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BIRD IMPACT ASSESSMENT STUDY
Scoping Phase

Proposed 400kV power line between Ankerlig power station and Omega substation, Western Cape Province

Eskom Transmission Division
Western Region

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EXECUTIVE SUMMARY

Eskom plans to build a new 400kV power line from the Ankerlig power station (Atlantis Industria) just north of Cape Town, Western Cape Province, to the already authorised Omega substation, situated some 15 km to the southeast. The potential impacts of this proposed power line on the local avifauna were evaluated in terms of (i) information on the birds of the area derived from the South African Bird Atlas Project (SABAP), the Birds in Reserves Project (BIRP), a site visit to the area, and the author's own experience and knowledge, and (ii) accumulated knowledge and understanding of the impacts of power lines on birds, including the EWT/Eskom Wildlife Incident Register.

The area supports 201 bird species**,** of which 15 species are Red-listed, 44 species are regional endemics or near-endemics, and three species are Red-listed endemics. Of five avian microhabitats identified, natural (if generally degraded) Strandveld/Fynbos areas and wetlands support or partially support the bulk of the local avian diversity and most of the Red-listed and endemic species. Of the total avifauna, eight species were considered to be priority species in terms their conservation status, the relative importance of likely populations on site, and their susceptibility to the negative impacts of power lines on birds – namely collision, electrocution and disturbance. Blue Crane, Secretarybird, Peregrine Falcon, Greater Flamingo, Lesser Flamingo and Great White Pelican were considered to be prone to collision with the earthwire of the proposed line, while Blue Crane, African Marsh Harrier, Black Harrier and Secretarybird were considered prone to disturbance during construction and maintenance of the line. Mitigation measures are suggested to reduce impacts, although these will need to be refined in the EIA Phase of the project.

Three possible alignments are proposed for the line. Of these, Option A is preferred, primarily because it runs adjacent and parallel to existing lines for much of its length. Option B is least preferred.

DECLARATION OF CONSULTANTS' INDEPENDENCE

A. Jenkins and J. Smallie (Avifaunal Specialists – Endangered Wildlife Trust) are independent consultants to Savannah Environmental Pty (Ltd). They have no business, financial, personal or other interest in the activity, application or appeal in respect of which they were appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of these specialists performing such work.

1. INTRODUCTION

Eskom plans to build a new 400kV power line from the Ankerlig power station (Atlantis Industria) just north of Cape Town, Western Cape Province, to the already authorised Omega substation, situated some 15 km to the southeast. This line is needed to transmit additional power generated at the Ankerlig Power Station into the National electricity grid. Savannah Environmental (Pty) Ltd was appointed as the main consulting agency for the Environmental Impact Assessment process. The Endangered Wildlife Trust (EWT) was appointed by Savannah to conduct a specialist avifaunal impact assessment for the proposed line.

The field investigation for this study was conducted in early December 2007.

1.1 Terms of reference

The terms of reference for the EWT avifaunal study stipulate that the study should include the following:

- A description of the affected environment, and of the likely nature of negative impacts.
- A description of environmental issues and potential impacts (direct, indirect and cumulative) that have been identified.
- An evaluation of all impacts in terms of their respective nature and extent.
- A statement on the overall, potential significance of the identified impacts, based on the impact evaluation process.
- A comparative evaluation of the identified, feasible alternative routes for the power line, with a nominated, preferred alternative for consideration in the EIA phase.
- Identification of potentially significant impacts to be assessed in the EIA phase, and a description of how these impacts should be assessed.

2. METHODS

2.1 Sources of information

The following information sources were consulted in order to conduct this study:

- Bird distribution data of the Southern African Bird Atlas Project (SABAP – Harrison *et al.* 1997) and of the Avian Demography Unit's 'Birds in Reserves Project' (BIRP) were obtained from the SANBI website (http://www.birds.sanbi.org) for the two quarter-degree squares traversed by the proposed line (Melkbosstrand 3318CB & Philadelphia 3318DA), and for the nearby Koeberg Nature Reserve. A composite list of species likely to occur in the impact zone of the line was drawn up as a combination of these three bird lists, refined by a more specific assessment of the actual habitats affected,

based on the site inspection and general knowledge of the avifauna of the region (APPENDIX 1).

