Final

Excelsior Wind Farm

CRITICAL HABITAT ASSESSMENT

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EXECUTIVE SUMMARY

1. INTRODUCTION

This Critical Habitat Assessment (CHA) provides an assessment of critical habitat applicable to the Excelsior Wind Farm (the Project), as required in terms of IFC Performance Standard 6, Paragraph 16, Criteria 1-4. The project is located near Swellendam in the Western Cape Province of South Africa. The criteria are as follows:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
- Criterion 2: Endemic and/or restricted-range species;
- Criterion 3: Migratory and/or congregatory species;
- Criterion 4: Highly threatened and/or unique ecosystems; and

It is based on the baseline information provided by the South African Bird Atlas Project 2 (SABAP2)[1] and several reports, namely a bird impact assessment study completed in 2010, consisting of an extensive literature review and in-field data collection as part of the ESIA process, and subsequent pre-construction avifaunal monitoring reports.

The process outlined above has completed the first two steps of critical habitat determination, as specified in paragraphs GN61 and GN62 of the IFC's Guidance Note 6. Therefore, the scope of this report is limited to step 3 as set out in paragraphs GN63 – GN83 on Critical Habitat Determination.

2. AREA OF IMPACT (AoI)

The Project AoI was delineated as the area comprising the site footprint itself and a 5km buffer drawn around the outer most wind turbines, and a 2km buffer zone around the proposed 14km long 132kV grid connection powerline running from the on-site substation to the Vryheid substation.

3. DETERMINATION

Table 1 below summarises the critical habitats confirmed to be present in the Proposed Project Area, according to Criteria 1 - 4.

[1] FitzPatrick Institute of African Ornithology, University of Cape Town, South African Bird Atlas Project 2 (SABAP2), http://sabap2.adu.org.za/. Accessed 19 July 2019.

Table 1: Summary of Critical Habitat within Project Area of Influence			
Feature	**PS6 Criterion**	**Rationale**	**Critical Habitat**
Black Harrier	Criterion 1	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Yes
		(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Yes
	Criterion 3	Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Cape Vulture	Criterion 1	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Yes
		(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Yes
	Criterion 3	Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Agulhas Long-billed Lark	Criterion 2	a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.	Yes
Blue Crane	Criterion 3	Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Renosterveld ecosystems	Criterion 4	b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.	Yes

4. CONSEQUENCES OF A CRITICAL HABITAT CLASSIFICATION

In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated (Paragraph 17 of Performance Standard 6):

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program (BMEP) is integrated into the client's management program.

Paragraph 18 states that in such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated.

4.1 No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical

Relocating the development elsewhere outside critical habitat, would have been impractical due to the combined size of the three adjoining IBAs where the Project is located.

4.2 The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values

According to guidance note 6, paragraph GN86, this requirement explicitly focuses on the biodiversity values for which the critical habitat was designated as a means of emphasizing the importance of considering biodiversity values across a broader scale. Therefore, the second bullet of PS6 paragraph 17 means that project-related direct and indirect impacts will not jeopardize the long-term persistence of the biodiversity value(s) for which the critical habitat was designated, considering the range of mitigation measures implemented by the client throughout the life of the project and in alignment with the mitigation hierarchy.

See Table 2 below for a summary of the potential impacts on the biodiversity values and the proposed mitigation measures to prevent measurable adverse impacts and to achieve a net gain (PS6 paragraph 10) in terms of conservation outcomes.

Table 2: Summary of potential impacts and proposed mitigation measures		
Species	Potential impacts	Mitigation to ensure no net loss plus gain
Black Harrier	The main potential Project impact on the regionally and globally Endangered Black Harrier is mortality due to collisions with the turbines. The Black Harrier is expected to occur fairly regularly in the AoI, but in very low numbers.	• Avoidance of high sensitivity areas. The site contains no suitable breeding habitat and the closest recorded nest is approximately 3.8 km away from the closest planned turbine. The lay-out also avoids all areas of remaining Renosterveld, i.e. potential foraging habitat for this species. • Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when a Black Harrier moves through the site). The shut-down can be triggered by human observers. Given the low flight frequency of the species at the site, it should not have a significant economic impact on power output. • Habitat enhancement outside the site to attract Black Harriers. Increased habitat attractiveness outside the site can be achieved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include, alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc.. This activity has potential to achieve net gain, with measurement of improvement through long-term monitoring of vegetation quality and the number of harrier sightings in suitable habitat. • A threshold mortality level for Black Harriers at the site must be determined through consultation with CapeNature and the ORCT, as part of the biodiversity monitoring and evaluation programme (BMEP). If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g., painting of one turbine blade black or red to enhance visibility.
Cape Vulture	The main potential Project impact on the regionally and globally Endangered Cape Vulture is mortality due to collisions with the turbines. The Cape Vulture is expected to occur fairly regularly in the AoI.	• The key mitigation measure is to avoid attracting vultures through management of food availability at the site. A strategy to this effect has been formulated to prevent mortality of Cape Vultures on the turbines. • Research to establish the status of the food supply of Cape Vultures at the Potberg Vulture Colony, and the funding of a supplementary feeding programme, if need

		be (habitat enhancement). This will entail a satellite tracking project to establish the foraging range and behaviour of the Cape Vultures at the Potberg Colony, inter alia to see how big a role the food provision at established vulture restaurants plays in the foraging behaviour of the birds. It will furthermore entail the investigation of land use patterns and farming practices e.g. the timing of lambing, to see how that influences the foraging behaviour of the birds. • Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when Cape Vulture move through the site). The shut-down can be triggered by human observers. Given the relatively low flight frequency of the species at the site, it should not have a significant economic impact. • A threshold mortality level for Cape Vultures at the site must be determined through consultation with CapeNature as part of the BMEP. If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g., painting of one turbine blade black or red to enhance visibility.
Agulhas Long-billed Lark	The main potential impact on the range-restricted Agulhas Long-billed Lark is displacement due to habitat transformation.	• All contractors are to adhere to the Construction Environmental Management Programme (CEMPr) and should apply good environmental practice during construction. This includes the following: o Existing roads and farm tracks should be used where possible; o The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths; o No off-road driving; • Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist. • Workshop with stakeholders (e.g. Overberg Renosterveld Conservation Trust, BirdLife South Africa, CapeNature and the Percy Fitzpatrick Institute of African Ornithology) to explore avenues or further research and the funding for such research. Specific research questions that need to be answered are: o Which agricultural practices are most beneficial to the species? o What is the breeding success of the species through-out its range in different habitats?

		○ How effective are formally protected areas in conserving the species? ○ What are the impacts of terrestrial predators on the breeding success in artificial pastures?
Blue Crane	The globally Vulnerable Blue Crane at the Project site may collide with turbines, although this is not expected to be a major impact. Collisions with the 14km long 132kV grid connection powerline running from the on-site substation to the Vryheid substation could potentially be the most significant impact associated with the wind farm development. The other potential impact is displacement of breeding Blue Cranes due to the disturbance associated with the construction of the wind farm.	• An intensive search will be conducted for Blue Crane nests during November and December 2018, and January 2019. If the presence of a breeding pair is confirmed, construction activities within 200m of the nest should not take place in the period October to February, unless the avifaunal specialist is of the opinion that the birds will not be displaced by the construction activities.[2] • A site-specific Construction Environmental Management Programme (CEMPr) will be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. This will include the following: ○ Construction activity should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network. ○ Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of breeding pairs. ○ Construction of new roads should only be considered if existing roads cannot be upgraded. ○ Measures to be implemented according to best practice to curb noise and dust. • The Contractor HSE Officer must oversee activities and ensure that the CEMPr is implemented and enforced. • Five environmental monitors will be trained by an avifaunal specialist to identify the signs that indicate possible breeding by Blue Cranes. The environmental monitors must then, make a concerted effort to look out for such breeding activities of Blue Cranes during their weekly monitoring surveys. If any Blue Cranes are confirmed to be breeding (e.g. if a nest site is found), construction activities within 200m of the breeding site must cease, and the avifaunal specialist will be contacted immediately for further assessment of the situation and instruction on how to proceed. • Marking of the high-risk sections of the 14km long 132kV grid connection powerline with Eskom approved Bird Flight Diverters (BFD's), as identified during the avifaunal

[2] This has already been completed

		powerline walk-through conducted in February 2016, followed-up by regular inspections by the environmental monitors to quantify collision mortality and assess the effectiveness of the BFD's in curbing mortality. • A survey of all the existing powerlines in the AoI by the environmental monitors to establish a baseline for current mortality, and to identify high risk sections of powerline and the subsequent marking of those sections with Eskom approved BFD's. This intervention to achieve net gain should be followed by regular inspections to assess the effectiveness of the BFD's.
Renosterveld ecosystems	The most important potential impact on the Renosterveld in the Project footprint is habitat transformation.	• All turbines and supporting infrastructure (including the powerline poles) are placed outside the remaining patches of Renosterveld. • The quality of the remaining Renosterveld within the AoA will be improved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include, alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc.). This could act as a potential net gain measurement, through the long-term monitoring of vegetation quality. This should not increase the collision risk for Black Harriers, as the site itself contains only one small patch of Renosterveld approximately 2.36 ha in extent.

4.4 The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time

Net reduction is a singular or cumulative loss of individuals that impacts on the species' ability to persist at the global and/or regional/national scales for many generations or over a long period of time. The acceptable reduction in population should not be interpreted as the survival of every individual on-site. Although this might be the case in some situations, for example for CR species nearing extinction in the wild, no net reduction is based on the species "ability to persist at the global and/or regional/national scales for many generations or over a long period of time".

4.4.1 Black Harrier

Given the relatively low numbers of the species recorded at the project site, the limited number of wind turbines (n=13), and the extensive mitigation measures to be implemented (see 4.2.1), it is not envisaged that the potential collision related mortality will lead to a net reduction in the regional or national population which will impact on the species' ability to persist at that scale for many generations or over a long period of time.

4.4.2 Cape Vulture

The estimated population size of the Cape Vulture is 14 100 individuals, including 4 400 breeding pairs (Taylor *et al.* 2015). The regional population is estimated at 316 individuals, which includes 100 breeding pairs (Shaw pers. comm). The implementation of the proposed mitigation measures (see Table 2) should ensure that the risk to Cape Vultures will be minimised, to such an extent that the project should not lead to a net reduction in the national or regional population of Cape Vultures over a reasonable period of time.

4.5 A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program (BMEP) is integrated into the client's management program.

A BMEP has already been implemented at the Project site since December 2018. Monitoring will be conducted both during the construction and the operational phases.

4.5.1 Construction Phase

The construction phase monitoring consists of the following components:

- A total of 5 environmental monitors are currently conducting weekly bird surveys, and will be trained as carcass searchers and to perform various other environmental duties;
- The current construction period (18 months) is used to investigate the feeding patterns of Cape Vultures at the site to assist with the formulation of a mitigation strategy to prevent mortality due to collision with the turbines. Elements of the mitigation strategy are outlined in section 4.2 above.

- A number of priority species nests, (including Blue Cranes) are being monitored during the construction phase of the Project in order to assess the potential impact of the construction activities on the breeding birds.

4.5.2 Operational Phase

The operational phase monitoring will consist of the following components:

- The monitoring will be conducted in accordance with the latest version of *the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.*
- Operational monitoring will aim to answer the following questions:
    - How has the habitat available to avifauna in and around the wind farm changed?
    - How have the number of birds and species composition changed?
    - How have the movements of priority species changed?
    - How has the wind farm affected priority species' breeding success?
    - How many birds collide with the wind turbines? And are there any patterns to this?
    - How should mitigation be applied to reduce the impacts on avifauna?

- As an absolute minimum, operational monitoring will be undertaken for the first three years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.
- The exact scope and nature of the post-construction monitoring will be informed on an ongoing basis by the results of the monitoring through a process of adaptive management.
- In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring will be applied as far as is practically possible in the same way to operational monitoring in order to ensure maximum comparability of these two data sets. This includes sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and vantage point surveys according to the current best practice.
- The collision monitoring will have three components:
    - Experimental assessment of search efficiency and scavenging rates of bird carcasses on the site;
    - Regular searches in the immediate vicinity of the wind farm turbines for collision casualties;
    - Estimation of collision rates.

- The probability of a carcass being detected and the rate of removal/decay of the carcass must be accounted for when estimating collision rates and when designing the monitoring protocol. This will be done in the form of biannual searcher and scavenger trials.

4.6 Legally protected and Internationally Recognized Areas

The Project is located in a Key Biodiversity Area which falls within the definition of an internationally recognized area as defined in footnote 17 of Performance Standard 6 Paragraph GN20. Internationally recognized areas are defined as "UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention). Projects proposed inside legally protected or internationally recognized areas should result in tangible benefits to the conservation objectives of that area, and clear conservation advantages should be gained by the presence of the project. Stakeholder engagement and consultation is required for all projects located in legally protected and internationally recognized areas.

The ORCT is the leading NGO operating within the AoI of the Project. It has compiled a comprehensive conservation strategy for the conservation of the Critically Endangered Renosterveld, as discussed under 4.2.1 and 4.2.5. The opportunity exists for the client to engage meaningfully with the ORCT to further the aims of this strategy, in order to align with the requirements of Paragraph GN20.

