact significance rating on sensory disturbance during construction.

Impact	Probability	Consequence	Significance
Sensory disturbance during construction	3	3	Medium

6.2.1.3.2 Preliminary Mitigation

- Spatial avoidance. Avoiding all areas identified as core habitat for Threatened species; and
- Temporal avoidance. Timing construction to take place outside critical breeding window for Southern Bald Ibis (near breeding roosts) and threatened high-altitude grassland species.

6.2.2 Operation

6.2.2.1 Collisions With Turbines

6.2.2.1.1 Impact Description

Overall, the high abundance and diversity of recorded priority species (which included 21 red-listed species) coupled with the seasonal migration of large flocks of Amur Falco across the WEF suggests a high potential risk for significant mortalities during operation. Vantage point data (six VPs) from the first year of pre-construction monitoring (432 hours) revealed yielded a total of 1257 flights of priority species, totalling 151.6 hours with a passage rate of 2.91 birds^{-hour}. A large proportion of these flights are due to the seasonal influx of migrating Amur Falcon (n=661). Excluding Amur Falcon, the passage rate for priority species is 1.53 birds^{-hour}. Nevertheless, this passage rate is still considerably more than that observed at the control site (0.97 birds^{-hour}). Rudimentary extrapolations on fatality rate (assuming 98% avoidance) predict that as many as 38.85 priority species (25.01 excluding Amur Falcon) may be killed in the turbine field (n=100 turbines) per year.

Species predicted to have a mortality rate of >1 bird per year include (from highest to lowest) Amur Falcon (13.83 birds^{-year}), Southern Bald Ibis (9.23 birds^{-year}), Cape Vulture (5.08 birds^{-year}), Jackal Buzzard (3.15 birds^{-year}), Blue Crane (1.18 birds^{-year}), White-necked Raven (1.97 birds^{-year}) and Rock Kestrel (1.38 birds^{-year}). These projected mortality rates are very high and should be considered unacceptable. Overall, this impact is afforded a Very High significance. Due to the sensitivity of the project area and magnitude of this impact, mitigation and avoidance strategies are unlikely to reduce the residual impact significance appreciably.

Cape Vulture ranks first on BirdLife South Africa's priority list of collision prone species (Ralston Paton et al. 2017). This assertion, which was made almost 7 years ago with very limited data, is now backed by observed mortality rates from multiple wind farms. This data was recently presented in the Birdlife Conservation Conversations Webinar entitled "*Sharing the Sky*" which demonstrated that Cape Vultures have one of the highest mortality rates of any priority species in the country of 0.011 birds per turbine per year, placing them third only to Jackal Buzzard and Amur Falcon. In the Normandien WEF a total of 121 individual Cape Vulture passages were recorded from the 6 vantage points (n= 432 hours) at a passage rate of 0.28 birds^{-hour} during the Year 1 monitoring. Cape Vulture are resident in the area, although a strong seasonal variation in flight activity was observed with a significant increase in summer 1.11 birds^{-hour}. The birds are coming from three roosts to the south of the project area (all within a 50 km radius) with the bulk emanating from the breeding colony at Nelson's Kop (ca. 200 individuals). Of particular concern is that of the 30.02 hours spent flying over the project area most (19.36 hours or 65%) is spent flying at rotor sweep height. This observation was found to be highly statistically significant under both parametric and non-parametric tests, suggesting this is more likely to represent an actual trend as opposed to random chance. The general trend is for small to medium-sized groups (average of 4 individuals) to appear on the horizon at low altitude from the direction of one of the three roosts to the south of the project area (typically 09:30 to 11:30 am in winter and 08:00 to 10:30 am in summer). A number of factors likely underpin the high attendance of Cape Vultures. These include the close proximity of roosts, ample carcass opportunities (major cattle farmers in the region) and the presence of a large Eskom Transmission line which bisects the project area and provides a corridor for

movement and overnight roosting. At times up to 120 birds were seen roosting on these powerlines overnight.

Other red-listed soaring species found to occur at Normandien WEF that are of particular concern from a collision risk perspective include several Threatened high altitude grassland passerines namely Rudd's Lark, and Yellow-breasted Pipit which are highly prone to collisions as they occupy plateau grasslands (where most of the turbines are likely to placed) and spend a large amount of time (up to 40 min at a time) displaying at rotor sweep height.

Table 6-4 Projected fatality rates for the various priority species. Methodology adapted from that used by Wild Skies

Common Name	Annual Passage Rate	VP Birds^{-year}	Birds at Rotor^{-year}	Projected Fatalities^{-year}
African Harrier-Hawk	0.009	40.56	8.39	0.17
Amur Falcon	1.530	3341.72	691.62	13.83
Black Harrier	0.000	0.00	0.00	0.00
Black Sparrowhawk	0.000	0.00	0.00	0.00
Black-winged Kite	0.007	30.42	6.30	0.13
Blue Crane	0.065	283.89	58.76	1.18
Booted Eagle	0.000	0.00	0.00	0.00
Cape Vulture	0.280	1226.81	253.91	5.08
Common Buzzard	0.009	40.56	8.39	0.17
Denham's Bustard	0.000	0.00	0.00	0.00
Greater Kestrel	0.012	50.69	10.49	0.21
Grey Crowned Crane	0.000	0.00	0.00	0.00
Ground Woodpecker	0.000	0.00	0.00	0.00
Jackal Buzzard	0.174	760.42	157.38	3.15
Lanner Falcon	0.058	253.47	52.46	1.05
Lesser Kestrel	0.002	10.14	2.10	0.04
Little Sparrowhawk	0.005	20.28	4.20	0.08
Martial Eagle	0.019	81.11	16.79	0.34
Melodious Lark	0.007	30.42	6.30	0.13
Peregrine Falcon	0.005	20.28	4.20	0.08
Rock Kestrel	0.076	334.58	69.25	1.38
Rudd's Lark	0.002	10.14	2.10	0.04
Rufous-breasted Sparrowhawk	0.005	20.28	4.20	0.08
Secretarybird	0.005	20.28	4.20	0.08
Southern Bald Ibis	0.509	2230.56	461.65	9.23
Verreaux's Eagle	0.021	91.25	18.89	0.38
Wahlberg's Eagle	0.000	0.00	0.00	0.00
White-necked Raven	0.109	476.53	98.62	1.97
Yellow-billed Kite	0.000	0.00	0.00	0.00
Yellow-billed Stork	0.000	0.00	0.00	0.00
Yellow-breasted Pipit	0.002	10.14	2.10	0.04
Total		6100.67	1262.63	38.85

Table 6-5 Scoping-level, pre-mitigation impact significance rating on collisions with turbines

Impact	Probability	Consequence	Significance
Collisions and Electrocutions with Electrical Transmission Lines and Auxiliary Infrastructure	4	4	Very High