- Conservation status and endemicity of all species considered likely to occur in the area was determined as per the most recent iteration of the national Red-list for birds (Barnes 2000), and the most recent and comprehensive summary of southern African bird biology (Hockey *et al.* 2005).
- The power line bird mortality incident database of the Eskom - Endangered Wildlife Trust Strategic Partnership (1996 to present) was consulted to determine which of the species occurring in the study area are typically impacted upon by power lines and the extent to which they are impacted on.
- A classification of the vegetation types present in the study area was obtained from Mucina & Rutherford (2006), and an additional classification of the 'avi-vegetational zones' in each quarter degree square was obtained from Harrison *et al.* (1997).
- Information at a more detailed level was obtained during a site visit to the area on 6 December 2007, and bird micro habitats were identified using a combination of ornithological and ecological experience.

2.2 Assumptions & Limitations

This study made the assumption that the above sources of information are reliable. The following factors may potentially detract from the accuracy of the predicted results:

- The SABAP data covers the period 1986-1997. Bird distribution patterns fluctuate continuously according to changes in land use, habitat quality and climatic conditions, which in turn affect levels of disturbance, and the availability of food and nesting substrates.
- Sources of error in the SABAP database, particularly inadequate coverage of some quarter degree squares.
- Difficult road access and limited time made examination of some parts of the study area from the ground difficult.

General comment: Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will hold true under all circumstances. However, power line impacts can be predicted with a fair amount of certainty, based on experience gained by the author and the EWT power lines team since 1996 in the investigation of hundreds of localities in southern Africa where birds have interacted with power lines.

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Vegetation

The study site falls within the Fynbos biome, and the West Strandveld bioregion (Mucina & Rutherford 2006), and includes an area of Cape Flats Dune Strandveld in the northwest, with the central and southeastern portion comprising Atlantis Sand Fynbos. Just east of the intersection of the R27 and the R307 there is a small patch of Cape Inland Salt Pan vegetation, coincident with a sizeable wetland area and sewage treatment plant. In terms of the avi-vegetational zones identified by the southern African bird atlas project (SABAP, Harrison *et al.* 1997), the area includes elements of both the Fynbos and the Succulent Karoo regions.

More specifically, the impact zone of the line features five, significant avian microhabitats – (i) Degraded/recovering Strandveld or Sand Fynbos, (ii) Farmland - croplands or pastures, (iii) Alien Acacia-infested Strandveld or Sand Fynbos, (iv) Permanent or ephemeral wetlands, (v) Developed areas, from rural homesteads and farm buildings to light-moderate industrial development (APPENDIX 1).

3.2 Relevant bird populations

The impact zone of the line is likely to support as many as 201 bird species (APPENDIX 2), of which 15 species are Red-listed, 44 species are regional endemics or near-endemics, and three species are Red-listed endemics (Barnes 2000, Hockey *et al.* 2005). Of the five avian microhabitats identified, the natural (if generally degraded) Strandveld/Fynbos areas and the wetlands support or partially support the bulk of the local avian diversity (111 and 95 species respectively), as well as most of the Red-listed and endemic species (APPENDIX 2).

4 ASSESSMENT OF IMPACTS

4.1 General description of power line impacts on birds

Because of their size and prominence, electrical infrastructures constitute an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines (Van Rooyen 1999, Van Rooyen & Ledger 1999). Other problems are: electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure; and disturbance and habitat destruction during the construction and maintenance activities associated with electrical infrastructure.

TABLE 1. Annotated list of threatened bird species likely to occur within the impact area of the proposed Ankerlig-Omega 400 kV transmission line.