5. THE STRATEGIC ENVIRONMENTAL ASSESSMENT FOR WIND AND SOLAR PHOTOVOLTAIC ENERGY IN SOUTH AFRICA

The Project is located within the Focus Area 1: Overberg REDZ. Table 3 below details the avifaunal criteria, the prescribed sensitivity rating, and how it potentially affects the Project.

Table 3: Avifaunal criteria and sensitivity ratings as defined in the SEA for wind and solar photovoltaic energy in South Africa.

Criterion	Sensitivity rating	Proposed mitigation	Project
Wetlands with a surface area greater than 2 ha	Medium:2 km from edge	All major wetlands larger than 20 000 m² should be surveyed to determine the abundance and diversity of wetland and other birds present. Where these represent locally or regionally significance resource areas they should be buffered accordingly.	Not applicable. Not present at the site.
All protected areas	Very High: 1 km from edge	No development within the 1km Very High buffer zone	Not applicable. Not preset at the site.
Slopes steeper than 75°	High: 1 km	Search areas for nest sites of cliff- nesting species and buffer these accordingly. Monitor thoroughly to determine which ridgelines are frequented by threatened slope-soaring species and buffer accordingly.	Not applicable. Not present at the site.
Power lines equal to or greater than 132 kV	Medium: 5 km	All existing power infrastructure should be surveyed for possible nesting or roosting sites. Any newly identified sites should be buffered accordingly, to ensure these areas are protected from possible disturbance.	Not applicable. Not present at the site.
Threatened Ecosystem Fragments greater than 100 ha	High: within 2 km of threatened ecosystems	Keep RE development out of and away from the designated buffer areas around Renosterveld fragments	Not applicable. Not present at the site.
Breede River	Very High: within 1 km of major rivers	No development within the 1km Very High buffer zone	Not applicable. Not present at the site.

Known Cape Vulture colonies	- Very High: within 20 km of Colonies - High: between 20 and 40 km from Colonies	Keep wind farms outside of the designated 20km Very High sensitivity buffer area around the colony. Survey vulture foraging patterns within the High sensitivity buffer around the colony to determine areas of high use and buffer accordingly. Best done using tracking devices on a representative sample of birds from the colony. Only embark on tracking studies in collaboration with accredited ornithologists. Investigate management of vulture access to stock mortalities to ensure that opportunities to feed close to or within a wind farmed area are minimised.	The Project is located in a High sensitivity zone. The Potberg Cape Vulture colony is located approximately 30km away from the Project.
Known Verreaux's Eagle nests	Very High Sensitivity within 3 km of Verreaux's Eagle nests - High Sensitivity Between 3 and 5 km from Verreaux's Eagle nests	All known cliff-nesting raptor nests are buffered as Very High sensitivity zones (see section 4). The High sensitivity outer buffer should be regularly surveyed to determine whether or not particular landscape features are favoured by foraging birds. Detailed information on ranging behaviour could be derived from direct observation or by remote tracking of individual birds - only embark on tracking studies in collaboration with accredited ornithologists. Based on findings, all high traffic areas need to be effectively buffered from development.	Not applicable. Not present at the site.
Known Peregrine Falcon nest sites	- Very High Sensitivity within 1 km of Peregrine Falcon nests - High Sensitivity between 1 and 2 km from Peregrine Falcon nests	All known cliff-nesting raptor nests are buffered as Very High sensitivity zones (see section 4). The High sensitivity outer buffer should be regularly surveyed to determine whether or not particular landscape features are favoured by foraging birds. Detailed information on ranging behaviour could be derived from direct observation or by remote tracking of individual birds - only embark on tracking studies in collaboration with accredited ornithologists. Based on findings, all high traffic areas need to be effectively buffered from development.	Not applicable. Not present at the site.
Known Martial Eagle nest sites	Very High Sensitivity within 5 km of Martial Eagle nests	No development within a 5km Very High buffer zone.	Not applicable. Not present at the site.
Known African Fish-Eagle nest sites	- Very High Sensitivity within 2 km of Fish-Eagle nests	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.
Known Black Harrier nesting areas	- Very High Sensitivity within 2 km of Black Harrier nests	Keep RE development out of and away from the designated 2km buffer areas around Renosterveld fragments.	Not applicable. Not present at the site.
Known Blue Crane nesting areas	- Very High Sensitivity within 150 m of known Blue Crane nests - High Sensitivity between 150 and 300 m from Blue Crane nests	Keep RE development outside of the designated 150m Very High sensitivity buffer areas. Search the designated High sensitivity buffer areas for other nests during the breeding season – October-February.	The Project is located in a High sensitivity zone. The closest recorded Blue Crane nest is about 180m away from a turbine position.
Selected Coordinated Waterbird Counts (CWAC) sites	- Very High Sensitivity	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.

Selected CWAC sites with high total counts, species diversities, and presence of Red-listed species	within 2 km of selected CWAC sites		
Past and possible future Lesser Kestrel roost site	High Sensitivity within 5 km of possible future Lesser Kestrel roosts	Keep wind farm developments well outside the 5km Very High sensitivity buffers imposed (See section 4). Survey the movements of birds within the surrounding High sensitivity buffer to ensure that there are no other, unforeseen points of aggregation that might heighten collision risk.	Not applicable. Not present at the site.
Other important wetlands	- High Sensitivity within 2 km of important wetlands	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.

The mitigation measures proposed for the Blue Crane and Cape Vultures in this CHA fall within the ambit of the proposed mitigation measures formulated for those species in the SEA for Focus Area 1: Overberg. No additional mitigation will be required to meet the requirements of the SEA.

CONTENTS

1. BACKGROUND

1.1 Introduction

This Critical Habitat Assessment (CHA) provides an assessment of critical habitat applicable to the Excelsior Wind Farm (the Project). It is based on the baseline information provided by the South African Bird Atlas Project 2 (SABAP2)[3] and several reports, namely a bird impact assessment study completed in 2010, consisting of an extensive literature review and in-field data collection as part of the ESIA process, and subsequent pre-construction avifaunal monitoring reports. The pre-construction avifaunal monitoring was conducted at the site and immediate surroundings during the following periods:

- Autumn: April 2011, May 2018
- Winter: June – July 2011, June -July 2018
- Spring: October 2011, October 2015, November – December 2017
- Summer: January – February 2012, December 2015, February 2016, November – December 2018, January 2019

The pre-construction monitoring protocol for the Project site was designed according to the current version *of Jenkins A R; Van Rooyen C S; Smallie J J; Anderson M D & Smit H A. 2011. Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Endangered Wildlife Trust and Birdlife South Africa.* The monitoring consisted of a combination of drive transects, point counts, vantage point watches, focal point monitoring and nest searches. The findings of the original bird impact assessment study and the subsequent pre-construction monitoring informed the final lay-out of the Project.

Weekly bird counts in the construction phase commenced at the Project site in January 2019 and are ongoing.

The process outlined above has completed the first two steps of critical habitat determination, as specified in paragraphs GN61 and GN62 of the IFC's Guidance Note 6[4]. Therefore, the scope of this report is limited to step 3 as set out in paragraphs GN63 – GN83 on Critical Habitat Determination.

1.1.1 Definition of Critical Habitat

Critical habitat is defined in Paragraph 16 of the 2012 version of IFC Performance Standard 6 (IFC PS6)[5] as an area with high biodiversity value. This includes areas that meet one or more of the following criteria:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
- Criterion 2: Endemic and/or restricted-range species;
- Criterion 3: Migratory and/or congregatory species;
- Criterion 4: Highly threatened and/or unique ecosystems; and
- Criterion 5: Key evolutionary processes[6].

GN54 states that certain internationally recognized areas of high biodiversity value may be recognized as critical habitats and should be given special attention during assessments. Examples include the following:

[3] FitzPatrick Institute of African Ornithology, University of Cape Town, South African Bird Atlas Project 2 (SABAP2), http://sabap2.adu.org.za/. Accessed 19 July 2019.
[4] IFC, 2019. Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
[5] IFC, 2012. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
[6] This criterion did not form part of the ToR for the Project CHA and will therefore not be further discussed.

- Areas that meet the criteria of the IUCN's Protected Area Categories Ia, Ib and II;
- Key Biodiversity Areas (KBAs), GN10 which encompass Important Bird and Biodiversity Areas (IBAs), and meet the criteria and thresholds described in paragraphs GN70 – GN83.

1.2 Thresholds

In order to facilitate decision-making, numerical thresholds have been defined for the first four critical habitat criteria listed in Section 1.1 of this document (i.e., CR/EN species; endemic/restricted-range species; migratory/congregatory species; threatened and unique ecosystems). The thresholds presented in Guidance Note 6 were obtained from globally standardized numerical thresholds published in the IUCN's A Global Standard for the Identification of Key Biodiversity Areas and Red List Categories and Criteria. Table 1 details the relevant thresholds.

Table 1: Quantitative Thresholds for Critical Habitat Criteria 1 - 4

Criterion	Threshold
1. CR/ EN Species	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species). (b) Areas that support globally-important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a). (c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.
2. Endemic/ Restricted Range Species	(a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.
3. Migratory/ Congregatory Species	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.
4. Highly Threatened or Unique Ecosystems	a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.

1.3 Area of Impact (AoI)

GN59 of IFC's Guidance Note 6 states that for Criteria 1-4, the project should identify an ecologically appropriate area of analysis (AoA) to determine the presence of critical habitat for each species with regular occurrence in the project's area of influence (AoI), or ecosystem, covered by Criteria 1-4. In this instance, the Project AoI was delineated as the area comprising the site footprint itself and a 5km buffer drawn around the outer most wind turbines, and a 2km buffer zone around the proposed 14km long 132kV grid connection powerline running from the on-site substation to the Vryheid substation (see Figure 1 below). This is a precautionary approach to make sure that project impacts beyond the wind farm boundaries are not overlooked in selecting the biodiversity features to assess (though such impacts are likely to be insignificant for a wind energy project).

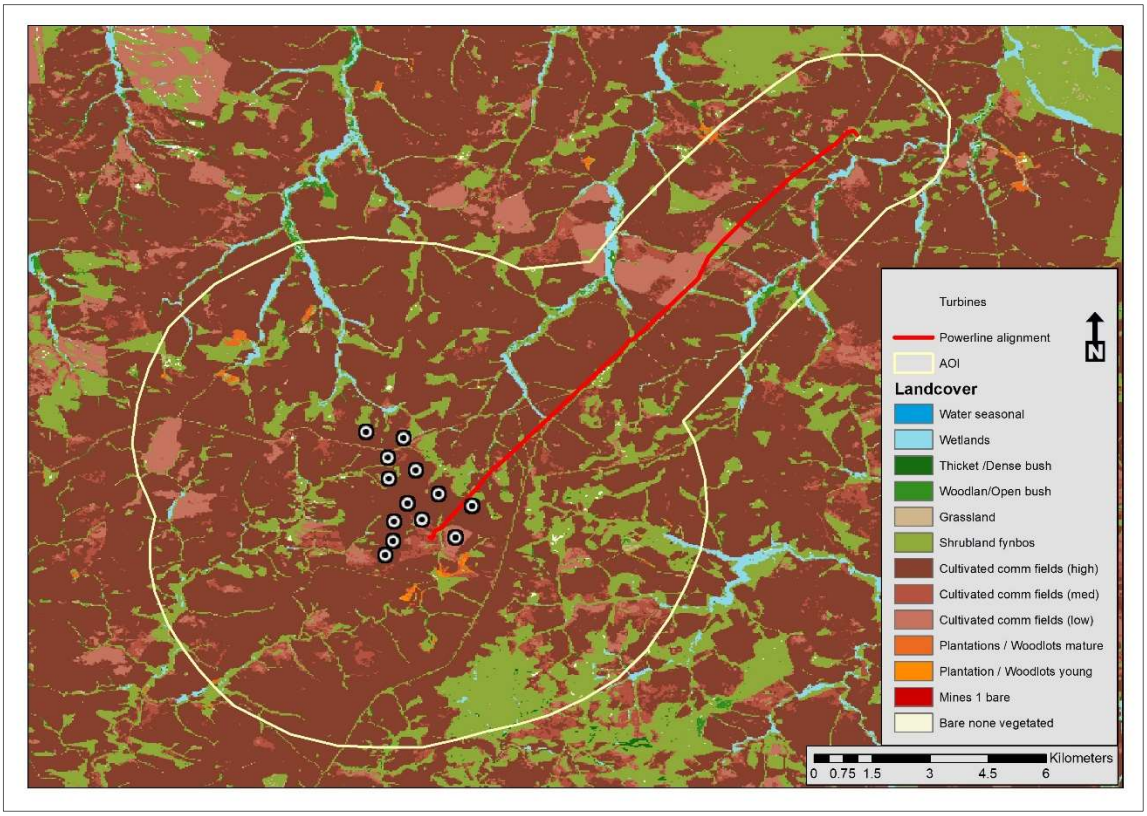

Figure 1: A landcover map of the Area of Influence (AoI)

The scale at which the critical habitat determination takes place depends on underlying ecological processes for the habitat and species in question and is not limited to the footprint of the Project. The boundaries of the AoA should be defined taking into account the distribution of species or ecosystems (within and sometimes extending beyond the project's AoI) and the ecological patterns, processes, features, and functions that are necessary for maintaining them.

The AoA at which each species and ecosystem is considered, is described in Section 3 of this document.