6.2.2.1.2 Preliminary Mitigation

- Mitigation efficacy limited by high Cape Vulture flight prevalence (cumulative passage rate and flight time at rotor height) over the WEF. Highlighted as a significant risk;
- Spatial Avoidance. In event that the WEF is authorised then spatial avoidance is paramount. The most important mitigation measure in this regard centres on spatial planning. All infrastructure should be completely avoided in areas designated in the sensitivity map as Very High sensitivity. Infrastructure should be minimised unless completely unavoidable in all areas of High sensitivity;
- Temporal avoidance. One aspect that should be thoroughly investigated would be the possibility for curtailment during peak flight times. The vantage point data revealed a strong diurnal variation in flight activity of priority species. By far the majority of flight activity occurred between 09:30 and 12:30 in winter and 08:30 to 11:30 in summer. Another peak occurs for about an hour before and following sunset when most priority species particularly Southern Bald Ibis and Martial Eagle commute back from foraging. Complete shutdown of the entire wind farm, or the shutdown of the majority of selected “risky” turbine locations, during these times will drastically reduce the risk of turbine collisions. Another key event to consider is the annual migration of Amur Falcon which peaks for only a few days. Observer-based shutdown could be critical to the avoidance of mass strikes;
- Any turbines placed in High sensitivity areas must be subject to intense mitigation measures such as intelligent camera systems (e.g. Identiflight or Bioseco), automated curtailment using Artificial Intelligence (AI) models and GPS flight data, radar and bird spotters to inform shutdown on demand, blade painting. Given the sensitivity of the site, as a minimum, all planned turbines which currently overlap Very High and High buffers should be removed from the turbine layout;
- Collision risk modelling should be conducted for the most significantly collision prone species. At Normandien WEF is recommended that this includes at least Rudd’s Lark, Cape Vulture and Southern Bald Ibis and potentially Amur Falcon;
- More tracking data on Southern Bald Ibis flight patterns is needed to better understand flight patterns and collision risk over the WEF and the VWC as a whole. It is recommended that Mulilo collaborate with Dr. Carina Pienaar who is currently tracking birds from the Witkoppe roost to investigate the possibility of fitting GPS trackers to fledglings from nearby breeding roosts in the VWC;
- Observer led shut down on demand (SDOD) should be implemented. It is, however, important to note that the efficacy of this system will be significantly limited by the extreme and highly erratic climatic conditions on site. Cloud, mist and rain can dramatically hamper visibility and therefore the efficacy of this system for several days at a time. However, vultures and other priority species were still observed flying in these conditions. It is recommended that selected turbines may need to be shut down in periods of intense mist and cloud cover. This would involve a massive undertaking by a very large team of well-trained observers capable of working (and surviving) at sub-zero temperatures in harsh conditions which includes snow blizzards. The team would require radios and satellite phones as a minimum and be linked to an emergency response team;
- One blade should be painted red. Anticipate and, budget for communications and authorisations from CAA; and

- A Cape Vulture Food Management Programme will need to be designed and implemented to ensure all dead livestock/wildlife on site are removed as soon as possible and transferred to designated vulture restaurants sufficiently far awa from the WEF. This would need to be an intensive undertaking by a team of full-time rangers working in close radio communication with the farmers.
- Develop a contingency mitigation budget to cater for significant mortality events. This budget should allow for research into, and effective implementation of, adaptive management strategies such as human based turbine shutdown on demand; habitat alteration; bird deterrence from site; and any others identified as feasible;
- A Biodiversity Management Plan (BMP) must be compiled for the project by an ornithologist prior to construction which outlines critical thresholds for fatalities and the appropriate management response;
- Inform and collaborate with relevant NGOs such as VULPRO, BirdLife South Africa and the Endangered Wildlife Trust (EWT). It is imperative that these organisations be given ample opportunity to provide information (e.g. tracking data, models and reports) that is critical to informing project planning regarding feasibility. Some collaboration with EWT and Birdlife is underway but VULPRO remains uninformed;
- Track Martial Eagles within the project area. A study of this nature has recently been commissioned by Mulilo and the first male eagle has already been captured and fitted with a GPS logger by Dr. Gareth Tate of EWT (May 2024);
- Track Southern Bald Ibis. Dr Carina Pienaar is currently busy tracking bald ibises from the Witkoppe Roost. It is recommended that she be contacted to consider fitting GPS loggers to fledglings from within the VWC; and
- Collision Risk Modelling. Mulilo is currently engaging with TBC and Afri-Avian to design and compile a detailed collision risk model for five species anticipated most prone to collision with the proposed wind turbines.

6.2.2.2 Collisions and Electrocutions with Electrical Transmission Lines and Auxiliary Infrastructure

6.2.2.2.1 Impact Description

It is currently uncertain as to the extent, position or length of any new transmission lines to be established for the WEF or where exactly the grid connection point will be. These linear infrastructure aspects will also be covered in a separate grid connection application report. However, the establishment of any transmission lines, and any overhead internal reticulation lines, poses a potential collision and electrocution risk to birds especially larger-bodied, less manoeuvrable species such as cranes, korhaans, bustards, storks, Secretarybirds and raptors. Normandien WEF supports one of the highest concentrations of White-bellied Korhaan in the VWC, a species which is anticipated to be particularly prone to collisions with electrical infrastructure.

The undulating landscape and frequent misty/rainy conditions of the Eastern Free State, contribute to high powerline collision rates for birds, even when the lines are marked with conventional flappers or alternating black/white pigtails. Increased wind speeds during winter, when mist/rain are less likely, makes manoeuvrability for large species like cranes more difficult (BirdlifeSA pers.comm. 2025).

Table 6-6 Scoping-level, pre-mitigation impact significance rating on Collisions and Electrocutions with Electrical Transmission Lines and Auxiliary Infrastructure.

Impact	Probability	Consequence	Significance

Collisions and Electrocutions with Electrical Transmission Lines and Auxiliary Infrastructure	3	3	Medium

6.2.2.2.2 Preliminary Mitigation

- Carefully plan the route of any above ground electrical infrastructure to avoid where possible large wetlands, cliffs, gorges and other areas of high avian abundance or sensitivity;
- Install Eskom-approved flappers or coils (flight diverters), along the entire length of the 500 m line at no more than 10 m intervals. Flight diverter structures should ideally alternate between light and dark shades to maximise visibility and contrast against background as seen from powerline level. The structures must be installed as the powerlines are being spanned. This will drastically help to increase the visibility of transmission lines especially the thinner earth line with which most collisions tend to be associated (Martin et al. 2010);
- Anti-perch devices should be intensified on main Eskom powerlines to further reduce perch suitability;
- All power cables between panels and the battery energy storage system (BESS) within the project area should be thoroughly insulated and buried in demarcated corridors; and
- All above ground electrical transmission infrastructure should be fitted with the latest Eskom approved anti-bird structures and anti-collision line marking devices.
- Quarterly monitoring at Ingula Nature Reserve can be used to help assess the likely significance of powerline collisions, after mitigation. An average of 5 priority threatened species (e.g. Cape Vulture, cranes, Denham's Bustard) are killed by collision per annum along the Ingula-Majuba 400kV line, which traverses a similar habitat type, land use, and avifaunal species composition (BirdlifeSA, pers.comm. 2025).

6.2.2.3 Sensory Disturbance

6.2.2.3.1 Impact Description

The effects of noise on threatened songbirds in the project area remains a pressing and under studied risk. The noise generated by a wind turbine can often exceed 30 dBA even at a distance of 800 m (Katinas et al., 2016; Rogers et al., 2006) which is the distance most often associated with avoidance behaviour (Santos et al., 2021). In this regard it is important to consider that a change of 3 dBA already reduces the hearing range of birds by 50% while a change in excess of 12dBA effectively reduces the hearing range of a bird by more than 90% meaning that at the core of the wind turbine noise-polluted area, birds are expected to barely perceive any other acoustic cues in their environment at all Barber et al. (2010).

Empirical research on the effects of turbine noise nose on birds is an emerging field. The few existing studies show that turbine-related noise impacts are likely to be hardest felt by songbirds which rely on vocalisations for a wide array of critical behavioural interactions from courtship and territory defence to rearing of young and alarm signalling causing them to either vacate the area or change the acoustic parameters of their calls with behavioural consequences. For example, a study by Lehnardt et al. (2021) using a simulated broadcast of turbine noise at a site in Israel noted a 45% and 36% decrease in abundance for the lesser whitethroat (*Sylvia curruca*) and Sardinian warbler (*Sylvia melanocephala momus*), respectively. Another study by Zwart et al. (2015) showed that male European Robins (*Erithacus rubecula*) called at higher frequencies in the presence of wind turbine noise, presumably in an attempt to combat acoustic masking at the expense of lower frequency contact calls used for territorial disputes. The consequence being a decreased ability to deter a rival through scolding alone leading to an increased energy expenditure, risks of injury and, ultimately breeding success.

Of the various songbirds susceptible to noise in the project area, two species namely Rudd's Lark, and Yellow-breasted Pipit (and potentially Botha's Lark) are of particular significance with regards the Normandien WEF. The males of these species spend a considerable proportion of their time, during the breeding season, calling during protracted aerial displays which can last more than 40 minutes at a time. Consequently, due to a combination of their Threatened status and acoustic-dependant breeding behaviour it stands to reason that these species may be significantly adversely affected by turbine noise.