Common name	Scientific name	Conservation status	Local status	Preferred habitat
Blue Crane	*Anthropoides paradiseus*	Vulnerable	Uncommon resident	Croplands and pastures
Greater Painted-snipe	*Rostratula benghalensis*	Near-threatened	Uncommon resident	Wetlands
African Black Oystercatcher	*Haematopus moquini*	Near-threatened	Uncommon visitor	Wetlands
Caspian Tern	*Sterna caspia*	Near-threatened	Uncommon visitor	Wetlands
African Marsh-Harrier	*Circus ranivorus*	Vulnerable	Uncommon resident	Wetlands, natural veld and farmland
Black Harrier	*Circus maurus*	Near-threatened	Uncommon resident	Wetlands, natural veld and farmland
Martial Eagle	*Polemaetus bellicosus*	Vulnerable	Rare visitor	Strandveld/Fynbos?
Secretarybird	*Sagittarius serpentarius*	Near-threatened	Uncommon resident	Natural veld and farmland
Lesser Kestrel	*Falco naumanni*	Vulnerable	Uncommon migrant	Natural veld and farmland
Lanner Falcon	*Falco biarmicus*	Near-threatened	Uncommon visitor	Natural veld and farmland
Peregrine Falcon	*Falco peregrinus*	Near-threatened	Uncommon resident	Natural veld and farmland
Greater Flamingo	*Phoenicopterus ruber*	Near-threatened	Uncommon visitor	Wetlands
Lesser Flamingo	*Phoenicopterus minor*	Near-threatened	Rare visitor	Wetlands
Great White Pelican	*Pelecanus onocrotalus*	Near-threatened	Common visitor	Wetlands
Black Stork	*Ciconia nigra*	Near-threatened	Rare visitor	Wetlands

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components.

Collision refers to the scenario where a bird collides with the conductors or earth wires of overhead power lines. The groups of birds most severely impacted by collision with overhead lines are bustards, storks and cranes. These species are generally large, heavy-bodied birds with limited maneuverability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. An unknown number of smaller, fast-flying species – especially pursuit hunting raptors such as falcons - are also prone to colliding with power lines. Unfortunately, many collision sensitive species are considered threatened in southern Africa, and many are long-lived, slow reproducing species poorly adapted to coping with high rates of adult mortality, inflated by power line casualties.

During the construction phase and maintenance of power lines and substations, some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, the clearing of servitudes and the leveling of substation yards. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for

maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimise the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity to the servitude through modification of habitat. Similarly, these activities impact on birds through disturbance, particularly during the bird's breeding activities.

4.2 Description of the anticipated impacts of the proposed power line on birds

About 40 species of the total estimated avifauna reported to occur in the study area are considered susceptible to either collision with overhead lines and/or electrocution (APPENDIX 2). In terms of an integrated impact and mitigation assessment for the line (TABLE 2), only eight of these species are considered (i) to be of national conservation concern, (ii) to occur in the impact area of the line with sufficient regularity to warrant special accommodation, and (iii) to be potentially impacted by the line to the extent that proactive mitigation is required (moderate-high significance of impact - TABLE 2).

4.2.1 Collision with earth wire/conductor

- Blue Crane *Anthropoides paradiseus* occurs in substantial (and increasing) numbers in the Swartland (Young *et al.* 2003), as part of the core distribution of this species globally which lies largely in the grain croplands of the Western Cape Province (Hockey *et al.* 2005), and is likely to frequent, and possibly even breed in the farmland traversed by the proposed transmission line. Blue Cranes are highly collision prone with overhead lines.
- Secretarybird *Sagittarius serpentarius* is probably a regular visitor to the area, if not a breeding resident, and is likely to occur most frequently in the open farmland and Strandveld/Fynbos areas of the study area.
- Peregrine Falcon *Falco peregrinus* is a breeding resident in the adjacent Koeberg Nature Reserve, and almost certainly forages over open habitat available in the study area, particularly farmland where preferred prey such as columbids and other granivorous birds are likely to congregate.
- Greater Flamingo *Phoenicopterus ruber*, Lesser Flamingo *Phoenicopterus minor* and Great White Pelican *Pelecanus onocrotalus* all occur in numbers at wetlands along the West Coast, and commute between these on a regular basis, and all are prone to collision with overhead lines, especially where these occur close to wetlands where flocks are likely to fly low in the process of take-off or landing.
- Mitigation measures intended to reduce impacts on the priority species listed above will almost certainly also cater for other collision prone species, including a variety of more common, non-threatened large terrestrial and waterbird species (APPENDIX 2).