2. METHODOLOGY

2.1 Criterion 1: Critically Endangered and/or Endangered Species

The bird impact assessment study (2010), subsequent pre-construction monitoring reports (2011-2019), and ongoing construction phase monitoring which commenced in January 2019, identified threatened species recorded in the Project Area of Influence (AoI). This has been

completed with reference to the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (RL)[7]. The classification system used by the IUCN RL for representing the extinction risk of species is presented in Table 2. Species classified as VU or above on the IUCN RL are often referred to as 'threatened' species.

Table 2: IUCN Categories of Extinction Risk[8]

IUCN Category	Definition
Extinct in the Wild (EXW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range.
Critically Endangered (CR)	Species facing an extremely high risk of extinction in the wild.
Endangered (EN)	Species facing a very high risk of extinction in the wild.
Vulnerable (VU)	Species facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Data Deficient (DD)	Inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho, and Swaziland also uses the IUCN classification system. Paragraph GN 71 states that, as described in footnote 11 of Performance Standard 6, the inclusion of species in Criterion 1 that are listed nationally/regionally as CR or EN in countries that have adhered to IUCN guidance, shall be determined on a project-by-project basis in consultation with competent professionals.

2.2 Criterion 2: Endemic and/or Restricted-Range Species

IFC's Guidance Note 6 provides the following definitions for endemic and restricted-range species:

- For terrestrial vertebrates and plants, a restricted-range species is defined as those species that have an extent of occurrence (EOO) less than 50,000 square kilometers (km²).
- For marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km2.
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

Species recorded by SABAP2 and during monitoring in the AoI were screened to identify whether they meet the definition of endemic/range-restricted species. This was completed with reference to published sources and in liaison with experts.

[7] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/

[8] IUCN, 2012. IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.

Paragraph GN 74 states that the term endemic is defined as restricted-range. Restricted range refers to a limited extent of occurrence (EOO).

2.3 Criterion 3: Migratory or Congregatory Species

IFC Guidance Note 6 defines migratory and congregatory species in the following way:

- Migratory species:
  - *"any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem)."*
- Congregatory species:
  - *"species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis;*
  - *Species that form colonies;*
  - *Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (e.g., foraging, roosting);*
  - *Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time (e.g., during migration);*
  - *Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (e.g., wildebeest distributions); and*
  - *Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species)."*

The SABAP2 data and monitoring in the AoI identified a number of migratory and congregatory bird species present within the AoI.

2.4 Criterion 4 Highly Threatened or Unique Ecosystems

A working group has been established by the IUCN to develop a system of quantitative categories and criteria, analogous to those used for species, for assigning levels of threat to ecosystems at local, regional, and global levels (IUCN, 2016)[9]. IFC Guidance Note 6 states that the IUCN Red List of Ecosystems should be used where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, assessments using systematic methods at the national/regional level may be used, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally-recognized NGOs).

As no formal IUCN assessment had been conducted for the various Renosterveld ecosystems, the National Biodiversity Assessment 2011, compiled by the South African National Biodiversity Institute (SANBI)[10], was used to establish the threatened status of the Renosterveld ecosystems present in the AoI. This was used to assess if these ecosystems are biodiversity priority areas i.e. features in the landscape or seascape that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services. Table 3 details the criteria and thresholds used in the SANBI assessment.

[9] Bland, L.M., Keith, D.A., Miller, R.M., Murray, N.J. and Rodríguez, J.P. (eds.), 2016. Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria, Version 1.0. Gland, Switzerland: IUCN. ix + 94pp.

[10] Driver A., Sink, K.J., Nel, J.L., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.

Table 3: SANBI Criteria used to identify threatened terrestrial ecosystems, with thresholds for critically endangered (CR), endangered (EN) and vulnerable (VU) ecosystems

Criterion	CR	EN	VU
A1: Irreversible loss of natural habitat	Remaining natural habitat ≤ biodiversity target	Remaining natural habitat ≤ (biodiversity target + 15%)	Remaining natural habitat ≤ 60% of original area of ecosystem
A2: Ecosystem degradation and loss of integrity*	≥ 60% of ecosystem significantly degraded	≥ 40% of ecosystem significantly degraded	≥ 20% of ecosystem significantly degraded
B: Rate of loss of natural habitat**			
C: Limited extent and imminent threat*		Ecosystem extent ≤ 3 000 ha, and imminent threat	Ecosystem extent ≤ 6 000 ha, and imminent threat
D1: Threatened plant species associations	≥ 80 threatened Red Data List plant species	≥ 60 threatened Red Data List plant species	≥ 40 threatened Red Data List plant species
D2: Threatened animal species associations**			
E: Fragmentation**			
F: Priority areas for meeting explicit biodiversity targets as defined in a systematic biodiversity plan	Very high irreplaceability and high threat	Very high irreplaceability and medium threat	Very high irreplaceability and low threat

* Owing to data constraints, Criteria A2 and C were applied to forests but not to other vegetation types.
** Owing to data constraints, Criteria B and D2 are dormant at this stage and thresholds have not been set for these criteria. Further testing of Criterion E is needed to determine whether it is a workable criterion for terrestrial ecosystems.

3. DETERMINATION

3.1 Criterion 1: Threatened species

The avifauna identified by SABAP2 and the pre-construction and construction phase monitoring as being present or likely to be present within the AoI have been screened to identify species that are classified as globally and/or nationally Critically Endangered or Endangered, or globally Vulnerable (Table 4).

Table 4: Species potentially present in the AoI that are classified as globally and/or nationally Critically Endangered or Endangered, or globally Vulnerable

Species	Expected occurrence in the AoI	SABAP2 full protocol reporting rate % in AoI[11]	Recorded Sp Su Au Wi 2011-12	Recorded Sp Su 2015-16	Recorded Wi Au 2018	Recorded Su Au 2019	National status	IUCN global status
Black Harrier *Circus maurus*	Regular	15.63	x	x		x	EN	EN
Blue Crane *Anthropoides paradiseus*	Regular	93.75	x	x	x	x	NT	VU
Cape Vulture *Gyps coprotheres*	Regular	12.5	x	x	x	x	EN	EN
Martial Eagle *Polemaetus bellicosus*	Sporadic[12]	12.5	x		x	x	EN	VU
Secretarybird *Sagittarius serpentarius*	Sporadic	10.94			x		VU	VU
Southern Black Korhaan *Afrotis afra*	Sporadic	0	x	x			VU	VU

Wi = Winter, Au = Autumn, Su = Summer, Sp = Spring

3.1.1 Critical Habitat Determination

3.1.1.1 Black Harrier *Circus maurus*

The species is classified as Endangered both nationally and globally. The total population is estimated at <1,000 individuals in South Africa, Lesotho and Swaziland (Taylor *et al.* 2015)[13] with only approximately 10 mature individuals outside this region (Taylor *et al.* 2015). Taylor *et al.* 2015 puts the estimated number at approximately 670 mature individuals, placed here in the range of 251-999 mature individuals. The population is thought to have undergone a major decline of 85% in the past 100 years (17% in the last 20 years) due to the loss of parts of its habitat (in its core habitat it is believed to have declined by as much as 50%) (Taylor *et al.* 2015), and declines are suspected to continue into the future (Taylor *et al.* 2015). The species is one of the most range-restricted harrier species in the world, with its core range located in the Fynbos Biome (which includes Renosterveld) of south-western South Africa. The species has a polarized distribution in the Fynbos Biome, with breeding birds largely restricted to the coastal strip, and inland in the mountains, where most of the remaining untransformed Fynbos (including Renosterveld) is located. Black Harriers undergo seasonal migrations during the summer, travelling as far as 1 200km inland to the Grassland Biome, returning in winter to their breeding grounds in the Fynbos Biome (Taylor *et al.* 2015).

The Black Harrier is expected to occur fairly regularly in the AoI, but in very low numbers. The species was not recorded during the initial four seasons' pre-construction monitoring, conducted in 2011-2012. It was subsequently recorded during spring and summer 2015-2016, in low numbers, with 2 birds recorded during transect surveys, and a total of 3 minutes and 15 seconds of flying time recorded during 48 hours of flight observations. During the autumn and winter 2018 surveys, no birds were recorded. Since the weekly counts started in 2019, the species have been recorded at an average rate of one bird per week from January to May 2019. It is likely that the birds recorded at the AoI are individuals moving through the area on their way to or from coastal breeding grounds to the south of the AoI.

3.1.1.2 Area of Analysis (AoA)

[11] The full protocol reporting rate refers to the number of full protocol surveys where the species was recorded, out of all the full protocol surveys that were conducted for that area. A full protocol survey is a survey that lasted at least two hours.
[12] Species which are not expected to occur regularly in the AoI are not assessed for critical habitat.
[13] Taylor, M.R., Peacock, F., Wanless, R.M. (eds.) 2015. The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

The Overberg Wheatbelt Important Bird Area (IBA) SA115 (Marnewick *et al.* 2015)[14] is considered to be an appropriate AoA for the Black Harrier, as the Project is located in the center of the IBA, and the habitat in the AoI is representative of the typical habitat in the IBA, namely a mosaic of crops and pastures, with patches of natural Renosterveld, especially in the drainage lines. Furthermore, the Black Harrier is listed as a trigger species for the IBA (Marnewick *et al.* 2015). The AoA allows for consideration of direct impacts, as well as indirect and cumulative impacts. Located in the Fynbos Biome at the southern tip of the African continent, this large agricultural district stretches from Caledon to Riversdale and encompasses the area south of these two towns, running between the coastal towns of Hermanus and Stilbaai. The topography consists of low-lying rolling coastal plains. The landscape consists primarily of cereal croplands and cultivated wheat pastures and crop fields, although a fair amount of natural vegetation still remains along the coast (Taylor *et al.* 2015). The Black Harrier frequently occurs in the modified agricultural matrix of the Overberg region, although it requires contiguous areas of untransformed, high quality Renosterveld habitat >100ha for breeding, of which very little is left in the IBA, except in the extreme south-eastern section of the IBA. Due to the very limited amount of contiguous Renosterveld remaining in the Overberg Wheatbelt IBA, the breeding population is very low, estimated at 10 – 20 pairs.[15]

[14] Marnewick, M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.

[15] Barnes, K.N. (ed.) 1998. The important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.

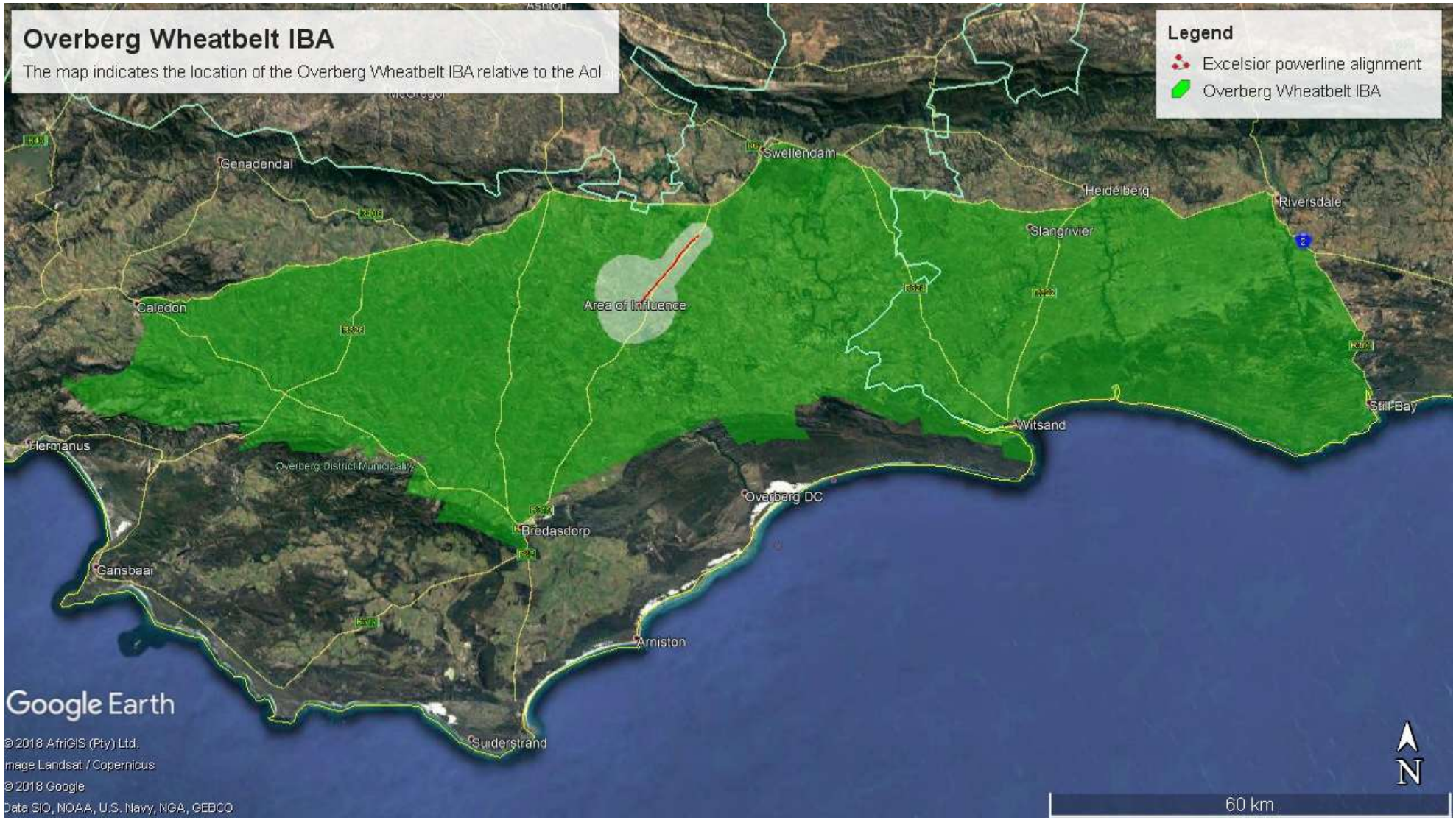

Figure 2: The Overberg Wheatbelt IBA and its location relative to the Project AoI.