Table 6-7 Scoping-level, pre-mitigation impact significance rating on sensory disturbance during operation.

Impact	Probability	Consequence	Significance
Sensory disturbance during operation	3	4	High

6.2.2.3.2 Preliminary Mitigation

- Spatial Avoidance. Avoid the placement of turbines in areas identified as core habitats identified for threatened high-altitude species; and
- Temporal Avoidance. The possibility of curtailment, namely stopping turbine operation during certain times of the day (mid-morning and late afternoon) during peak breeding season should be considered.

6.2.3 Effect on Migratory and Congregatory Species

6.2.3.1.1 Impact Description

Many flocks of migratory birds move across the project area in early summer. One of the most potentially significant flocks in this regard is the annual migration of Amur Falcon. During Survey 3 a very large migratory flock was observed moving along the Muel River valley (mainly in the Normandien WEF) in a dense swarm numbering over a thousand birds. Migratory flocks of this size are of global significance. The potential for a large collision event is a possibility and represents a large risk in terms of wind farm development. Projected fatality rates suggest that as many as 13.8 birds could be killed in the turbine field on an annual basis.

Another potentially significant aspect is the project's proximity to the Great Escarpment (100 m from eastern-most corner). Many of South-Africa's resident grassland species make seasonal altitudinal movements across the escarpment in response to climate and food availability, between high altitude grasslands and lower altitude savannahs (Chittenden et al. 2017). Additionally, the lift created through thermals in these steep mountainous areas provides ideal conditions for large-bodied, red-listed soaring species such as Bearded Vulture, Cape Vulture, Verreaux's Eagle, Secretarybird, Martial Eagle, Black Stork and Yellow-billed Stork, which frequently move along the escarpment to access foraging grounds on either side of it.

Table 6-8 Scoping-level, pre-mitigation impact significance rating on effect on migratory and congregatory species.

Impact	Probability	Consequence	Significance
Effect on migratory and congregatory species	3	4	Very High

6.2.3.1.2 Preliminary Mitigation

- Due to the seasonal arrival of large migratory flocks it is possible that a combination of observer-based shut-down on demand and temporal avoidance can be employed to reduce the probability of collisions; and

- Radar is a useful but expensive option to guide shut-off on demand in this regard.

6.2.4 Cumulative Impact

The AOI is largely natural and, in most areas, pristine. At present there are no operational wind energy facilities in or within 50 km surrounding the project area. However, there are two other proposed Mulilo WEF projects in the region namely that of Phumelela (avifauna assessment conducted by TBC) and Goedehoop (avifauna monitoring conducted by Dr. Steven Evans). Additionally, EDF has proposed WEF projects for most of the land in between these WEFs. Including this project there are at least 4 prospective wind developments planned for the Phumelela region. There is, however, also a vested birding interest in the region (e.g. Roberts Memel Birding Site, Memel Getaway Birding Routes) and NGOs such as BirdLife and EWT are distinctly aware of the avifaunal importance and are actively working in the region. The proposed VWC is not located within one of the promulgated Renewable Energy Development Zones (REDZ) and a portion of the northern end of the VWC overlaps the Grasslands IBA. Known projects located within a 50km radius of the are listed in Table 6-10 and mapped in Figure 6-1. Based on the information at hand, the cumulative impact of wind energy developments in this region is likely to have a significance consequence for birdlife on a national to global scale.

Table 6-9 Scoping-level, pre-mitigation impact significance rating on the cumulative impact.

Impact	Probability	Consequence	Significance
Cumulative impact	4	4	Very High

Table 6-10 Projected fatality rates for the various priority species. Methodology adapted from that used by Wild Skies

Project Name	Applicant	Status	Reference Number	Distance away (KM)
Newcastle Gas Engine Power Plant (NGEPP), Newcastle, KwaZulu-Natal Province.	Newcastle Energy (Pty) Ltd	Refused	14/12/16/3/3/2/2074	36
Proposed Upgrade of Karbochem boilers and electricity project in Newcastle	Distributed Energy Generation (Pty) Ltd	In process	14/12/16/3/3/1/1164	37
Proposed Upgrade of Karbochem boilers and electricity project in Newcastle - Amendment	Distributed Energy Generation (Pty) Ltd	Approved	14/12/16/3/3/1/1164/AM1	37
Proposed Newcastle solar energy facility near Newcastle, KwaZulu-Natal Province	Building Energy (Pty) Ltd	Refused	14/12/16/3/3/1/1225	38

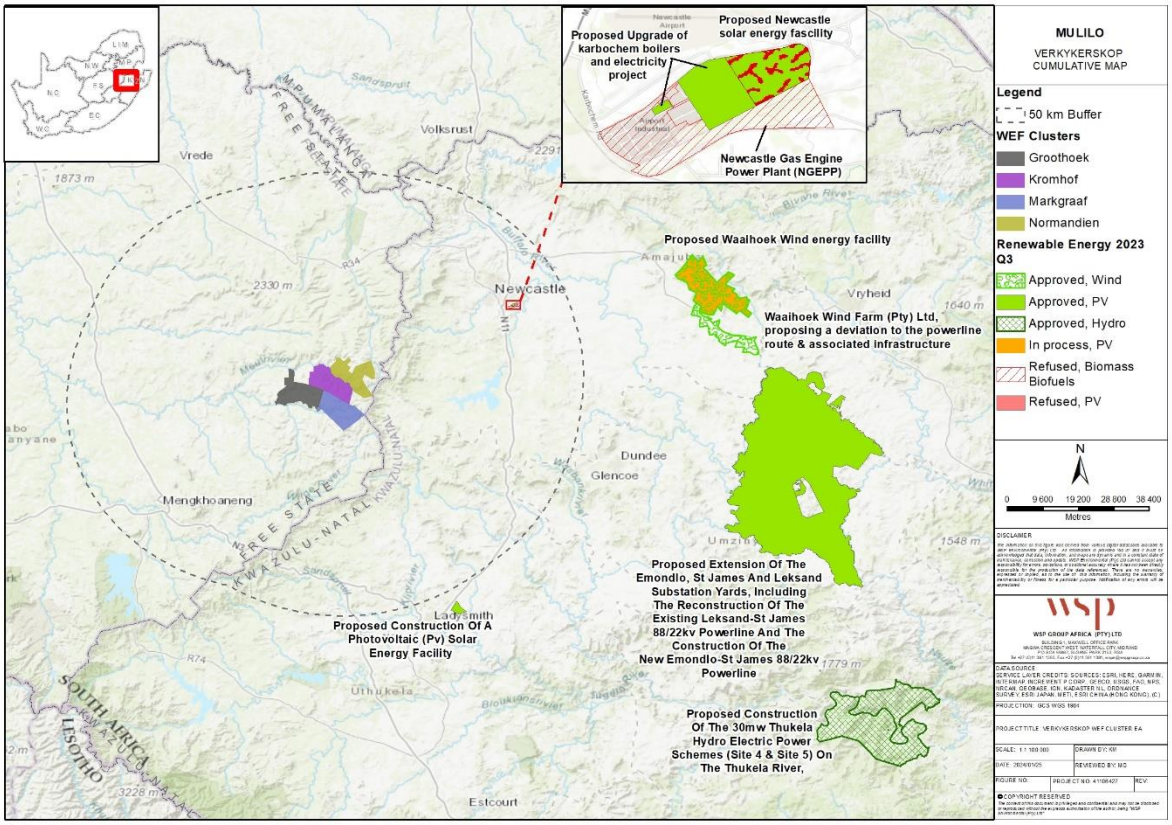

Figure 6-1 Renewable energy applications within a 50 km radius of the VWC. Note this map excludes several proposed wind energy projects in the Phumelela / Memel Area.

7. Plan of Study – Pre-construction Monitoring

Based on the information provided it the developer will seek to establish up to four wind energy facilities within the VWC of which Normandien WEF is one. It is also noted that each will have its own grid connection linear infrastructure. As the position and length of each grid connection corridor is currently unknown this project allows for two 15 km alternatives for the Normandien WEF.