4.2.2 Electrocution

Because of the high voltage being carried, and the resulting large air gaps between the conducting elements of the tower assemblies, the risk of birds being electrocuted on the proposed line is considered negligible.

4.2.3 Disturbance & habitat destruction

Blue Crane, African Marsh Harrier *Circus ranivorus* and Black Harrier *C. maurus* are all Red-listed species (the former and the latter are also regional endemics) which nest on the ground and could occur as breeding residents within the impact area of the line. Both the harrier species breed in the adjacent Koeberg Nature Reserve, and Blue Cranes have been reported breeding over an increasingly wide area in the western Swartland (Young *et al.* 2003). All three are likely to favour situations close to water – Blue Crane on open ground, often near dams or pans, Black Harrier in tall, damp vegetation adjacent to small pans or wetlands, and African Marsh Harrier in wet reedbeds (Hockey *et al.* 2006). Should any of these species be breeding close to the selected route for the line at the time at which the line is erected and/or serviced or maintained, these nests could be subject to damaging levels of disturbance.

TABLE 2. Impact and mitigation matrix for threatened bird species likely to occur within the impact area of the proposed Ankerlig-Omega 400 kV transmission line.

Species	Conservation status	Conservation value of local population	Nature of impact	Probability	Extent (area)	Duration	Intensity	Significance	Degree of confidence	Suggested mitigation
Blue Crane	Vulnerable	Moderate	Collision	Moderate	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Moderate	Small	Short	Moderate	Moderate	Moderate	Minimise spatial and temporal footprint of line installation and maintenance
African Marsh-Harrier	Vulnerable	Moderate	Collision	Low	-	-	-	-	-	-
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Moderate	Small	Short	Moderate	Moderate	Low	Minimise spatial and temporal footprint of line installation and maintenance
Black Harrier	Near-threatened	High	Collision	Low	-	-	-	-	-	-
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Moderate	Small	Short	Moderate	Moderate	Moderate	Minimise spatial and temporal footprint of line installation and maintenance
Secretarybird	Near-threatened	Low	Collision	High	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Moderate	Small	Short	Moderate	Low	Moderate	Minimise spatial and temporal footprint of line installation and maintenance
Peregrine Falcon	Near-threatened	Moderate	Collision	High	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line

Species	Conservation status	Conservation value of local population	Nature of impact	Probability	Extent (area)	Duration	Intensity	Significance	Degree of confidence	Suggested mitigation
Peregrine Falcon (contd)			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Low	-	-	-	-	-	-
Greater Flamingo	Near-threatened	Moderate	Collision	Moderate	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Low	-	-	-	-	-	-
Lesser Flamingo	Near-threatened	Moderate	Collision	Moderate	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Low	-	-	-	-	-	-
Great White Pelican	Near-threatened	Moderate	Collision	Moderate	Small	Long	Moderate	Moderate	High	Fit bird flappers to selected sections of line
			Electrocution	Low	-	-	-	-	-	-
			Disturbance	Low	-	-	-	-	-	-