3.1.1.3 Critical Habitat Determination

Table 5 below shows the process followed in determining if the AoA meets the thresholds for critical habitat for Black Harrier.

Table 5: Critical Habitat Determination for Black Harrier: Criterion 1

Threshold for Criterion 1	Area of Assessment	Does it meet the criterion for critical habitat?
(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Population size: 20-50 individuals i.e. 2.9 – 7.4% of the estimated global population, and 10 – 20 breeding pairs.[16]	Yes
(b) Areas that support globally-important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a).	Not applicable	No
(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Population size: 20-50 individuals i.e. 2.9 – 7.4% of the estimated global population, and 10 – 20 breeding pairs.[17]	Yes

3.1.1.4 Blue Crane *Anthropoides paradiseus*

The species is classified as globally Vulnerable. The most recent Blue Crane population estimate for South Africa is a minimum of 25,500 mature individuals with 12,100 in the Western Cape (Taylor *et al.* 2015). Numbers in the south and south-western Western Cape have increased as the species has expanded into agricultural areas (Taylor *et al.* 2015). Current population trend is stable (IUCN 2019). The Blue Crane occurs regularly in the AoI.

3.1.1.5 Area of Analysis (AoA)

The Overberg Wheatbelt Important Bird Area (IBA) SA115 (Marnewick *et al.* 2015)[18] is considered to be an appropriate AoA for the Blue Crane, as the Project is located in the center of the IBA, and the habitat in the IBA is representative of the habitat in the AoI, namely a mosaic of crops and pastures, with patches of natural Renosterveld, especially in the drainage lines. Furthermore, the Blue Crane is listed as a trigger species for the IBA (Marnewick *et al.* 2015). The AoA allows for consideration of direct impacts, as well as indirect and cumulative impacts. The IBA contains approximately 6 000 adults and juveniles, which amounts to approximately 30% of the global population (Marnewick *et al.* 2015).

[16] Barnes, K.N. (ed.) 1998. The important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.
[17] Barnes, K.N. (ed.) 1998. The important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.
[18] Marnewick, M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.

3.1.1.6 Critical Habitat Determination

Table 6 below shows the process followed in determining if the AoA meets the thresholds for critical habitat for Blue Crane.

Table 6: Critical Habitat Determination for Blue Crane: Criterion 1

Threshold for Criterion 1	Area of Assessment	Does it meet the criterion for critical habitat?
(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Not applicable	No
(b) Areas that support globally-important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a).	The area supports 30% of the global population, which means it meets the criterion of globally important concentrations of a IUCN Red-listed Vulnerable (VU) species. However, the hypothetical loss of this population, while serious, would not result in the species being reclassified as Endangered (EN). The population threshold for EN (Red List criterion C) is 2500 mature individuals.	No
(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Not applicable. Its regional Red List classification is Near Threatened.	No

3.1.1.7 Cape Vulture *Gyps coprotheres*

The species is classified as globally and regionally Endangered. In 2006, the total population was estimated at 8,000-10,000 individuals (M. Diekmann in litt. 2006), roughly equivalent to 5,300-6,700 mature individuals. The global population estimate has been revised with an estimate of 4,700 pairs or 9,400 mature individuals (Allan 2015)[19]. The population is estimated to have declined by 10% between 1994 and 1999 (Barnes 2000)[20], and over the period 1992-2007, the species declined by 60-70% in eastern South Africa (McKean and Botha 2007)[21]. There remains some uncertainty over the severity of population declines experienced by this species. Ogada *et al.* (2016)[22] estimate a median decline of 92% (range: 87-94%) over three generations (48 years). However, according to the 2015 Eskom Red Data Book of Birds (Allan 2015), declines in South Africa since the 1960s may be between 66 and 81% (though this relies on individuals not moving between breeding colonies, which is not necessarily true [Borello and

[19] Allan, D. G. 2015. Cape Vulture Gyps coprotheres. In: Taylor, M. R.; Peacock, F.; Wanless, R. M. (ed.), The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland, pp. 174-178. BirdLife South Africa, Johannesburg, South Africa.
[20] Barnes, K. N. 2000. The Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.
[21] McKean, S.; Botha, A. 2007. Traditional medicine demand threatens vultures in Southern Africa.
[22] Ogada, D., Shaw, P., Beyers, R.L., Buij, R., Murn, C., Thiollay, J.M., Beale, C.M., Holdo, R.M., Pomeroy, D., Baker, N., Krüger, S.C., Botha, A., Virani, M.Z., Monadjem, A. and Sinclair, A.R.E. 2016. Another Continental Vulture Crisis: Africa's Vultures Collapsing toward Extinction. Conservation Letters 9: 89-97.

Borello 2002[23], P. Benson in litt. 2016]), and some populations in South Africa are reported to be increasing (Benson 2015[24], P. Benson in litt. 2015). The IUCN (2019) puts the population estimate at 14 100, in an assessment done in October 2016[25].

Cape Vultures have been recorded regularly in the AoI during pre-construction monitoring. During the initial pre-construction monitoring, Cape Vultures were recorded flying over the site for a total of 1 hour and 19 minutes, during 288 hours of flight observations. The concentration of flight activity recorded during that survey was directly linked to a lamb carcass which the birds fed on. Vultures are specifically attracted to lambing sheep, where they feed on the placentas of lambing ewes. During the spring and summer 2015 – 2016 surveys, the species was recorded for 1 hour and 42 minutes during 48 hours of flight observations. During the autumn and winter 2018 surveys, the species was observed for a period of five hours, during 48 hours of flight observations. However, since the weekly counts started in 2019, only a single individual was recorded only once from January to May 2019.

3.1.1.8 Area of Analysis (AoA)

Cape Vultures can be expected to regularly use the air-space within 50 km around their roosts and breeding colonies (Pfeiffer & Ralston-Patton 2018)[26]. Vultures will occur well beyond these zones, but there is a lower probability of them occurring beyond these buffers. BirdLife South Africa requires that a buffer of approximately 50 km around all colonies, and regular or seasonal/occasional roosts should be considered as high to very high sensitivity (with sensitivity influenced by distance from the roost/colony, as well as its size and location)[27]. The Project is located approximately 35km from the Potberg Vulture Colony, which is the only breeding colony of the species in the Western Cape. In 2017, the Potberg colony consisted of 100 breeding pairs, and the total population was 316 birds[28]. A 50km radius around the colony is regarded as an appropriate AoA for the Cape Vulture. This area (AoA) allows for consideration of direct impacts, as well as indirect and cumulative impacts.

3.1.1.9 Critical Habitat Determination

Table 7 below shows the process followed in determining if the AoA meets the thresholds for critical habitat for Cape Vulture.

Table 7: Critical Habitat Determination for Cape Vulture: Criterion 1

Threshold for Criterion 1	Area of Assessment	Does it meet the criterion for critical habitat?
(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	The Potberg Cape Vulture colony supports approximately 2.2% of the global population, with 100 reproductive units.	Yes

[23] Borello, W. D.; Borello, R. M. 2002. The breeding status and colony dynamics of Cape Vulture (Gyps coprotheres) in Botswana. Bird Conservation International 12: 79-97.

[24] Benson, P.C. 2015. A survey of Cape Vulture breeding colonies in South Africa's northern provinces (Transvaal Region) – an update 2013. *Ornithological Observations*6: 31-36.

[25] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/

[26] Pfeiffer, M., Ralston-Patton, S. 2018. Cape Vultures and Wind Farms. Guidelines for impact assessment, monitoring and mitigation. BirdLife South Africa, Johannesburg.

[27] Pfeiffer, M., Ralston-Patton, S. 2018. Cape Vultures and Wind Farms. Guidelines for impact assessment, monitoring and mitigation. BirdLife South Africa, Johannesburg.

[28] Kevin Shaw, CapeNature ornithologist, personal communication to the author on 19 July 2019.

(b) Areas that support globally-important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in GN72(a).	Not applicable	No
(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	The Potberg Cape Vulture colony supports approximately 2.2% of the global population, with 100 reproductive units.	Yes

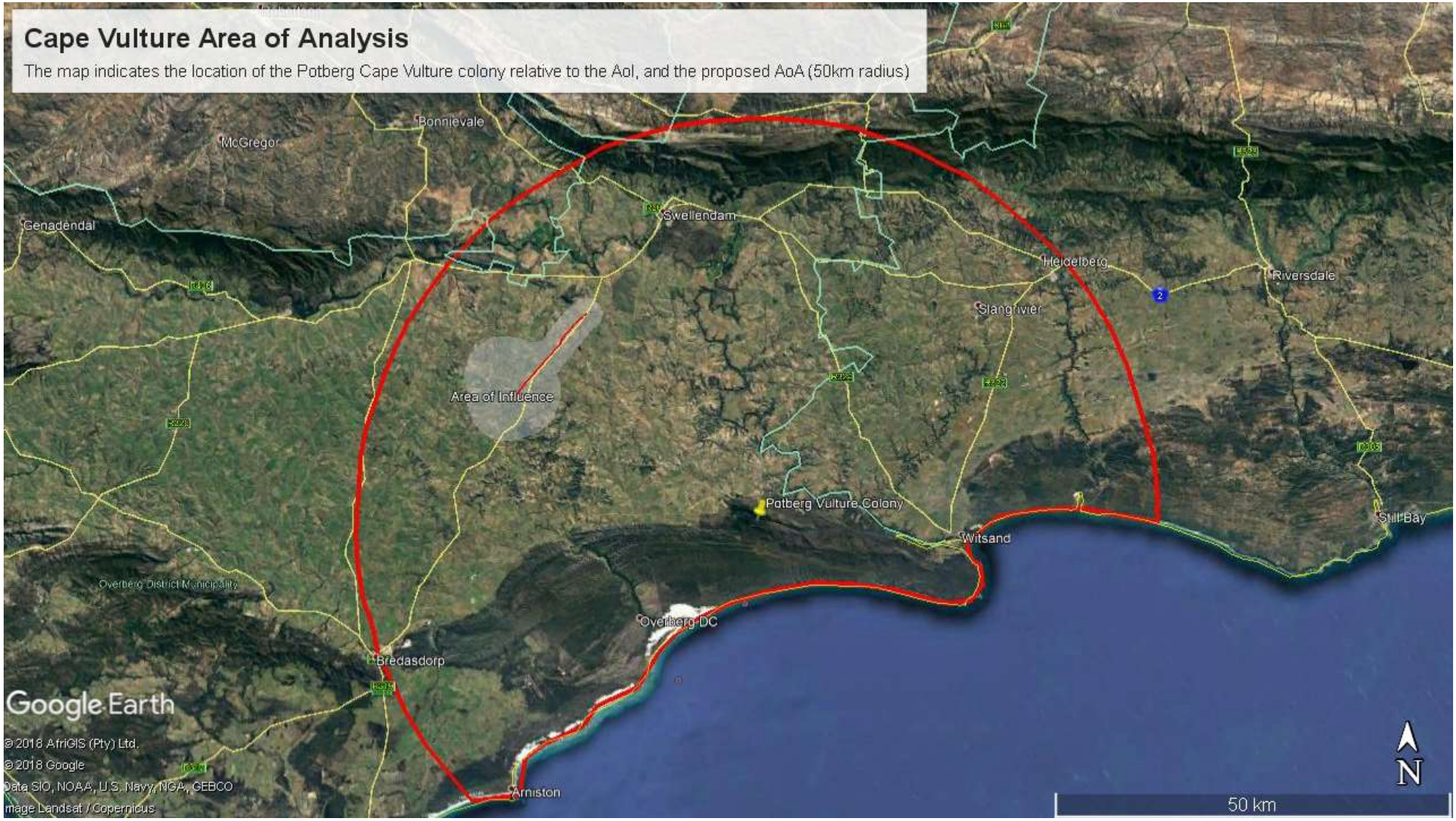

Figure 3: The location of the Potberg Cape Vulture colony relative to the Project AoI, and the suggested AoA (the area inside the red outline).

3.2 Criterion 2: Endemic and/or Restricted-Range Species

The avifauna identified by SABAP2 and the pre-construction and construction phase monitoring as being likely to be present within the AoI have been screened to identify species that are classified as range restricted. Only one range-restricted species was regularly recorded in the AoI, namely the Agulhas Long-billed Lark *Certhilauda brevirostris*.