7.1 Compliance

The approach outlined below has been designed to comply with the following global and national legislation and best proactive standards:

- International Finance Corporation (IFC) Performance Standard 6 (IFC, 2019);
- Equator Principles (EP4, 2020);
- Birds and wind energy best practice guidelines (Jenkins et al. 2015);
- Cape Vulture and wind farms best practice guidelines (BLSA, 2018);
- Verreaux's Eagle and wind farms best practice guidelines (BLSA, 2017);
- The National Web-Based Environmental Screening Tool DEA website (2022);
- South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna Protocols for environmental impact assessments in South Africa;

- Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 when applying for Environmental Authorisation (Gazetted October 2020); and
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on avifaunal species by onshore wind energy generation facilities where the electricity output is 20MW or more (Government Gazette No. 43110 – 20 March 2020).

7.2 Schedule and Deliverables

Scoping fieldwork involved an eight-day reconnaissance survey from 18-25 July 2022 (two days per WEF). Due to the scale of the project, there are six surveys in a year as opposed to the conventional four. Each survey for the VWC is run over two 22-day periods (which translates to ca. 5-6 days for Groothoek WEF per survey). Based on the two-year monitoring requirement, fieldwork sessions were thus planned to end in late 2024, assuming no unforeseen catastrophic events or pandemic restrictions. The scoping reports are set to be submitted in January 2025. Then, allowing for data processing and reporting, the first draft submission deadline for all four WEF reports (one for each WEF) would be April 2025 (with progress reports after each sampling season). The following plan and scope of work is anticipated.

1. Information requests session (bullet point list and one remote meeting, completed).
2. Scoping Assessment (desktop study followed by 8-day site visit divided into 2 days per WEF project and a brief report (**completed**).
3. Use results of scoping assessment to inform initial layout planning of WEF and establish more precise scope of avifauna monitoring (**completed**).
4. Species specific guidelines **are** warranted, therefore:
    - Two-year cycle
    - Intensive pre-construction monitoring conducted according to national and international best practice as well as the species-specific guidelines for Verreauxs' Eagle, Cape Vulture.
    - Fieldwork per annual cycle:
        - Three in-field observers per site visit, which includes one avifaunal lead and two competent avifaunal field assistants;
        - This is broken into Six, 22-day field sessions (one in each main season and others in peak breeding season). This equates to six, 5-6 day trips per WEF project per year. Note the sessions are broken into two WEFs at a time (two site visit legs per survey). This essentially means 12 trips to and from our base in northern Gauteng per year so 12 surveys or 24 trips over the 2-year cycle;
        - A total of 17 Vantage Points and one Control for the VWC. Average of four vantage points per WEF;
        - 12 hours of surveying per vantage point **per season totalling 72 hours per VP per year conducted by two observers simultaneously**;
        - Two to four driven transects per WEF (including one control) conducted by the third observer in rotation with the vantage point observers;
        - One walked transect at each VP (including one control);

- Several focal point surveys scattered throughout the VWC and AOI;

- Progress report after each fieldwork session (6 per year);
- Three pre-construction monitoring reports (one for each WEF) after 24-month cycle completed;
- Three Avifaunal Impact Assessment Reports (one for each WEFs grid connection infrastructure) submitted after the two-year monitoring WE reports have been completed; and
- Mulilo will be initiating a carcass management project within the project area in collaboration with the local landowners and their staff. The Biodiversity Company was commissioned to extend the avifaunal monitoring by two surveys to note any changes in vulture attendance.

Note: The VWC is situated 23 km north of a known Cape Vulture colony on Nelson's Kop as well as two other roost sites (<35 km radius of the project area). The status of this colony has been confirmed as a breeding colony. As such, the decision-making hierarchy / philosophy was be based on the flow diagram for Cape Vultures as presented in the 2018 best practice document entitled Cape Vulture and Wind Farms Guidelines for Impact Assessment, monitoring and Mitigation (see **Error! Reference source not found.**).

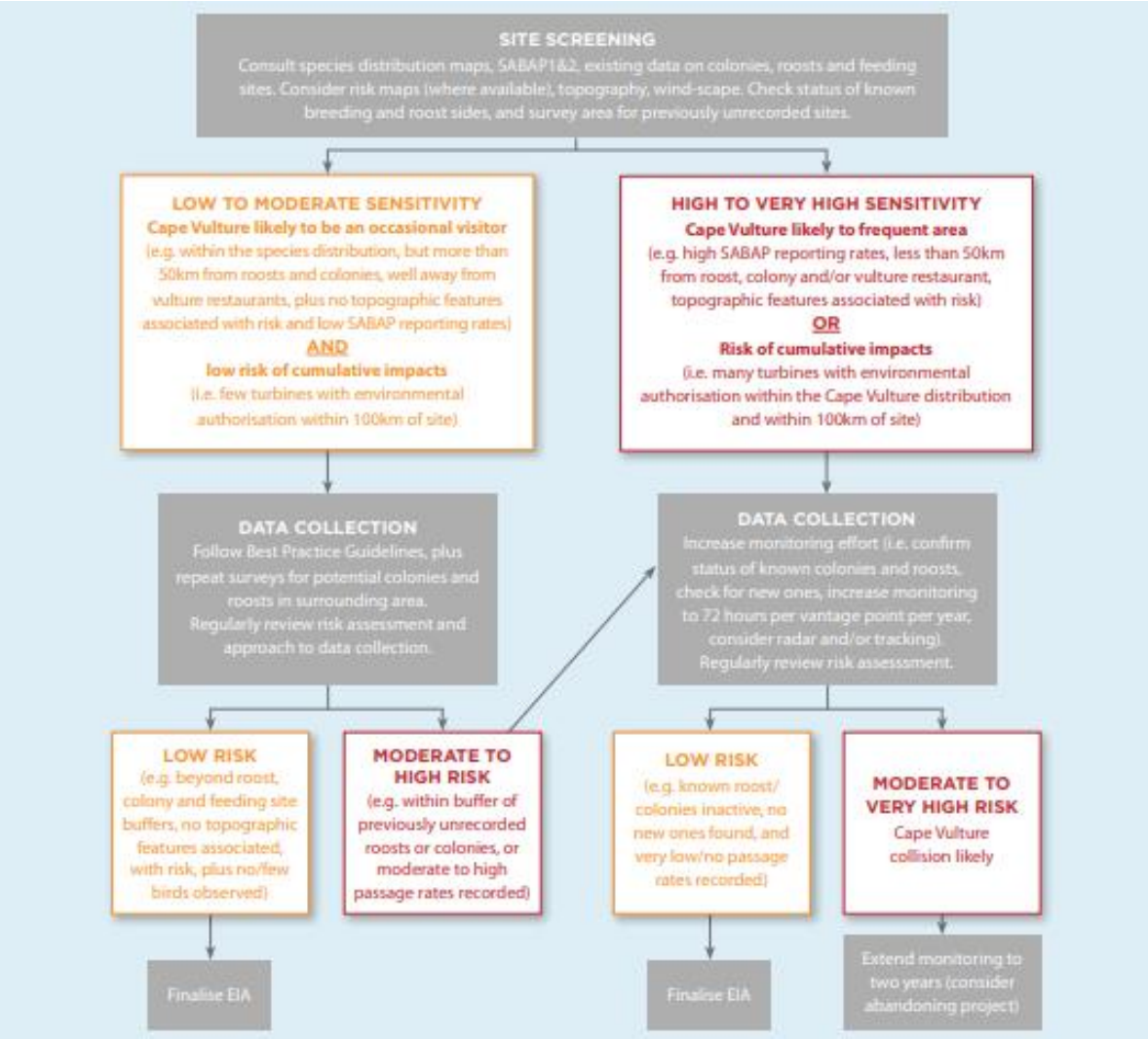

Figure 7-1 Decision hierarchy as applicable to Cape Vulture sensitive areas (BLSA, 2018).