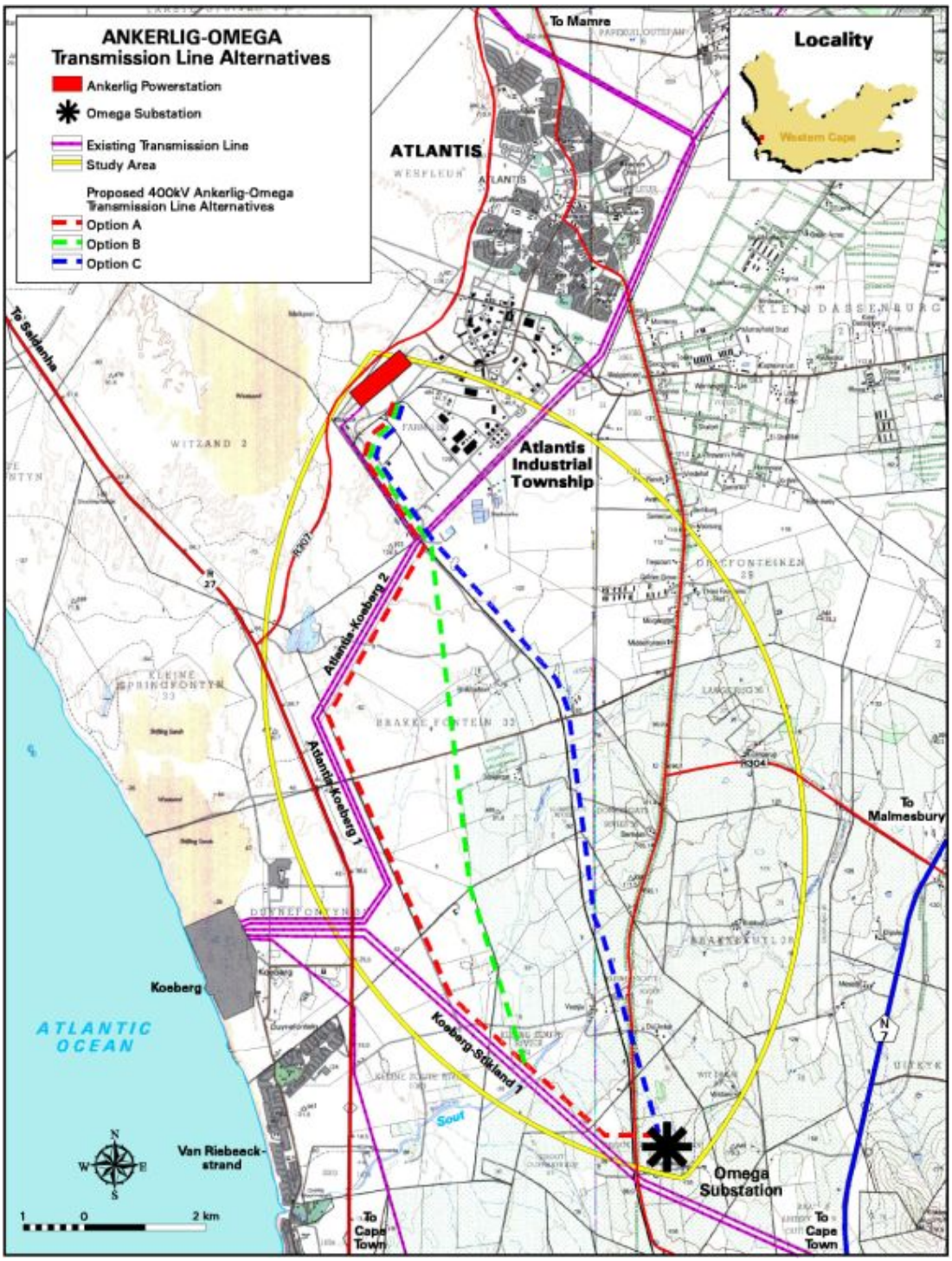

Figure 1. The three proposed routes for the Ankerlig-Omega 400 kV transmission line.