3.2.1 Critical Habitat Determination

3.2.1.1 Agulhas Long-billed Lark *Certhilauda brevirostris*

The species is classified as nationally Near Threatened and globally of Least Concern. The total population is estimated at c.9 000 individuals all in South Africa, with an estimated extent of occurrence of 16 418 km² (Taylor *et al.* 2015)[29]. Although it is not of immediate conservation concern, the species has a naturally small range and population which make it vulnerable to natural or anthropogenic changes in its habitat. Widespread conversion of Renosterveld habitat into agricultural fields and pastures has more than likely benefited the species, but future changes in land-use may prove detrimental. Agulhas Long-billed Lark is abundant in the AoI, with a SABAP2 full protocol reporting rate of 73.44%.

3.2.1.2 Area of Analysis (AoA)

The Overberg Wheatbelt Important Bird Area (IBA) SA115 (Marnewick *et al.* 2015)[30] is considered to be an appropriate AoA for the Agulhas Long-billed Lark, as the Project is located in the center of the IBA, and the habitat in the IBA is representative of the habitat in the AoI. Furthermore, the Agulhas Long-billed Lark is listed as a trigger species for the IBA, and it encompasses approximately 37% of the total distribution range of the species (Marnewick *et al.* 2015). This area (AoA) allows for consideration of direct impacts, as well as indirect and cumulative impacts.

3.2.1.3 Critical Habitat Determination

Table 8 below shows the process followed in determining if the AoA meets the threshold for critical habitat for Agulhas Long-billed Lark.

Table 8: Critical Habitat Determination for Agulhas Long-billed Lark: Criterion 2

Threshold for Criterion 2	Area of Assessment	Does it meet the criterion for critical habitat?
a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.	No accurate population estimate is available for the Agulhas Long-billed Lark in the Overberg Wheatbelt IBA. Barnes (1998)[31] describes it as "1 000s" with "100s" of breeding pairs.	Yes

[29] Taylor, M.R., Peacock, F., Wanless, R.M. (eds.) 2015. The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.
[30] Marnewick, M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.
[31] Barnes, K.N. (ed.) 1998. The important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.

3.3 Criterion 3: Migratory and/or Congregatory Species

The avifauna identified by SABAP2 and the pre-construction and construction phase monitoring as being likely to be present within the AoI have been screened to identify species that are classified as migratory and/or congregatory (Table 9).

Table 9: Species potentially present in the AoI that are classified as migratory and/or congregatory

Species	Expected occurrence in the AoI	SABAP2 full protocol reporting rate in AoI	Recorded Sp Su Au	Recorded Sp Su 2015-16	Recorded Wi Au 2018	Recorded Su Au 2019	National status	IUCN global status	Range restricted	Congregatory	Migratory
African Black Swift *Apus barbatus*	Regular	14.06	x	x		x					x
Alpine Swift *Tachymarptis melba*	Regular	21.88	x	x		x					x
Barn Swallow *Hirundo rustica*	Regular	46.88	x	x		x				x	x
Black Harrier *Circus maurus*	Regular	15.63	x	x		x	EN	EN		x	x
Booted Eagle *Aquila pennatus*	Regular	6.25	x	x		x					x
Common Buzzard *Buteo buteo*	Regular	35.94	x	x		x					x
Pearl-breasted Swallow *Hirundo dimidiata*	Regular	20.31	x	x							x
Blue Crane *Anthropoides paradiseus*	Regular	93.75	x	x	x	x	NT	VU		x	
Cape Vulture *Gyps coprotheres*	Regular	12.5	x	x	x	x	EN	EN		x	
Common Starling *Sturnus vulgaris*	Regular	75	x	x	x	x				x	
Spur-winged Goose *Plectropterus gambensis*	Regular	60.94	x	x	x	x				x	
Red-billed Quelea *Quelea quelea*	Sporadic	3.3	x	x						x	
Red-knobbed Coot *Fulica cristata*	Sporadic	15.63								x	
Lesser Kestrel *Falco naumanni*	Sporadic	1.56		x		x				x	x
Black Saw-wing *Psalidoprocne pristoptera*	Sporadic	1.56		x							x
Klaas's Cuckoo *Chrysococcyx klaas*	Sporadic	0			x						x
White Stork *Ciconia ciconia*	Sporadic	17.9	x							x	x
Yellow-billed Kite *Milvus aegyptius*	Sporadic	17.9	x			x					x
Diderick Cuckoo *Chrysococcyx caprius*	Sporadic	4.69	x	x							x
Jacobin Cuckoo *Clamator jacobinus*	Sporadic	1.56									x

3.3.1 Critical Habitat Determination

3.3.1.1 Area of Analysis (AoA)

The Overberg Wheatbelt Important Bird Area (IBA) SA115 (Marnewick *et al.* 2015)[32] is considered to be an appropriate AoA for all the migratory and congregatory species, except the Cape Vulture, which are likely to occur regularly in the AoI, as the Project is located in the center of the IBA, and the habitat in the AoI is representative of the typical habitat in the IBA, namely a mosaic of crops and pastures, with patches of natural Renosterveld, especially in the drainage lines. In the case of the Cape Vulture, a 50km radius around the Potberg Vulture colony is regarded as an appropriate AoA for the Cape Vulture. These areas allow for consideration of direct impacts, as well as indirect and cumulative impacts.

3.2.1.3 Critical Habitat Determination

Table 10 below shows the process followed in determining if the AoA meets the threshold for critical habitat for the migratory and congregatory species which are likely to occur regularly in the AoI.

Table 10: Critical Habitat Determination for migratory and congregatory species which are likely to occur regularly in the AoI: Criterion 3

Species	Migratory	Congregatory	Global population	Population in Area of Assessment	Does it meet the threshold for critical habitat?
African Black Swift *Apus barbatus*	x		The global population size has not been quantified, but the species is described as locally abundant in South Africa and locally common in east Africa.[33]	Unknown, but likely to be less than 1%.	No
Alpine Swift *Tachymarptis melba*	x		Number of mature individuals 1,000,000-2,499,999.[34]	Unknown, but likely to be less than 1%.	No
Barn Swallow *Hirundo rustica*	x	x	Number of mature individuals 290,000,000-499,999,999.[35]	Unknown, but likely to be less than 1%.	No
Black Harrier *Circus maurus*	x		Approximately 670 mature individuals, placed here in the range 251-999 mature individuals.[36]	Population size: 20-50 individuals i.e. 2.9 – 7.4% of the estimated global population.[37]	Yes, the area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.

[32] Marnewick, M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.
[33] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[34] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/
[35] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/
[36] Taylor, M.R., Peacock, F., Wanless, R.M. (eds.) 2015. The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.
[37] Barnes, K.N. (ed.) 1998. The important Bird Areas of southern Africa. BirdLife South Africa, Johannesburg.

Booted Eagle *Aquila pennatus*	x		Number of mature individuals 149,000-188,000.[38]	Unknown, but likely to be less than 1%.	No
Common Buzzard *Buteo buteo*	x		Number of mature individuals 2,100,000-3,700,000.[39]	Unknown, but likely to be less than 1%.	No
Pearl-breasted Swallow *Hirundo dimidiata*	x		The global population size has not been quantified, but the species is described as usually scarce, although locally common.[40]	Unknown, but likely to be less than 1%.	No
Blue Crane *Anthropoides paradiseus*		x	A minimum of 25,500 mature individuals.[41]	Estimated to be around 7 500 individuals i.e. 30% of the global population.[42]	Yes, the area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.
Cape Vulture *Gyps coprotheres*		x	An estimated 14 100 individuals.[43]	The Potberg Cape Vulture colony supports 316 individuals, i.e. approximately 2.2% of the global population.[44]	Yes, the area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.
Common Starling *Sturnus vulgaris*		x	Number of mature individuals 100,000,000-199,999,999[45]	Unknown, but likely to be less than 1%.	No
Spur-winged Goose *Plectropterus gambensis*		x	Unknown but described as "very large"[46] South African population >50 000.[47]	Unknown, but likely to be less than 1%.	No

3.4 Criterion 4: Highly Threatened and/or Unique Ecosystems

The habitat in the AoI consists primarily of cereal crops and artificial pastures, with around 90% of the natural vegetation having been transformed to agriculture. The remnants of the natural vegetation are Renosterveld, which is found mostly along drainage lines and on steeper slopes that are unsuitable for planting. There is one contiguous patch of approximately 350 hectares in the south-east which contains a

[38] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[39] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[40] del Hoyo, J., Elliott, A. and Christie, D. 2004. Handbook of the Birds of the World, Vol. 9: Cotingas to Pipits and Wagtails. Lynx Edicions, Barcelona, Spain.
[41] Taylor, M.R., Peacock, F., Wanless, R.M. (eds.) 2015. The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.
[42] Marnewick, M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. Important Bird and Biodiversity Areas of South Africa. Johannesburg: BirdLife South Africa.
[43] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[44] Kevin Shaw, CapeNature ornithologist, personal communication to the author on 19 July 2019.
[45] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[46] IUCN, 2019. The IUCN Red List of Threatened Species. Version 2019.2. https://www.iucnredlist.org/.
[47] Hockey P.A.R., Dean W.R.J., And Ryan P.G. 2005. Robert's Birds of Southern Africa, seventh edition. Trustees of the John Voelcker Bird Book Fund, Cape Town.

Black Harrier nest[48]. The AoI is situated at the interface of two Critically Endangered ecosystems, namely Central Rûens Shale Renosterveld and Eastern Rûens Shale Renosterveld[49].

3.4.1 Critical Habitat Determination

3.4.1.1 Area of Analysis (AoA)

Paragraph GN 58 states that relatively broad landscape units might qualify as critical habitat. The scale of the critical habitat assessment depends on the biodiversity attributes particular to the habitat in question and the ecological patterns and processes required to maintain them. The Overberg Renosterveld Conservation Trust has produced a strategy for the conservation of the remaining Renosterveld within the historical distribution of the Renosterveld biomes[50]. This strategy focuses on the identification and conservation of critical clusters which still contain significant remnants of the original Renosterveld vegetation. The AoI overlaps with two of these clusters, namely the Ouka River Cluster, and the Eastern Rûens De Hoop Cluster. Together these two areas comprise an area of 457 km² (see Figure 3). This combined area allows consideration of direct impacts, as well as indirect and cumulative impacts.

3.4.1.2 Critical Habitat Determination

Table 11 below shows the process followed in determining if the AoA meets the threshold for critical habitat for highly threatened and/or unique ecosystems which occur in the AoI.

Table 11: Critical Habitat Determination for Central Rûens Shale Renosterveld and Eastern Rûens Shale Renosterveld: Criterion 4

Threshold for Criterion 4	Area of Assessment	Does it meet the criterion for critical habitat?
a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.	Not applicable, the renosterveld biomes have not yet been assessed according to IUCN criteria.	No
b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.	Both Renosterveld biomes are represented in the AoA, are classified as critically endangered,[51] and the AoA has been prioritised for urgent conservation action by regional and national systematic conservation planning.	Yes

[48] Pers. comm from Dr. Odette Curtiss, Director of the Overberg Renosterveld Conservation Trust.
[49] Driver A., Sink, K.J., Nel, J.L., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.
[50] Curtiss, O. 2019. Overberg Renosterveld Conservation Trust: Conservation Strategy. Priority clusters & sites for conservation of the Overberg's Renosterveld.
[51] Driver A., Sink, K.J., Nel, J.L., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. & Maze, K. 2012. National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems. Synthesis Report. South African National Biodiversity Institute and Department of Environmental Affairs, Pretoria.

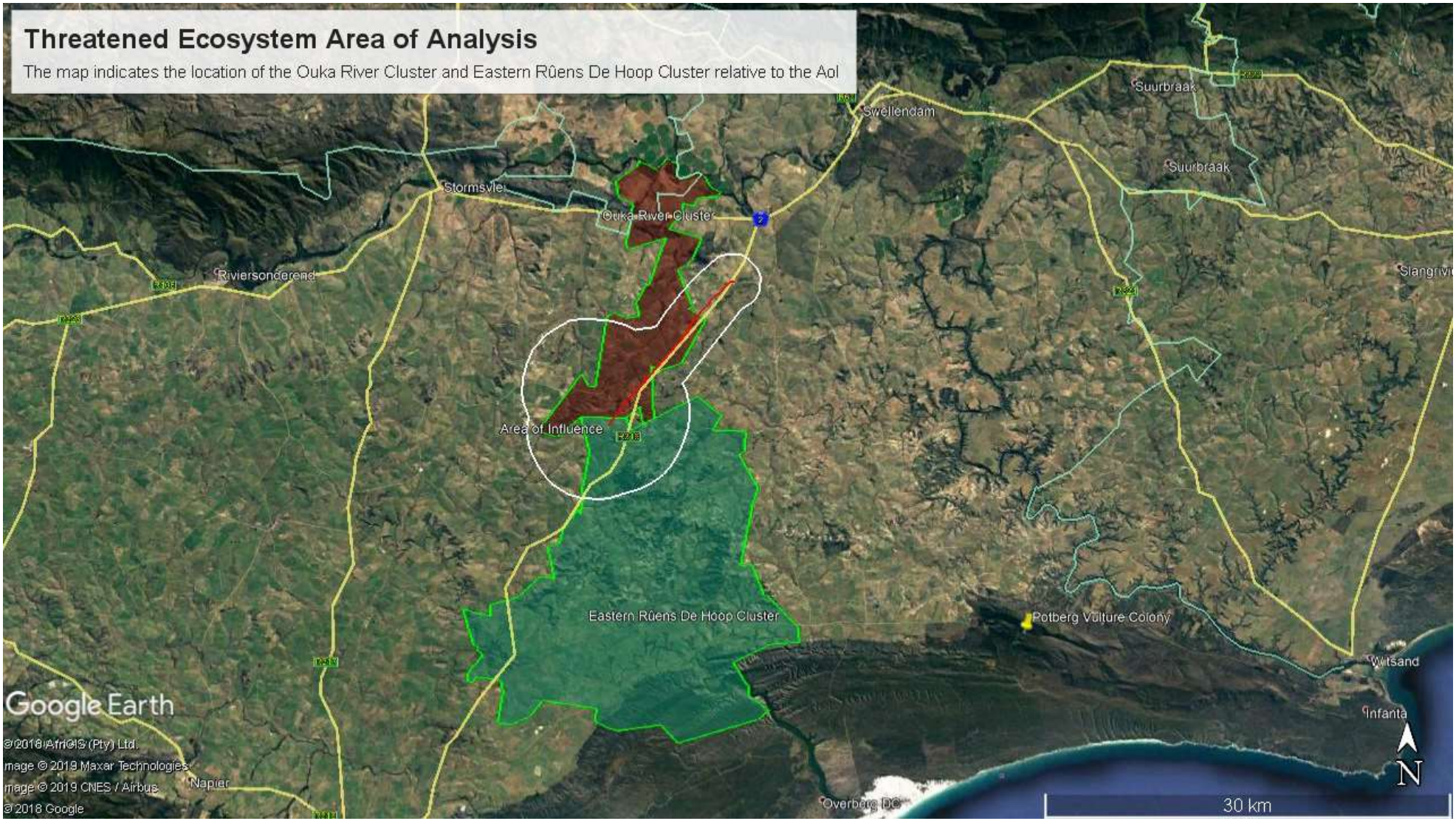

Figure 4: The area of analysis for Criterion 4: Highly Threatened and/or Unique Ecosystems