8. Conclusion

The Normandien WEF is large and spans a wide diversity of habitats including palustrine wetlands, bench wetlands, depressions, gorges, cliffs, crests, ridges and scrub forest. Its proximity to the Great Escarpment means that the eastern half receives considerably more rainfall than any other part of the VWC and as such supports a distinct avifaunal assemblage. Consequently, the WEF supports a very high diversity of conservation important bird species. To date 21 red-listed species have been documented within the Normandien WEF, a high number in the South African context. The higher-altitude plateau grasslands particularly in the east of the WEF (closer to the escarpment) provide ideal habitat for threatened passerines such as Botha's Lark, Rudd's Lark and Yellow-breasted Pipit. At present Botha's Lark is facing a rapid decline throughout its range and BirdlifeSA considers any observation of the species to be highly significant. The species was seen once at VP16 and has not been detected again since.

Regarding Cape Vulture, Normandien WEF registered the highest seasonal passage rate of the entire VWC in the summer of 2023 at 1.11 birds^{-hour}. Particularly noteworthy is that Cape Vultures at Normandien WEF spend most of their time flying at rotor sweep height, a finding which was found to be highly statistically significant. At present passage rates and projected fatality rates are significant. The birds appear to be emanating from the five distinct roosts which occur on separate inselbergs throughout the AOI, all of which are within a 50 km radius of the Normandien WEF. Of these, successful breeding was confirmed at Roost 3 on Nelson's Kop (30 km south-west).

In terms of avifaunal sensitivity, at a regional scale, the project area is surrounded by five IBAs (within 30 km radius). A significant portion of the eastern region of the Normandien WEF overlaps the Eastern Free State Escarpment KBA. Additionally, several well-established birding routes traverse the AOI. At a local scale the Normandien WEF overlaps 19 nests/ roost buffers of priority species as well as two near pristine plateau grassland areas which were identified as core habitats for Threatened high altitude species. These areas support breeding Rudd's Lark, a resident population of White-bellied Korhaan, regular large flocks of foraging Southern Bald Ibis and considered particularly important for being the only grassland in the VWC from which Botha's Lark and Wattled Crane. The upper reaches of the Klip River associated with Farm Welgelukt are considered sensitive based on the presence of a breeding pair of Half-collared Kingfishers. Another core habitat for Threatened waterbirds was identified along the Muel River floodplain based on habitat suitability for wattled Crane and White-winged Flufftail. Additionally, three flight corridors for priority species were identified over the project area.

9. Preliminary Specialist Statement

Given the largely intact, high altitude grassland nature of the WEF, its close proximity to the Drakensburg Escarpment, high diversity and abundance of red-listed and / or endemic species and high passage rate of priority species including large flocks of migrating Amur Falcon, it is apparent that the project area is situated in an area of high avifaunal importance and sensitivity. The establishment of wind turbines in this area (in spite of micro-siting and mitigation), may pose a significant risk to local birdlife. Based on the flight activity data and projected fatality rates it is cautioned that significant mortalities of several Threatened species are likely to occur on an annual basis. There are currently no operational wind energy facilities on high-altitude plateau grasslands associated with the Great Escarpment in the eastern Free State and as such our knowledge regarding the collision risk of many of these grassland endemics is limited. A thorough exploration of the realistic mitigation and spatiotemporal avoidance options is required which includes the incorporation of findings from the ongoing habitat modelling for selected threatened passerines and the Martial Eagle tracking into the final report. It is recommended that the pursuit of this application be carefully considered, given the high avifaunal sensitivity of the region and the significant risk of collision posed to a high number of threatened bird species.

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11. Appendix: Present and Potentially Occurring Avifauna

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Common Ostrich	*Struthio camelus*	LC	LC					5			2
Grey-winged Francolin	*Scleroptila afra*	LC	LC		OG	E	x	1	x	x	6
Red-winged Francolin	*Scleroptila levaillantii*	LC	LC		OG			1	x	x	5
Shelley's Francolin	*Scleroptila shelleyi*	LC	LC		OG			4			
Natal Spurfowl	*Pternistis natalensis*	LC	LC		OG			1	x	x	2
Red-necked Spurfowl	*Pternistis afer*	LC	LC		OG			2	x	x	
Swainson's Spurfowl	*Pternistis swainsonii*	LC	LC		OG			1	x	x	10
Common Quail	*Coturnix coturnix*	LC	LC		OG			1	x	x	10
Helmeted Guineafowl	*Numida meleagris*	LC	LC		OG			1	x	x	13
White-faced Whistling Duck	*Dendrocygna viduata*	LC	LC		PG			1	x	x	
White-backed Duck	*Thalassornis leuconotus*	LC	LC		PG			1	x	x	
Maccoa Duck	*Oxyura maccoa*	EN	NT		PG		x	2		x	
Egyptian Goose	*Alopochen aegyptiaca*	LC	LC		PG			1	x	x	15
South African Shelduck	*Tadorna cana*	LC	LC		OG			1	x	x	6
Spur-winged Goose	*Plectropterus gambensis*	LC	LC		OG			1	x	x	9
Knob-billed Duck	*Sarkidiornis melanotos*	LC	LC		PG			3			
African Black Duck	*Anas sparsa*	LC	LC		PG			1	x	x	6
Yellow-billed Duck	*Anas undulata*	LC	LC		OG			1	x	x	14
Cape Shoveler	*Spatula smithii*	LC	LC		PG			1	x	x	2
Red-billed Teal	*Anas erythrorhyncha*	LC	LC		OG			1	x	x	5
Common (Kurrichane) Buttonquail	*Turnix sylvaticus*	LC	LC		PG			2	x	x	
Greater Honeyguide	*Indicator indicator*	LC	LC		PG			2	x	x	2
Lesser Honeyguide	*Indicator minor*	LC	LC		PG			3			
Brown-backed Honeybird	*Prodotiscus regulus*	LC	LC		PG			3			
Red-throated Wryneck	*Jynx ruficollis*	LC	LC		PG			1	x	x	10

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Ground Woodpecker	*Geocolaptes olivaceus*	NT	LC		PG	E	x	1	x	x	14
Olive Woodpecker	*Dendropicos griseocephalus*	LC	LC		PG			1	x	x	
Acacia Pied Barbet	*Tricholaema leucomelas*	LC	LC		PG			2	x	x	1
Black-collared Barbet	*Lybius torquatus*	LC	LC		PG			2	x	x	2
Crested Barbet	*Trachyphonus vaillantii*	LC	LC		PG			2	x	x	
African Hoopoe	*Upupa africana*	LC	LC		PG			1	x	x	9
Green Wood-hoopoe	*Phoeniculus purpureus*	LC	LC		PG			1	x	x	2
Lilac-breasted Roller	*Coracias caudatus*	LC	LC		PG			1	x	x	
Half-collared Kingfisher	*Alcedo semitorquata*	LC	NT		PG		x	1	x	x	1
Malachite Kingfisher	*Corythornis cristatus*	LC	LC		PG			1	x	x	7
Brown-hooded Kingfisher	*Halcyon albiventris*	LC	LC		PG			1	x	x	1
Giant Kingfisher	*Megaceryle maxima*	LC	LC		PG			1	x	x	6
Pied Kingfisher	*Ceryle rudis*	LC	LC		PG			1	x	x	2
European Bee-eater	*Merops apiaster*	LC	LC		PG			1	x	x	
Speckled Mousebird	*Colius striatus*	LC	LC					1	x	x	8
Red-faced Mousebird	*Urocolius indicus*	LC	LC					1	x	x	
Jacobin Cuckoo	*Clamator jacobinus*	LC	LC		PG			4			
Great Spotted Cuckoo	*Clamator glandarius*	LC	LC		PG			4			
Red-chested Cuckoo	*Cuculus solitarius*	LC	LC		PG			1	x	x	4
Black Cuckoo	*Cuculus clamosus*	LC	LC		PG			3			1
Common Cuckoo	*Cuculus canorus*	LC	LC		PG			4			
Klaas's Cuckoo	*Chrysococcyx klaas*	LC	LC		PG			1	x	x	
Diederik Cuckoo	*Chrysococcyx caprius*	LC	LC		PG			1	x	x	5
Alpine Swift	*Tachymarptis melba*	LC	LC		PG			1	x	x	6
Common Swift	*Apus apus*	LC	LC		PG			2	x	x	1
African Black Swift	*Apus barbatus*	LC	LC		PG			1	x	x	10
Little Swift	*Apus affinis*	LC	LC		PG			1	x	x	2
Horus Swift	*Apus horus*	LC	LC		PG			1	x	x	2