5. SELECTION OF A PREFERRED ROUTE FOR THE LINE

The initial stages of all three alignment options running south from Ankerlig Power Station are the same (Fig. 1) and so were not compared. **Option A** is the westernmost alignment, which runs close to and parallel with the existing Ankerlig-Koeberg and Koeberg-Stikland 1 power lines along

nearly its entire length. It runs through some of the best quality natural veld in the study area, which exists largely because thick, alien acacia stands which predominate in the area generally have been cleared as the servitude for the existing lines (APPENDIX 1). This option has the distinct advantage of minimising the length of a new, isolated power line, and effectively reducing collision risk for both the new line and the existing ones by grouping the entire assemblage together, hugely improving the conspicuousness of all the overhead lines traversing this area. Widening of the current, cleared servitude area (to accommodate an additional line) will probably also have a long-term, positive effect on the local avifauna, as the resulting cleared area is likely to support a greater biomass and diversity of birds. The existing road infrastructure on this alignment would also largely negate the need for new construction and maintenance roads to be put in, reducing the overall impact of the line. The only negative aspect of this alignment is that it runs closest of the three options to the wetlands at the junction of the R27 and the R307.

Option B runs centrally through the Brakkefontein area, and was the most difficult of the three options to access and evaluate. Suffice to say that it does not run close to any existing infrastructure, has poor road access (and therefore new roads would have to be put in, increasing the impact footprint of the line), and includes some relatively open, un-infested Sand Fynbos areas.

Option C is the easternmost of the three alignments (Fig. 1), and runs parallel to the railway for almost its entire length, through what is mostly heavily infested Sand Fynbos, with some open, cultivated areas in the southern half of it's length. It also runs through at least one area either permanent or ephemeral wetland (APPENDIX 1), although even this is thickly covered by alien acacias. Because it runs parallel to the railway, existing road infrastructure on this alignment is good, which would largely negate the need for new construction and maintenance roads to be put in, reducing the overall impact of the line.

Overall, Option A is clearly the preferred option, with Option C a passable alternative, and Option B the least preferred (although even this alignment does not pose a significant threat to the local avifauna).

6. IMPACT STATEMENT

The proposed Ankerlig-Omega 400 kV transmission line does not traverse over any avian habitats of high conservation value and, provided that full cognisance is taken suggested mitigation, it is unlikely to have any long-term, significant negative impacts on the local avifauna.

7. SUGGESTED MITIGATION AND ADDITIONAL WORK FOR THE EIA PHASE

The following are recommendations in order to mitigate as far as possible for the above impacts:

7.1 Collisions with the earth wire

- Sections of the line which either cross or run adjacent to croplands and wetlands should be marked on the earth wire with a suitable marking device.
- Sections of the line crossing drainage lines and farm dams should be marked on the earth wire with a suitable marking device.
- On a micro-scale, wherever possible, the line should be routed away from any of the above situations.
- The final selection of sections of the power line that should be marked with marking devices should be identified after the tower positions have been pegged by way of a walk-through conducted jointly by Eskom and a suitably qualified ornithologist.

7.2 Electrocution

- In the unlikely event that bird electrocutions will be recorded on the line post-construction, all relevant perching surfaces should be fitted with bird guards as deterrents. It may also be necessary to fit bird guards to certain lengths of the new line should any bird streamer-related line faulting occur.

7.3 Disturbance and habitat destruction

- All construction and maintenance activities should be carried out according to generally accepted environmental best practice, and the temporal and spatial footprint of the line should be kept to a minimum. In particular, care should be taken in the vicinity of wetlands, and existing roads must be used as far as possible for access during construction.
- Ideally, a walk-through of the selected alignment should be done by an experienced ornithologist to check key areas for nests of threatened species should be done immediately before construction commences. Any bird nests that are found subsequently should be reported to the EWT to allow expert advice on how to deal with the situation.

7.4 Additional work for the EIA Phase

Beyond verifying the presence or absence of key breeding species (Blue Crane, African Marsh Harrier, Black Harrier and possibly others) within the impact area of the line (once an alignment has been selected), there is no obvious, outstanding work still required for the EIA Phase of this evaluation. This verification could easily be done during the pre-construction walk-through, which would essentially negate the need for a more detailed assessment of the impacts of this line on birds.

8. REFERENCES

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APPENDIX 1. Photographs of typical bird habitats within the impact zone of the proposed Ankerlig-Omega 400 kV transmission line.