Table 12 below summarises the critical habitats confirmed to be present in the Proposed Project Area.

Table 3: Summary of Critical Habitat within Project Area of Influence

Feature	PS6 Criterion	Rationale	Critical Habitat
Black Harrier	Criterion 1	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Yes
		(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Yes
	Criterion 3	Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Cape Vulture	Criterion 1	(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥5 reproductive units of a CR or EN species).	Yes
		(c) As appropriate, areas containing important concentrations of a nationally or regionally-listed EN or CR species.	Yes
		Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Agulhas Long-billed Lark	Criterion 2	a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species.	Yes

Feature	PS6 Criterion	Rationale	Critical Habitat
Blue Crane	Criterion 3	Area is known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of the species at any point of the species' lifecycle.	Yes
Renosterveld ecosystems	Criterion 4	b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.	Yes

4. CONSEQUENCES OF A CRITICAL HABITAT CLASSIFICATION

In areas of critical habitat, the client will not implement any project activities unless all of the following are demonstrated (Paragraph 17 of Performance Standard 6):

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values[52];
- The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program (BMEP) is integrated into the client's management program.

Paragraph 18 states that in such cases where a client is able to meet the requirements defined in paragraph 17, the project's mitigation strategy will be described in a Biodiversity Action Plan and will be designed to achieve net gains of those biodiversity values for which the critical habitat was designated. Biodiversity off-sets to achieve this goal will only be appropriate if the project will result in significant residual impacts.

Net gains are additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset (only in instances of significant residual impacts) and/or, in instances where the client could meet the requirements of paragraph 17 of this Performance Standard without a biodiversity offset, the client should achieve net gains through the implementation of

[52] Measurable: identified using a quantitative or semi-quantitative biodiversity monitoring program throughout the project's life-cycle. Adverse impacts: project-related direct or indirect impacts that irreversibly alter the critical habitat in such a way as to substantially reduce the critical habitat's ability to support the identified biodiversity values and ecological processes. Ecological processes: biophysical processes (e.g., hydrologic regimes, local climatic regimes, soil chemistry/nutrient cycling, fires, floods and other natural disturbance regimes, herbivory, predation, ecological corridors, migration routes) necessary for the critical habitat to persist in the landscape or seascape for the long term.

programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.

4.1 No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical

During the pre-feasibility stage a range of potential sites in the Overberg Region were reviewed, including site visits to eight sites that were short-listed. These sites were evaluated based on a range of criteria such as:

- Local wind climate (the wind regime in the area appears favourable);
- Local power line network, including existing grid availability, stability and capacity, local power utilisation, future developments and planned power line upgrades;
- Proximity to conservation areas such as national parks, nature reserves and wetlands;
- Proximity to the local aviation and military zones such as the Overberg Toetsbaan (OTB) and SA Air Force Base and associated constraints;
- Road access for construction and operational maintenance; and
- Engagement with landowners.

Based on the above review, the Excelsior site was selected to be taken forward to the EIA phase. The Overberg Wheatbelt IBA, together with the neighbouring Agulhas Plain - Heuningnes Estuary IBA SA 121, and De Hoop Nature Reserve IBA SA 119, encompass 8 236 km² (Marnewick *et al.* 2015). Relocating the development elsewhere outside critical habitat, would have been impractical due to the combined size of the three IBAs.

4.2 The project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values

According to guidance note 6, paragraph GN86, this requirement explicitly focuses on the biodiversity values for which the critical habitat was designated as a means of emphasizing the importance of considering biodiversity values across a broader scale. Therefore, the second bullet of paragraph 17 means that project-related direct and indirect impacts will not jeopardize the long-term persistence of the biodiversity value(s) for which the critical habitat was designated, considering the range of mitigation measures implemented by the client throughout the life of the project and in alignment with the mitigation hierarchy.

4.2.1 Black Harrier

The main potential Project impact on the regionally and globally Endangered Black Harrier is mortality due to collisions with the turbines. The Black Harrier is expected to occur fairly regularly in the AoI, but in very low numbers. The species was not recorded during the initial four seasons' pre-construction monitoring, conducted in 2011-2012. It was subsequently recorded during spring and summer 2015-2016, in low numbers, with 2 birds recorded during transect surveys, and a total of 3 minutes and 15 seconds of flying time recorded during 48 hours of flight observations. During the autumn and winter 2018 surveys, no birds were recorded. Since the weekly counts started in 2019, the species have been recorded at an average rate of one bird per week from January to May 2019. The majority of flight activity recorded at the site so far has been below turbine height i.e. <30m.

It is likely that the birds recorded at the AoI are individuals moving through the area on their way to or from breeding grounds to the south of the AoI, as no suitable breeding habitat is present at the site itself, and little suitable foraging habitat. The closest recorded nest is situated at Goereesoe, approximately 3.8km south-east from the closest turbine location, in a patch of Renosterveld of approximately 500 ha in extent, which contains one breeding pair.[53] Another three breeding pairs are present at Haarwegskloof, which is situated approximately 12km south-east of the closest turbine location[54]. Where indigenous vegetation is reduced, as is the case with Goereesoe and Haarwegskloof, foraging ranges are restricted to 2 – 3km around nests (Taylor et al. 2015)[55]. In the case of Goereesoe pair, it is likely that the birds generally forage south-west of their breeding site, as that is where the majority of remaining high quality Renosterveld is located. Black Harrier breeding seems to be closely linked to food supplies, with no breeding taking place in some years (Simmons & Ralston-Paton in prep).[56]

According to the latest publicly available statistics, a total of six Black Harrier mortalities have so far been recorded at two out of twenty operational wind farms in South Africa (BLSA 2018)[57]. Four of these mortalities have happened at a wind farm with two resident breeding pairs (Simmons & Ralston-Paton in prep).[58]

The site itself does not contain suitable breeding habitat, as the Renosterveld has been severely depleted. The AoA (the Overberg Wheatbelt IBA) is estimated to support 10 – 20 pairs of the species, and a total population of 20-50 birds (Barnes 1998).

The following mitigation measures have been implemented already, or will be implemented at the site once it is operational, as part of a Biodiversity Management Plan (BMP), to prevent measurable adverse impacts on Black Harriers, and to effect net gains in conservation outcomes:

- Avoidance of high sensitivity areas. The site contains no suitable breeding habitat and the closest recorded nest is approximately 3.8 km away from the closest planned turbine. This is more than the 3km buffer zone which is recommended around Black Harrier nests (Simmons & Ralston-Paton in prep). Breeding behavior greatly increases collision risks through aerial displays, food provisioning, nest defense against aerial predators and occasional night-time movement (Simmons & Ralston-Paton in prep). The lay-out also avoids all areas of remaining Renosterveld, i.e. potential foraging habitat.
- Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when a Black Harrier moves through the site). The shut-down can be triggered by human observers. Given the low flight frequency of the species at the site, it should not have a significant economic impact.
- Habitat enhancement outside the site to attract Black Harriers. Increased habitat attractiveness outside the site can be achieved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include, alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc.). This could act as a potential net gain measurement, through the long-term monitoring of vegetation quality and the number of harrier sightings in suitable habitat.

[53] Personal communication by Dr. Odette Curtiss, director of the Overberg Renosterveld Conservation Trust.
[54] Ibid
[55]Taylor, M.R., Peacock, F., Wanless, R.M. (eds.) 2015. The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.
[56] Black Harriers and Wind Energy. Draft Guidelines for impact Assessment, monitoring and mitigation
[57] Presentation by BirdLife SA at the Birds and Renewable Energy Forum, October 2018.
[58] Black Harriers and Wind Energy. Draft Guidelines for impact Assessment, monitoring and mitigation

- A threshold mortality level for Black Harriers at the site must be determined through consultation with CapeNature and the ORCT, as part of the biodiversity monitoring and evaluation programme (BMEP). If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g, painting of one turbine blade black or red to enhance visibility.

Given the relatively low numbers of the species recorded at the site, the limited number of turbines (n = 13), and the anticipated impact of the of the mitigation measures listed above, it is not envisaged that the potential collision related mortality will substantially reduce the critical habitat's ability to support Black Harriers and the ecological processes underpinning the existence of the species in the AoA.

4.2.2 Cape Vulture

Cape Vultures have been recorded regularly in the AoI during pre-construction monitoring. During the initial pre-construction monitoring in 2011-2012, Cape Vultures were recorded flying over the site for a total of 1 hour and 19 minutes, during 288 hours of flight observations. The concentration of flight activity recorded during that survey was directly linked to food availability. Vultures were specifically attracted to lambing sheep, where they fed on the placentas of lambing ewes. During the spring and summer 2015 – 2016 surveys, the species was recorded for 1 hour and 42 minutes during 48 hours of flight observations. During the autumn and winter 2018 surveys, the species was observed for a period of five hours, during 48 hours of flight observations. However, since the weekly counts started in 2019, a single individual was recorded only once from January to May. Discussions with the farm management at Excelsior revealed that sheep carcasses were provided in the past at a specific spot on the farm, but this has since been discontinued. According to the farm manager, he stopped seeing the birds when he stopped the feeding.

Vultures are highly susceptible to wind turbine collisions, the virtually identical Eurasian Griffon *Gyps fulvus* frequently gets killed through turbine collisions in Spain (Martínez-Abraín *et al*. 2012)[59]. So far, Cape Vultures have been killed at a rate of 0.03 vultures per turbine per year at the five operational wind farms in South Africa which overlaps with the species range (Pfeiffer & Ralston 2018)[60].

The following mitigation measures will be implemented as part of the BMP at the site once it is operational, to prevent measurable adverse impacts on Cape Vulture, and to effect net gains in conservation outcomes for the species:

- The most important mitigation measure which will be implemented, is the avoidance of mortality through the management of food availability at the site. It is critically important that the availability of food at the site is closely monitored and that all available food is removed without delay before it can attract vultures. A strategy to this effect has been formulated to prevent mortality of Cape Vultures on the turbines. This strategy will be in place as soon as the first turbine starts operating.
- Research to establish the status of the food supply of Cape Vultures at the Potberg Vulture Colony, and the funding of a supplementary feeding programme, if need be (habitat

[59] Alejandro Martínez-Abraín, Giacomo Tavecchia, Helen M. Regan, Juan Jimenez, Martín Surroca and Daniel Oro. Effects of wind farms and food scarcity on a large scavenging bird species following an epidemic of bovine spongiform encephalopathy. Journal of Applied Ecology 2012 ,49, 109–117.

[60] Pfeiffer, M. And Ralston-Paton, S. 2018. Cape Vulture and wind farms: Guidelines for impact assessment, monitoring and mitigation. BirdLife South Africa.

enhancement). This will entail a satellite tracking project to establish the foraging range and behaviour of the Cape Vultures at the Potberg Colony, inter alia to see how big a role the food provision at established vulture restaurants play in the foraging behaviour of the birds. It will furthermore entail the investigation of land use patterns and farming practices to see how that influence the foraging behaviour of the birds, e.g. the timing of lambing. The ultimate aim would be to establish what the critical factors are to sustain and possibly grow the colony in the long term from its current status of 100 breeding pairs, and specifically to establish if there are times when a supplementary feeding programme should be implemented to assist the birds through periods of food scarcity.

- Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when Cape Vulture move through the site). The shut-down can be triggered by human observers. Given the relatively low flight frequency of the species at the site, it should not have a significant economic impact.
- A threshold mortality level for Cape Vultures at the site must be determined through consultation with CapeNature as part of the BMEP. If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g, painting of one turbine blade black or red to enhance visibility.