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
White-rumped Swift	*Apus caffer*	LC	LC		PG			1	x	x	11
Western Barn Owl	*Tyto alba*	LC	LC		PG			2	x	x	
African Grass Owl	*Tyto capensis*	LC	VU		PG		x	3			
Southern White-faced Owl	*Ptilopsis granti*	LC	LC		PG			2			
Cape Eagle-Owl	*Bubo capensis*	LC	LC		PG		x	2	x	x	2
Spotted Eagle-Owl	*Bubo africanus*	LC	LC		PG		x	1	x	x	3
Marsh Owl	*Asio capensis*	LC	LC		PG		x	1	x	x	
Fiery-necked Nightjar	*Caprimulgus pectoralis*	LC	LC		PG			2	x	x	1
Freckled Nightjar	*Caprimulgus tristigma*	LC	LC		PG			2			
Rock Dove	*Columba livia*	LC	LC		PG			2			4
Speckled Pigeon	*Columba guinea*	LC	LC					1	x	x	13
African Olive Pigeon	*Columba arquatrix*	LC	LC		PG			1	x	x	2
Laughing Dove	*Spilopelia senegalensis*	LC	LC					1	x	x	10
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*	LC	LC					1	x	x	16
Red-eyed Dove	*Streptopelia semitorquata*	LC	LC		PG			1	x	x	15
Namaqua Dove	*Oena capensis*	LC	LC		PG			1	x	x	3
Denham's Bustard	*Neotis denhami*	NT	VU	VU	PG		x	2	x	x	4
Blue Korhaan	*Eupodotis caerulescens*	NT	LC		PG	E	x	1	x	x	5
White-bellied Korhaan (Bustard)	*Eupodotis senegalensis*	LC	VU		PG		x	1	x	x	3
Black-bellied Bustard	*Lissotis melanogaster*	LC	LC		PG		x	3		x	
Grey Crowned Crane	*Balearica regulorum*	EN	EN	EN	PG		x	2	x	x	10
Blue Crane	*Grus paradisea*	VU	NT	PS	OG		x	1	x	x	12
Wattled Crane	*Grus carunculata*	VU	CR	CR	PG		x	1	x	x	1
Striped Flufftail	*Sarothrura affinis*	LC	VU		PG		x	1	x	x	
White-winged Flufftail	*Sarothrura ayresi*	CR	CR		PG		x	3			
African Rail	*Rallus caerulescens*	LC	LC		PG			2	x	x	1
African Crake	*Crecopsis egregia*	LC	LC		PG			2	x	x	
Corn Crake	*Crex crex*	LC	LC		PG			3			

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Black Crake	*Zapornia flavirostra*	LC	LC		PG			2			1
Baillon's Crake	*Zapornia pusilla*	LC	LC		PG			3			
African (Purple) Swamphen	*Porphyrio madagascariensis*	LC	LC		PG			2			2
Common Moorhen	*Gallinula chloropus*	LC	LC		PG			1	x	x	6
Red-knobbed coot	*Fulica cristata*	LC	LC		OG			1	x	x	13
African Snipe	*Gallinago nigripennis*	LC	LC		PG			2	x	x	1
Common Greenshank	*Tringa nebularia*	LC	LC		PG			3			1
Common Sandpiper	*Actitis hypoleucos*	LC	LC		PG			2	x	x	
African Jacana	*Actophilornis africanus*	LC	LC		PG			1	x	x	
Spotted Thick-knee	*Burhinus capensis*	LC	LC		PG			1	x	x	2
Black-winged Stilt	*Himantopus himantopus*	LC	LC		PG			1	x	x	
Pied Avocet	*Recurvirostra avosetta*	LC	LC		PG			2			
Common Ringed Plover	*Charadrius hiaticula*	LC	LC		PG			3			
Kittlitz's Plover	*Charadrius pecuarius*	LC	LC		PG			3			
Three-banded Plover	*Charadrius tricollaris*	LC	LC		PG			1	x	x	2
Blacksmith Lapwing	*Vanellus armatus*	LC	LC		PG			1	x	x	9
African Wattled Lapwing	*Vanellus senegallus*	LC	LC		PG			1	x	x	4
Black-winged Lapwing	*Vanellus melanopterus*	LC	LC		PG			1	x	x	2
Crowned Lapwing	*Vanellus coronatus*	LC	LC		PG			1	x	x	4
Black-winged Pratincole	*Glareola nordmanni*	NT	NT		PG		x	4			
Whiskered Tern	*Chlidonias hybrida*	LC	LC		PG			1	x	x	2
African Cuckoo Hawk	*Aviceda cuculoides*	LC	LC		PG		x	4			
Black-winged Kite	*Elanus caeruleus*	LC	LC		PG		x	1	x	x	15
African Fish Eagle	*Haliaeetus vocifer*	LC	LC		PG		x	2	x	x	4
Bearded Vulture	*Gypaetus barbatus*	NT	CR	CR	PG		x	2		x	
Cape Vulture	*Gyps coprotheres*	VU	EN	EN	PG		x	1	x	x	7
Black-chested Snake Eagle	*Circaetus pectoralis*	LC	LC		PG		x	3			1
Brown Snake Eagle	*Circaetus cinereus*	LC	LC		PG		x	4			1

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
African Marsh Harrier	*Circus ranivorus*	LC	EN		PG		x	2	x	x	1
Black Harrier	*Circus maurus*	EN	EN		PG	NE	x	2	x	x	2
Pallid Harrier	*Circus macrourus*	NT	NT		PG		x	4			
Montagu's Harrier	*Circus pygargus*	LC	LC		PG		x	2			
African Harrier-Hawk	*Polyboroides typus*	LC	LC		PG		x	1	x	x	6
Little Sparrowhawk	*Accipiter minullus*	LC	LC		PG		x	1	x	x	
Rufous-breasted Sparrowhawk	*Accipiter rufiventris*	LC	LC		PG		x	1	x	x	3
Black Sparrowhawk	*Accipiter melanoleucus*	LC	LC		PG		x	1	x	x	2
Common (Steppe) Buzzard	*Buteo buteo*	LC	LC		PG		x	1	x	x	12
Forest Buzzard	*Buteo trizonatus*	NT	LC		PG	E	x	3			2
Jackal Buzzard	*Buteo rufofuscus*	LC	LC		PG	NE	x	1	x	x	14
Verreaux's Eagle	*Aquila verreauxii*	LC	VU		PG		x	1	x	x	2
Booted Eagle	*Hieraaetus pennatus*	LC	LC		PG		x	2	x	x	
Martial Eagle	*Polemaetus bellicosus*	EN	EN	EN	PG		x	1	x	x	1
Crowned Eagle	*Stephanoaetus coronatus*	NT	VU		PG		x	4			
Secretarybird	*Sagittarius serpentarius*	EN	VU		PG		x	1	x	x	9
Lesser Kestrel	*Falco naumanni*	LC	LC		PG		x	1	x	x	1
Rock Kestrel	*Falco rupicolus*	LC	LC		PG		x	1	x	x	9
Greater Kestrel	*Falco rupicoloides*	LC	LC		PG		x	1	x	x	1
Red-footed Falcon	*Falco vespertinus*	VU	NT		PG		x	1	x	x	2
Amur Falcon	*Falco amurensis*	LC	LC		PG		x	1	x	x	14
Eurasian Hobby	*Falco subbuteo*	LC	LC		PG		x	3			
Lanner Falcon	*Falco biarmicus*	LC	VU		PG		x	1	x	x	7
Little Grebe	*Tachybaptus ruficollis*	LC	LC		PG			1	x	x	7
African Darter	*Anhinga rufa*	LC	LC		PG			1	x	x	1
Reed Cormorant	*Microcarbo africanus*	LC	LC					1	x	x	11
White-breasted Cormorant	*Phalacrocorax lucidus*	LC	LC					2		x	4
Black Heron	*Egretta ardesiaca*	LC	LC		PG			4			