The implementation of the above strategy will ensure that the risk to Cape Vultures will be reduced to a minimum, to such an extent that the project will not jeopardize the long-term persistence of the species in the AoA. It has been established that a regular vulture restaurant is operated by a local landowner 28km away from the Project site where regular feeding is taking place. Experiments with time-lapse cameras have established that large numbers of Cape Vulture were feeding there while experimental carcasses were available to the birds at the Project site, which may account for the lack of birds at the Project site. Experience has shown that when Cape Vultures have become habituated to feeding at a specific spot, they generally go straight to that spot and do not forage widely (pers. obs.).

4.2.3 Agulhas Long-billed Lark

The main potential impact on the range-restricted Agulhas Long-billed Lark is displacement due to habitat transformation. The species' habitat of choice is stony wheat-fields and pastureland, which constitutes 95% of the approximately 6 000 km² Overberg Wheatbelt IBA (Marnewick *et al.* 2015). The wind farm perimeter plus a 1km buffer zone amounts to approximately 15 km². It is therefore self-evident that even if the species were to be completely displaced from that area, which is highly unlikely, the displacement impact due to habitat transformation will not substantially reduce the critical habitat's long-term ability to support Agulhas Long-billed Larks and ecological processes underpinning the existence of the species in the AoA, due to the small size of the project footprint.

The following mitigation measures have been implemented already as part of the Construction Environmental Management Plan (CEMPr), or will be implemented at the site once it is operational, to prevent measurable adverse impacts on Agulhas Long-billed Larks, and to effect net gains in conservation outcomes for the species :

- All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. This includes the following:
  - Existing roads and farm tracks should be used where possible;
  - The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths;
  - No off-road driving;

- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist.
- Workshop with stakeholders (e.g. Overberg Renosterveld Conservation Trust, BirdLife South Africa, CapeNature and the Percy Fitzpatrick Institute of African Ornithology) to explore avenues or further research and the funding for such research. Specific research questions that need to be answered are:

    - Which agricultural practices are most beneficial to the species?
    - What is the breeding success of the species through-out its range in different habitats?
    - How effective are formally protected areas in conserving the species?
    - What are the impacts of terrestrial predators on the breeding success in artificial pastures?

4.2.4 Blue Crane

Blue Cranes were commonly recorded at the AoI during all the monitoring periods to date. During the pre-construction monitoring in 2011-2012, the species was recorded at an average of 3.8 birds/km during transect counts. During the spring and summer 2015 – 2016 surveys, the figure was an average of 0.45 birds/km, and during the winter and autumn surveys in 2018, it was 0.67 birds/km. Nest searches conducted between November 2018 to January 2019 recorded at least seven breeding pairs within an area comprising the site and a 1 km zone around the perimeter of the site. Weekly counts instituted in January 2019 recorded an average of 10 birds per count between and January and May.

During the initial pre-construction monitoring in 2011-2012, Blue Crane flights amounted to a total of 1 hour and 19 minutes, during 288 hours of flight observations. During the spring and summer 2015 – 2016 surveys, the species was recorded for 49 minutes during 48 hours of flight observations. During the autumn and winter 2018 surveys, flight activity was observed for a period of twelve hours, of which approximately 9 hours were within high risk height (30m – 220m), during 48 hours of flight observations.

The globally Vulnerable Blue Crane at the Project site may collide with the turbines. However, the observed risk of turbine collisions for Blue Cranes is relatively low. The current Blue Crane recorded mortality at the Dassieklip Wind Farm near Caledon, which has comparable densities of the species to Excelsior, stands at <1 bird per year after five years of operational monitoring (unpubl. data). The latest figure for Blue Crane mortality at twenty operational wind farms in South Africa is eight confirmed turbine related fatalities (BLSA 2018)[61]. It is not foreseen that collisions with turbines at Excelsior will be a major long-term adverse impact on the species in the Overberg Wheatbelt IBA, and the ecological processes underpinning the existence of the species in the IBA.

Unfortunately, the situation is very different when it comes to Blue Cranes and powerline collisions. Shaw (2009)[62] estimated a Blue Crane collision rate of 0.25 birds/km of powerlines per year (95% CI 0.10-0.46 birds/km per year) in the Overberg Wheatbelt IBA, corrected for biases, which means that approximately 10% (95% CI 4-18%) of the total Blue Crane population within the Overberg Wheatbelt IBA could be killed annually in power line collisions, based on 199 km of

[61] Presentation by BirdLife SA at the Birds and Renewable Energy Forum, October 2018.

[62] Shaw, J.M. 2009. The End of the Line for South Africa's National Bird? Modelling Power Line Collision Risk for the Blue Crane. MSc thesis in Conservation Biology. University of Cape Town.

surveyed powerlines. Collisions with the 14km long 132kV grid connection powerline running from the on-site substation to the Vryheid substation could potentially be the most significant impact associated with the wind farm development.

The other potential impact is displacement of breeding Blue Cranes due to the disturbance associated with the construction of the wind farm. Blue Cranes are proving to be relatively unaffected by wind farm developments in the wheat growing Overberg region as far as displacement is concerned. No significant decline has been recorded in the Blue Crane population at the similarly sized Dassieklip Wind Farm near Caledon (personal observation), which has a very similar habitat mix to the Excelsior site with Blue Cranes successfully breeding within the turbine area every year since the wind farm became operational in 2014. Nest inspections conducted at Excelsior in the breeding season between December 2018 and January 2019 did not detect any obvious impacts on breeding pairs, despite the construction activities taking place around them, possibly because Blue Cranes in the Overberg are very habituated to human activity in the form of agricultural operations.

The following mitigation measures have been or will be implemented at the site once it is operational, to limit the mortality and displacement risk to Blue Cranes:

- An intensive search will be conducted for Blue Crane nests during November and December 2018, and January 2019. If the presence of a breeding pair is confirmed, construction activities within 200m of the nest should not take place in the period October to February, unless the avifaunal specialist is of the opinion that the birds will not be displaced by the construction activities.[63]
- A site-specific Construction Environmental Management Programme (CEMPr) will be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. This will include the following:
    - Construction activity should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network.
    - Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of breeding pairs.
    - Construction of new roads should only be considered if existing roads cannot be upgraded.
    - Measures to be implemented according to best practice to curb noise and dust.
- The Contractor HSE Officer must oversee activities and ensure that the CEMPr is implemented and enforced.
- Five environmental monitors will be trained by an avifaunal specialist to identify the signs that indicate possible breeding by Blue Cranes. The environmental monitors must then, make a concerted effort to look out for such breeding activities of Blue Cranes during their weekly monitoring surveys. If any Blue Cranes are confirmed to be breeding (e.g. if a nest site is found), construction activities within 200m of the breeding site must cease, and the avifaunal specialist will be contacted immediately for further assessment of the situation and instruction on how to proceed.
- Marking of the high-risk sections of the 14km long 132kV grid connection powerline with Eskom approved Bird Flight Diverters (BFD's), as identified during the avifaunal powerline walk-through conducted in February 2016, followed-up by regular inspections by the environmental monitors to quantify collision mortality and assess the effectiveness of the BFD's in curbing mortality.

[63] This has already been completed

- A survey of all the existing powerlines in the AoI by the environmental monitors to establish a baseline for current mortality, and to identify high risk sections of powerline and the subsequent marking of those sections with Eskom approved BFD's. This should be followed by regular inspections to assess the effectiveness of the BFD's. This action is expected to reduce existing mortality of Blue Cranes on powerlines in the Overberg, and thus secure a net gain outcome for this species.

If the mitigation measures outlined above are implemented, it can be assumed that the residual impacts of the wind farm will be minimal and it will not substantially reduce the critical habitat's ability to support Blue Cranes and the ecological processes underpinning the existence of the species in the AoA.

4.2.5 Renosterveld ecosystems

The most important potential impact on the Renosterveld in the Project footprint is habitat transformation. However, care has been taken to place all turbines and supporting infrastructure (including the powerline poles) outside the remaining patches of Renosterveld. No impact on the Renosterveld in the AoI is therefore envisaged, which fulfills the first step of the mitigation hierarchy, namely avoidance of impacts from the outset. Secondly, the quality of the remaining Renosterveld within the AoA will be improved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc. This could act as a potential net gain measurement, through the long-term monitoring of vegetation quality.

4.3 The project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time

Net reduction is a singular or cumulative loss of individuals that impacts on the species' ability to persist at the global and/or regional/national scales for many generations or over a long period of time. The acceptable reduction in population should not be interpreted as the survival of every individual on-site. Although this might be the case in some situations, for example for CR species nearing extinction in the wild, no net reduction is based on the species "ability to persist at the global and/or regional/national scales for many generations or over a long period of time".

4.3.1 Black Harrier

Given the relatively low numbers of the species recorded at the project site, the limited number of wind turbines (n=13), and the extensive mitigation measures to be implemented (see 4.2.1), it is not envisaged that the potential collision related mortality will lead to a net reduction in the regional or national population which will impact on the species' ability to persist at that scale for many generations or over a long period of time.

4.3.2 Cape Vulture

The estimated population size of the Cape Vulture is 14 100 individuals, including 4 400 breeding pairs (Taylor *et al.* 2015). The regional population is estimated at 316 individuals, which includes 100 breeding pairs (Shaw pers. comm). The implementation of the proposed mitigation measures (see 4.2.2) should ensure that the risk to Cape Vultures will be minimised, to such an extent that

the project should not lead to a net reduction in the national or regional population of Cape Vultures over a reasonable period of time.

4.4 A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program (BMEP) is integrated into the client's management program.

A BMEP has already been implemented at the Project site since December 2018. Monitoring will be conducted both during the construction and the operational phases.

4.4.1 Construction Phase

The construction phase monitoring consists of the following components:

- A total of 5 environmental monitors are currently conducting weekly bird surveys, and will be trained as carcass searchers and to perform various other environmental duties;
- The current construction period (18 months) is being used to investigate the feeding patterns of Cape Vultures at the site to assist with the formulation of a mitigation strategy to prevent mortality due to collision with the turbines. Elements of the mitigation strategy are outlined in section 4.2 above.
- A number of priority species' nests (including Blue Cranes) are being monitored during the construction phase of the Project in order to assess the potential impact of the construction activities on the breeding birds.

4.4.2 Operational Phase

The operational phase monitoring will consist of the following components:

- The monitoring will be conducted in accordance with the latest version of *the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.*
- Operational monitoring will aim to answer the following questions:
    - How has the habitat available to avifauna in and around the wind farm changed?
    - How have the number of birds and species composition changed?
    - How have the movements of priority species changed?
    - How has the wind farm affected priority species' breeding success?
    - How many birds collide with the wind turbines? And are there any patterns to this?
    - How should mitigation be applied to reduce the impacts on avifauna?

- As an absolute minimum, operational monitoring will be undertaken for the first three years of operation, and then repeated again in year 5, and again every five years thereafter for the operational lifetime of the facility.
- The exact scope and nature of the post-construction monitoring will be informed on an ongoing basis by the results of the monitoring through a process of adaptive management.
- In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during baseline monitoring will be applied as far as is practically possible in the same way to operational monitoring in order to ensure maximum comparability of these two data sets. This includes sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and vantage point surveys according to the current best practice.
- The collision monitoring will have three components:

- Experimental assessment of search efficiency and scavenging rates of bird carcasses on the site;
- Regular searches in the immediate vicinity of the wind farm turbines for collision casualties;
- Estimation of collision rates.

- The probability of a carcass being detected and the rate of removal/decay of the carcass must be accounted for when estimating collision rates and when designing the monitoring protocol. This will be done in the form of biannual searcher and scavenger trials.

4.5 Legally protected and Internationally Recognized Areas

The Project is located in a Key Biodiversity Area which falls within the definition of an internationally recognized area as defined in footnote 17 of Performance Standard 6 Paragraph GN20. Internationally recognized areas are defined as "UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention). Projects proposed inside legally protected or internationally recognized areas should result in tangible benefits to the conservation objectives of that area, and clear conservation advantages should be gained by the presence of the project. Stakeholder engagement and consultation is required for all projects located in legally protected and internationally recognized areas.

The ORCT is the leading NGO operating within the AoI of the Project. It has compiled a comprehensive conservation strategy for the conservation of the Critically Endangered Renosterveld, as discussed under 4.2.1 and 4.2.5. The opportunity exists for the client to engage meaningfully with the ORCT to further the aims of this strategy, in order to comply with the requirements of Paragraph GN20.

See Table 12 below for a summary of the potential impacts on the biodiversity values and the proposed mitigation measures to prevent measurable adverse impacts and to achieve a net gain in terms of conservation outcomes.

Table 12: Summary of potential impacts and proposed mitigation measures

Species	Potential impacts	Mitigation to ensure no net loss plus gain
Black Harrier	The main potential Project impact on the regionally and globally Endangered Black Harrier is mortality due to collisions with the turbines. The Black Harrier is expected to occur fairly regularly in the AoI, but in very low numbers.	• Avoidance of high sensitivity areas. The site contains no suitable breeding habitat and the closest recorded nest is approximately 3.8 km away from the closest planned turbine. The lay-out also avoids all areas of remaining Renosterveld, i.e. potential foraging habitat for this species. • Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when a Black Harrier moves through the site). The shut-down can be triggered by human observers. Given the low flight frequency of the species at the site, it should

		not have a significant economic impact on power output. • Habitat enhancement outside the site to attract Black Harriers. Increased habitat attractiveness outside the site can be achieved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include, alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc.. This activity has potential to achieve net gain, with measurement of improvement through long-term monitoring of vegetation quality and the number of harrier sightings in suitable habitat. • A threshold mortality level for Black Harriers at the site must be determined through consultation with CapeNature and the ORCT, as part of the biodiversity monitoring and evaluation programme (BMEP). If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g., painting of one turbine blade black or red to enhance visibility.
Cape Vulture	The main potential Project impact on the regionally and globally Endangered Cape Vulture is mortality due to collisions with the turbines. The Cape Vulture is expected to occur fairly regularly in the AoI.	• The key mitigation measure is to avoid attracting vultures through management of food availability at the site. A strategy to this effect has been formulated to prevent mortality of Cape Vultures on the turbines. • Research to establish the status of the food supply of Cape Vultures at the Potberg Vulture Colony, and the funding of a supplementary feeding programme, if need be (habitat enhancement). This will entail a satellite tracking project to establish the foraging range and behaviour of the Cape Vultures at the Potberg Colony, inter alia to see how big a role the food provision at established vulture restaurants plays in the foraging behaviour of the birds. It will furthermore entail the investigation of land use patterns and farming practices e.g. the timing of lambing, to see how that influences the foraging behaviour of the birds. • Turbine management (shut-down on demand). Feathering the blades or shut-down on demand (i.e. stopping the rotors when Cape Vulture move through the site). The shut-down can be triggered by human observers. Given the relatively low flight frequency of the species at the

		site, it should not have a significant economic impact. • A threshold mortality level for Cape Vultures at the site must be determined through consultation with CapeNature as part of the BMEP. If collision rates exceed threshold mortality levels, additional experimental mitigation measures will have to be implemented, e.g., painting of one turbine blade black or red to enhance visibility.
Agulhas Long-billed Lark	The main potential impact on the range-restricted Agulhas Long-billed Lark is displacement due to habitat transformation.	• All contractors are to adhere to the Construction Environmental Management Programme (CEMPr) and should apply good environmental practice during construction. This includes the following: o Existing roads and farm tracks should be used where possible; o The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths; o No off-road driving; • Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist. • Workshop with stakeholders (e.g. Overberg Renosterveld Conservation Trust, BirdLife South Africa, CapeNature and the Percy Fitzpatrick Institute of African Ornithology) to explore avenues or further research and the funding for such research. Specific research questions that need to be answered are: o Which agricultural practices are most beneficial to the species? o What is the breeding success of the species through-out its range in different habitats? o How effective are formally protected areas in conserving the species? o What are the impacts of terrestrial predators on the breeding success in artificial pastures?
Blue Crane	An envisaged impact for the globally Vulnerable Blue Crane at the Project site is collisions with the turbines, although it is not expected to be a major impact. Collisions with the 14km long 132kV grid connection powerline running from the on-site substation to the Vryheid substation could potentially be the most significant impact associated with the wind farm development. The other potential impact is displacement of	• An intensive search will be conducted for Blue Crane nests during November and December 2018, and January 2019. If the presence of a breeding pair is confirmed, construction activities within 200m of the nest should not take place in the period October to February, unless the avifaunal specialist is of the opinion that the

	breeding Blue Cranes due to the disturbance associated with the construction of the wind farm.	birds will not be displaced by the construction activities.[64] • A site-specific Construction Environmental Management Programme (CEMPr) will be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. This will include the following: o Construction activity should be restricted to the immediate footprint of the infrastructure, and in particular to the proposed road network. o Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of breeding pairs. o Construction of new roads should only be considered if existing roads cannot be upgraded. o Measures to be implemented according to best practice to curb noise and dust. • The Contractor HSE Officer must oversee activities and ensure that the CEMPr is implemented and enforced. • Five environmental monitors will be trained by an avifaunal specialist to identify the signs that indicate possible breeding by Blue Cranes. The environmental monitors must then, make a concerted effort to look out for such breeding activities of Blue Cranes during their weekly monitoring surveys. If any Blue Cranes are confirmed to be breeding (e.g. if a nest site is found), construction activities within 200m of the breeding site must cease, and the avifaunal specialist will be contacted immediately for further assessment of the situation and instruction on how to proceed. • Marking of the high-risk sections of the 14km long 132kV grid connection powerline with Eskom approved Bird Flight Diverters (BFD's), as identified during the avifaunal powerline walk-through conducted in February 2016, followed-up by regular inspections by the environmental monitors to quantify collision mortality and assess the effectiveness of the BFD's in curbing mortality. • A survey of all the existing powerlines in the AoI by the environmental monitors to establish a baseline for current mortality, and to identify high risk sections of powerline and the subsequent marking of those sections with Eskom approved BFD's. This intervention to achieve net gain

[64] This has already been completed

		should be followed by regular inspections to assess the effectiveness of the BFD's.
Renosterveld ecosystems	The most important potential impact on the Renosterveld in the Project footprint is habitat transformation.	• All turbines and supporting infrastructure (including the powerline poles) are placed outside the remaining patches of Renosterveld. • The quality of the remaining Renosterveld within the AoA will be improved through the Overberg Renosterveld Conservation Trust's (ORCT) "Conservation Easement" programme involving landowners. This will entail assistance with implementation of Integrated Management Plans (IMPs), which include, alien clearing, watercourse restoration, erosion control (sheet and gully erosion), grazing management (through fencing), ecological burning, etc.). This could act as a potential net gain measurement, through the long-term monitoring of vegetation quality. This should not increase the collision risk for Black Harriers, as the site itself contains only one small patch of Renosterveld approximately 2.36 ha in extent.

5. THE STRATEGIC ENVIRONMENTAL ASSESSMENT FOR WIND AND SOLAR PHOTOVOLTAIC ENERGY IN SOUTH AFRICA

In 2012, the South African Government adopted the National Development Plan (NDP) as the long-term strategy to address economic growth and broaden socio-economic transformation in the country. The National Infrastructure Plan (NIP) which is fully aligned with the NDP initiated a process of accelerated infrastructure development to enable economic growth and job creation in South Africa. The Presidential Infrastructure Coordination Commission (PICC), as the coordinator and facilitator of the NIP, subsequently identified 18 Strategic Integrated Projects (SIPs) which are large-scale infrastructure projects of national importance aimed at unlocking development potential in the country.[65]

The Department of Environmental Affairs (DEA) undertook several Strategic Environmental Assessments (SEAs) to identify adaptive processes that streamline the regulatory environmental requirements for SIPs, while also safeguarding the environment. The wind and solar photovoltaic (PV) SEA was the first to be commissioned by DEA in support of SIP 8, which aims to facilitate the implementation of sustainable green energy initiatives. This SEA identified areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the natural environment, while yielding the highest possible socio-economic benefits to the country. These areas are referred to as Renewable Energy Development Zones (REDZs).[66]

[65] Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.
[66] Ibid

To allow for DEA to utilise provisions in the National Environmental Management Act (NEMA) to streamline environmental authorisation processes in pre-assessed geographical areas, scoping level assessments of the biophysical and social environments have been undertaken as part of the SEA to produce sensitivity maps for the proposed REDZs. The sensitivity maps are based on the best available data but are not sufficiently detailed to support project level decision-making in terms of the NEMA. The maps instead identify potential sensitivities to inform environmental assessment at a project level. One of the potential sensitivities which were assessed is impacts on avifauna, which resulted in an avifaunal sensitivity map being produced for each of the 8 REDZs, with prescribed buffer zones around each identified sensitive avifaunal criterion within a given REDZ.[67]

The Project is located within the Focus Area 1: Overberg REDZ. Table 13 below details the avifaunal criteria, the prescribed sensitivity rating, and how it potentially affects the Project.

Table 13: Avifaunal criteria and sensitivity ratings as defined in the SEA for wind and solar photovoltaic energy in South Africa.

Criterion	Sensitivity rating	Proposed mitigation	Project
Wetlands with a surface area greater than 2 ha	Medium:2 km from edge	All major wetlands larger than 20 000 m² should be surveyed to determine the abundance and diversity of wetland and other birds present. Where these represent locally or regionally significance resource areas they should be buffered accordingly.	Not applicable. Not present at the site.
All protected areas	Very High: 1 km from edge	No development within the 1km Very High buffer zone	Not applicable. Not preset at the site.
Slopes steeper than 75°	High: 1 km	Search areas for nest sites of cliff-nesting species and buffer these accordingly. Monitor thoroughly to determine which ridgelines are frequented by threatened slope-soaring species and buffer accordingly.	Not applicable. Not present at the site.
Power lines equal to or greater than 132 kV	Medium: 5 km	All existing power infrastructure should be surveyed for possible nesting or roosting sites. Any newly identified sites should be buffered accordingly, to ensure these areas are protected from possible disturbance.	Not applicable. Not present at the site.
Threatened Ecosystem Fragments greater than 100 ha	High: within 2 km of threatened ecosystems	Keep RE development out of and away from the designated buffer areas around Renosterveld fragments	Not applicable. Not present at the site.
Breede River	Very High: within 1 km of major rivers	No development within the 1km Very High buffer zone	Not applicable. Not present at the site.
Known Cape Vulture colonies	- Very High: within 20 km of Colonies - High: between 20 and 40 km from Colonies	Keep wind farms outside of the designated 20km Very High sensitivity buffer area around the colony. Survey vulture foraging patterns within the High sensitivity buffer around the colony to determine areas of high use and buffer accordingly. Best done using tracking devices on a representative sample of birds from the colony. Only embark on tracking studies in collaboration with accredited ornithologists.	The Project is located in a High sensitivity zone. The Potberg Cape Vulture colony is located approximately 30km away from the Project.

[67] Ibid

		Investigate management of vulture access to stock mortalities to ensure that opportunities to feed close to or within a wind farmed area are minimised.	
Known Verreaux's Eagle nests	Very High Sensitivity within 3 km of Verreaux's Eagle nests - High Sensitivity Between 3 and 5 km from Verreaux's Eagle nests	All known cliff-nesting raptor nests are buffered as Very High sensitivity zones (see section 4). The High sensitivity outer buffer should be regularly surveyed to determine whether or not particular landscape features are favoured by foraging birds. Detailed information on ranging behaviour could be derived from direct observation or by remote tracking of individual birds - only embark on tracking studies in collaboration with accredited ornithologists. Based on findings, all high traffic areas need to be effectively buffered from development.	Not applicable. Not present at the site.
Known Peregrine Falcon nest sites	- Very High Sensitivity within 1 km of Peregrine Falcon nests - High Sensitivity between 1 and 2 km from Peregrine Falcon nests	All known cliff-nesting raptor nests are buffered as Very High sensitivity zones (see section 4). The High sensitivity outer buffer should be regularly surveyed to determine whether or not particular landscape features are favoured by foraging birds. Detailed information on ranging behaviour could be derived from direct observation or by remote tracking of individual birds - only embark on tracking studies in collaboration with accredited ornithologists. Based on findings, all high traffic areas need to be effectively buffered from development.	Not applicable. Not present at the site.
Known Martial Eagle nest sites	Very High Sensitivity within 5 km of Martial Eagle nests	No development within a 5km Very High buffer zone.	Not applicable. Not present at the site.
Known African Fish-Eagle nest sites	- Very High Sensitivity within 2 km of Fish-Eagle nests	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.
Known Black Harrier nesting areas	- Very High Sensitivity within 2 km of Black Harrier nests	Keep RE development out of and away from the designated 2km buffer areas around Renosterveld fragments.	Not applicable. Not present at the site.
Known Blue Crane nesting areas	- Very High Sensitivity within 150 m of known Blue Crane nests - High Sensitivity between 150 and 300 m from Blue Crane nests	Keep RE development outside of the designated 150m Very High sensitivity buffer areas. Search the designated High sensitivity buffer areas for other nests during the breeding season – October-February.	The Project is located in a High sensitivity zone. The closest recorded Blue Crane nest is about 180m away from a turbine position.
Selected Coordinated Waterbird Counts (CWAC) sites - Selected CWAC sites with high total counts, species diversities, and presence of Red-listed species	- Very High Sensitivity within 2 km of selected CWAC sites	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.

Past and possible future Lesser Kestrel roost site	High Sensitivity within 5 km of possible future Lesser Kestrel roosts	Keep wind farm developments well outside the 5km Very High sensitivity buffers imposed (See section 4). Survey the movements of birds within the surrounding High sensitivity buffer to ensure that there are no other, unforeseen points of aggregation that might heighten collision risk.	Not applicable. Not present at the site.
Other important wetlands	- High Sensitivity within 2 km of important wetlands	No development within a 2km Very High buffer zone.	Not applicable. Not present at the site.

The SEA defines high sensitivity areas as follows:

High sensitivity areas potentially support important populations of threatened species that are susceptible to impacts. These areas are potentially sensitive for development and the identified sensitivities will require assessment before any development can be considered in these areas.

The mitigation measures proposed for the Blue Crane and Cape Vultures in this CHA fall within the ambit of the proposed mitigation measures formulated for those species in the SEA for Focus Area 1: Overberg. No additional mitigation will be required to meet the requirements of the SEA.