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Little Egret	*Egretta garzetta*	LC	LC		PG			2	x	x	2
Yellow-billed (Intermediate) Egret	*Ardea intermedia*	LC	LC		PG			1	x	x	4
Great Egret	*Ardea alba*	LC	LC		PG			1	x	x	1
Grey Heron	*Ardea cinerea*	LC	LC		PG			1	x	x	6
Black-headed Heron	*Ardea melanocephala*	LC	LC		PG			1	x	x	16
Goliath Heron	*Ardea goliath*	LC	LC		PG			3			
Purple Heron	*Ardea purpurea*	LC	LC		PG			1	x	x	
Western Cattle Egret	*Bubulcus ibis*	LC	LC		PG			1	x	x	14
Squacco Heron	*Ardeola ralloides*	LC	LC		PG			2			
Green-backed (Striated) Heron	*Butorides striata*	LC	LC		PG			3			
Black-crowned Night Heron	*Nycticorax nycticorax*	LC	LC		PG			4			
Little Bittern	*Ixobrychus minutus*	LC	LC		PG			3			
Eurasian Bittern	*Botaurus stellaris*	LC	LC		PG			4			
Hamerkop	*Scopus umbretta*	LC	LC		PG			1	x	x	8
Glossy Ibis	*Plegadis falcinellus*	LC	LC		PG			1	x	x	2
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	LC	LC		PG			1	x	x	16
Southern Bald Ibis	*Geronticus calvus*	VU	VU	VU	PG	E	x	1	x	x	16
African Sacred Ibis	*Threskiornis aethiopicus*	LC	LC		PG			1	x	x	7
African Spoonbill	*Platalea alba*	LC	LC		PG			1	x	x	4
Yellow-billed Stork	*Mycteria ibis*	LC	EN		PG		x	2	x	x	
Black Stork	*Ciconia nigra*	LC	VU		PG		x	1	x	x	1
Abdim's Stork	*Ciconia abdimii*	LC	NT		PG		x	2			
White Stork	*Ciconia ciconia*	LC	LC		PG		x	1	x	x	7
Marabou Stork	*Leptoptilos crumenifer*	LC	NT		PG		x	4			
Fork-tailed Drongo	*Dicrurus adsimilis*	LC	LC		PG			1	x	x	5
African Paradise Flycatcher	*Terpsiphone viridis*	LC	LC		PG			2	x	x	3
Brubru	*Nilaus afer*	LC	LC		PG			2	x	x	
Southern Boubou	*Laniarius ferrugineus*	LC	LC		PG			1	x	x	6

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Bokmakierie	*Telophorus zeylonus*	LC	LC		PG			1	x	x	17
Orange-breasted Bush-Shrike	*Chlorophoneus sulfureopectus*	LC	LC		PG			4			
Olive Bush-Shrike	*Chlorophoneus olivaceus*	LC	LC		PG			3			1
Cape Batis	*Batis capensis*	LC	LC		PG			3	x	x	2
Chinspot Batis	*Batis molitor*	LC	LC		PG			3			
Cape Crow	*Corvus capensis*	LC	LC					1	x	x	17
Pied Crow	*Corvus albus*	LC	LC					1	x	x	10
White-necked Raven	*Corvus albicollis*	LC	LC				x	1	x	x	3
Red-backed Shrike	*Lanius collurio*	LC	LC		PG			1	x	x	1
Southern (Common) Fiscal	*Lanius collaris*	LC	LC		PG			1	x	x	17
Black Cuckooshrike	*Campephaga flava*	LC	LC		PG			2			
Sand Martin	*Riparia riparia*	LC	LC		PG			2			1
Brown-throated Martin	*Riparia paludicola*	LC	LC		PG			2	x	x	10
Banded Martin	*Neophedina cincta*	LC	LC		PG			1	x	x	16
Barn Swallow	*Hirundo rustica*	LC	LC		PG			1	x	x	16
White-throated Swallow	*Hirundo albigularis*	LC	LC		PG			1	x	x	12
Greater Striped Swallow	*Cecropis cucullata*	LC	LC		PG			1	x	x	16
Lesser Striped Swallow	*Cecropis abyssinica*	LC	LC		PG			2	x	x	1
South African Cliff Swallow	*Petrochelidon spilodera*	LC	LC		PG	E		1	x	x	13
Rock Martin	*Ptyonoprogne fuligula*	LC	LC		PG			1	x	x	12
Common House Martin	*Delichon urbicum*	LC	LC		PG			1	x	x	3
Dark-capped Bulbul	*Pycnonotus tricolor*	LC	LC					1	x	x	15
African Red-eyed Bulbul	*Pycnonotus nigricans*	LC	LC					4			1
Fairy Flycatcher	*Stenostira scita*	LC	LC		PG	NE		2	x	x	
Cape Grassbird	*Sphenoeacus afer*	LC	LC		PG	NE		1	x	x	4
Long-billed crombec	*Sylvietta rufescens*	LC	LC		PG			4			
Little Rush Warbler	*Bradypterus baboecala*	LC	LC		PG			2	x	x	3
Barratt's Warbler	*Bradypterus barratti*	LC	LC		PG	NE	x	1	x	x	2

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Common Reed Warbler	*Acrocephalus scirpaceus*	LC	LC		PG			2			1
Lesser Swamp Warbler	*Acrocephalus gracilirostris*	LC	LC		PG			2	x	x	3
Willow Warbler	*Phylloscopus trochilus*	LC	LC		PG			1	x	x	2
Arrow-marked Babbler	*Turdoides jardineii*	LC	LC		PG			4			
Bush Blackcap	*Sylvia nigricapillus*	VU	VU		PG	E	x	1	x	x	1
Cape White-eye	*Zosterops virens*	LC	LC		PG	NE		1	x	x	10
Orange River White-eye	*Zosterops pallidus*	LC	LC		PG			2			1
Lazy Cisticola	*Cisticola aberrans*	LC	LC		PG			2	x	x	2
Wailing Cisticola	*Cisticola lais*	LC	LC		PG			1	x	x	9
Levaillant's Cisticola	*Cisticola tinniens*	LC	LC		PG			1	x	x	14
Neddicky	*Cisticola fulvicapilla*	LC	LC		PG			1	x	x	9
Zitting Cisticola	*Cisticola juncidis*	LC	LC		PG			1	x	x	12
Desert Cisticola	*Cisticola aridulus*	LC	LC		PG			3			2
Cloud Cisticola	*Cisticola textrix*	LC	LC		PG	N-end		1	x	x	12
Pale-crowned Cisticola	*Cisticola cinnamomeus*	LC	LC		PG			1	x	x	6
Wing-snapping Cisticola	*Cisticola ayresii*	LC	LC		PG			1	x	x	15
Tawny-flanked Prinia	*Prinia subflava*	LC	LC		PG			1	x	x	1
Black-chested Prinia	*Prinia flavicans*	LC	LC		PG			1	x	x	3
Drakensberg Prinia	*Prinia hypoxantha*	LC	LC		PG	E		1	x	x	8
Bar-throated Apalis	*Apalis thoracica*	LC	LC		PG			2	x	x	2
Melodious Lark	*Mirafra cheniana*	LC	LC		PG	NE	x	1	x	x	1
Rufous-naped Lark	*Mirafra africana*	LC	LC		PG			3	x	x	2
Eastern clapper Lark	*Mirafra fasciolata*	LC	LC		PG			1	x	x	4
Rudd's Lark	*Heteromirafra ruddi*	EN	EN		PG	E	x	1	x	x	2
Spike-heeled Lark	*Chersomanes albofasciata*	LC	LC		PG			1	x	x	8
Eastern Long-billed Lark	*Certhilauda semitorquata*	LC	LC		PG	E		1	x	x	9
Red-capped Lark	*Calandrella cinerea*	LC	LC		PG			1	x	x	14
Botha's Lark	*Spizocorys fringillaris*	EN	EN		PG	E	x	1	x	x	1

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		Global	Regional	TOPS	FS	Endemicity					
Cape Rock Thrush	*Monticola rupestris*	LC	LC		PG	E	x	1	x	x	5
Sentinel Rock Thrush	*Monticola explorator*	NT	LC		PG	E	x	1	x	x	3
Groundscraper Thrush	*Turdus litsitsirupa*	LC	LC		PG			1	x	x	1
Olive Thrush	*Turdus olivaceus*	LC	LC		PG			1	x	x	3
Southern Black flycatcher	*Melaenornis pammelaina*	LC	LC		PG			2			
Fiscal Flycatcher	*Melaenornis silens*	LC	LC		PG	NE		2	x	x	1
Spotted flycatcher	*Muscicapa striata*	LC	LC		PG			2			
African Dusky Flycatcher	*Muscicapa adusta*	LC	LC		PG			2			1
Cape Robin-Chat	*Cossypha caffra*	LC	LC		PG			1	x	x	14
White-browed Robin-Chat	*Cossypha heuglini*	LC	LC		PG			3	x	x	
Chorister Robin-Chat	*Cossypha dichroa*	LC	LC		PG	E	x	4			1
African StoneChat	*Saxicola torquatus*	LC	LC		PG			1	x	x	17
Buff-streaked Chat	*Campicoloides bifasciatus*	LC	LC		PG	E		1	x	x	8
Mountain Wheatear	*Myrmecocichla monticola*	LC	LC		PG			1	x	x	12
Sickle-winged Chat	*Emarginata sinuata*	LC	LC		PG	NE	x	2	x	x	
Familiar Chat	*Oenanthe familiaris*	LC	LC		PG			1	x	x	9
Ant-eating Chat	*Myrmecocichla formicivora*	LC	LC		PG			1	x	x	16
Mocking Cliff Chat	*Thamnolaea cinnamomeiventris*	LC	LC					1	x	x	3
Red-winged Starling	*Onychognathus morio*	LC	LC					1	x	x	10
Cape Glossy (Cape) Starling	*Lamprotornis nitens*	LC	LC		PG			1	x	x	13
Pied Starling	*Lamprotornis bicolor*	LC	LC			E	x	1	x	x	16
Common Myna	*Acridotheres tristis*	LC	LC					2	x	x	
Amethyst Sunbird	*Chalcomitra amethystina*	LC	LC		PG			2	x	x	1
Malachite Sunbird	*Nectarinia famosa*	LC	LC		PG			1	x	x	11
Greater Double-collared Sunbird	*Cinnyris afer*	LC	LC		PG	E		1	x	x	1
White-browed Sparrow-Weaver	*Plocepasser mahali*	LC	LC					1	x	x	2
Lesser Masked Weaver	*Ploceus intermedius*	LC	LC					2	x	x	
Cape Weaver	*Ploceus capensis*	LC	LC			NE		1	x	x	16

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		Global	Regional	TOPS	FS	Endemicity					
Southern Masked Weaver	*Ploceus velatus*	LC	LC					1	x	x	16
Village Weaver	*Ploceus cucullatus*	LC	LC					2	x	x	
Red-billed Quelea	*Quelea quelea*	LC	LC					1	x	x	13
Yellow-crowned Bishop	*Euplectes afer*	LC	LC					1	x	x	14
Southern Red Bishop	*Euplectes orix*	LC	LC					1	x	x	16
Yellow Bishop	*Euplectes capensis*	LC	LC					2	x	x	5
Fan-tailed Widowbird	*Euplectes axillaris*	LC	LC					2	x	x	5
White-winged Widowbird	*Euplectes albonotatus*	LC	LC					2	x	x	2
Red-collared Widowbird	*Euplectes ardens*	LC	LC					2			4
Long-tailed Widowbird	*Euplectes progne*	LC	LC					1	x	x	16
Orange-breasted Waxbill	*Amandava subflava*	LC	LC		PG			1	x	x	1
African Quail-finch	*Ortygospiza atricollis*	LC	LC		PG			1	x	x	14
Red-headed Finch	*Amadina erythrocephala*	LC	LC		PG			2			
Swee Waxbill	*Coccopygia melanotis*	LC	LC		PG	NE		2	x	x	1
Common Waxbill	*Estrilda astrild*	LC	LC		PG			1	x	x	14
African Firefinch	*Lagonosticta rubricata*	LC	LC		PG			3			1
Pin-tailed Whydah	*Vidua macroura*	LC	LC		PG			1	x	x	14
Shaft-tailed Whydah	*Vidua regia*	LC	LC		PG			2			1
Cuckoo Finch	*Anomalospiza imberbis*	LC	LC					3			
Cape Sparrow	*Passer melanurus*	LC	LC					1	x	x	11
Southern Grey-headed Sparrow	*Passer diffusus*	LC	LC		PG			1	x	x	12
Yellow-throated Petronia	*Gymnoris superciliaris*	LC	LC		PG			1	x	x	
Cape Wagtail	*Motacilla capensis*	LC	LC		PG			1	x	x	15
Cape Longclaw	*Macronyx capensis*	LC	LC		PG			1	x	x	17
Yellow-breasted Pipit	*Anthus chloris*	VU	VU		PG	E	x	1	x	x	5
African Rock Pipit	*Anthus crenatus*	LC	NT		PG	E	x	1	x	x	4
African Pipit	*Anthus cinnamomeus*	LC	LC		PG			1	x	x	16
Plain-backed Pipit	*Anthus leucophrys*	LC	LC		PG			1	x	x	3

Common Name	Scientific Name	Conservation Status					Priority Spp	LO Normandien	VK Cluster	AOI	SABAP2
		Global	Regional	TOPS	FS	Endemicity					
Buffy Pipit	*Anthus vaalensis*	LC	LC		PG			2			5
Nicholson's Pipit	*Anthus nicholsoni*	LC	LC		PG			1	x	x	1
Short-tailed Pipit	*Anthus brachyurus*	LC	VU		PG		x	3			
Cape Canary	*Serinus canicollis*	LC	LC		PG			1	x	x	16
Yellow-fronted Canary	*Crithagra mozambica*	LC	LC		PG			1	x	x	2
Black-throated Canary	*Crithagra atrogularis*	LC	LC		PG			1	x	x	6
Forest Canary	*Crithagra scotops*	LC	LC		PG	E	x	2			1
Yellow Canary	*Crithagra flaviventris*	LC	LC		PG			2	x	x	1
Brimstone Canary	*Crithagra sulphurata*	LC	LC		PG			2			1
Streaky-headed Seedeater	*Crithagra gularis*	LC	LC		PG			2	x	x	1
Lark-like Bunting	*Emberiza impetuani*	LC	LC		PG			3			2
Cinnamon-breasted Bunting	*Emberiza tahapisi*	LC	LC		PG			2	x	x	1
Cape Bunting	*Emberiza capensis*	LC	LC		PG			1	x	x	12
Golden-breasted Bunting	*Emberiza flaviventris*	LC	LC		PG			2	x	x	
Yellow-billed Kite	*Milvus aegyptius*	LC	LC		PG		x	2	x	x	1
Peregrine Falcon	*Falco peregrinus*	LC	LC		PG		x	1	x	x	

Key: Status: CR = Critically Endangered; DD = Data Deficient; EN = Endangered; LC = Least Concern; NA = Not Assessed; NT = Near Threatened; OG = Ordinary Game; PG = Protected Game; PS = Protected Species; VU = Vulnerable. Likelihood of Occurrence (LO): 1 = Present; 2 = High; 3 = Moderate. Sources: Taylor et al. (2015); BirdLife South Africa (2016); SABAP 2 (2022)