(A) Degraded Sand Fynbos and grassland along the servitude of the Ankerlig-Koeberg power line (alignment Option A).

(B) A wetland in the northern half of alignment Option C, with heavy acacia infestation.

(C) Alien acacia bordering both sides of the railway, along the alignment for Option C.

APPENDIX 2. Annotated list of bird species likely to occur within the impact area of the proposed Ankerlig-Omega 400 kV transmission line.

				Preferred habitat					Susceptibility to		
Common name	**Scientific name**	**Conservation status**	**Regional endemicity**	**Strandveld or Sand Fynbos**	**Farmland**	**Alien acacias**	**Wetlands**	**Developed areas**	**Collision**	**Electrocution**	**Disturbance**
Common Ostrich	*Struthio camelus*	-	-	X					-	-	Moderate
Grey-winged Francolin	*Scleroptila africanus*	-	Endemic	X	X				Moderate	-	Moderate
Cape Spurfowl	*Pternistis capensis*	-	Endemic	X					Moderate	-	Moderate
Common Quail	*Coturnix coturnix*	-	-	X	X					-	-
Helmeted Guineafowl	*Numida meleagris*	-	-		X	X			Moderate	-	Moderate
White-backed Duck	*Thalassornis leuconotus*	-	-				X		Moderate	-	-
Maccoa Duck	*Oxyura maccoa*	-	-				X		Moderate	-	-
Egyptian Goose	*Alopochen aegyptiaca*	-	-		X		X		High	High	-
South African Shelduck	*Tadorna cana*	-	Endemic				X		High	-	-
Spur-winged Goose	*Plectropterus gambensis*	-	-		X		X		High	High	-
Cape Teal	*Anas capensis*	-	-				X		Moderate	-	-
African Black Duck	*Anas sparsa*	-	-				X		Moderate	-	-
Mallard	*Anas platyrhynchos*	-	-				X		Moderate	-	-
Yellow-billed Duck	*Anas undulata*	-	-				X		Moderate	-	-
Cape Shoveler	*Anas smithii*	-	Endemic				X		Moderate	-	-
Red-billed Teal	*Anas erythrorhyncha*	-	-				X		Moderate	-	-
Hottentot Teal	*Anas hottentota*	-	-				X		Moderate	-	-
Southern Pochard	*Netta erythrophthalma*	-	-				X		Moderate	-	-
Greater Honeyguide	*Indicator indicator*	-	-			X			-	-	-
Lesser Honeyguide	*Indicator minor*	-	-			X			-	-	-
Cardinal Woodpecker	*Dendropicos fuscescens*	-	-			X			-	-	Moderate

				Preferred habitat					Susceptibility to		
Common name	**Scientific name**	**Conservation status**	**Regional endemicity**	**Strandveld or Sand Fynbos**	**Farmland**	**Alien acacias**	**Wetlands**	**Developed areas**	**Collision**	**Electrocution**	**Disturbance**
Acacia Pied Barbet	*Tricholaema leucomelas*	-	Near-endemic			X			-	-	Moderate
African Hoopoe	*Upupa africana*	-	-			X		X	-	-	Moderate
Malachite Kingfisher	*Alcedo cristata*	-	-				X		-	-	-
Giant Kingfisher	*Megaceryle maximus*	-	-				X		-	-	-
Pied Kingfisher	*Ceryle rudis*	-	-				X		-	-	-
European Bee-eater	*Merops apiaster*	-	-	X	X				-	-	-
White-backed Mousebird	*Colius colius*	-	Endemic	X		X			-	-	Moderate
Speckled Mousebird	*Colius striatus*	-	-	X		X			-	-	Moderate
Red-faced Mousebird	*Urocolius indicus*	-	-	X					-	-	Moderate
Red-chested Cuckoo	*Cuculus solitarius*	-	-			X			-	-	-
Klaas's Cuckoo	*Chrysococcyx klaas*	-	-	X		X			-	-	-
Diderick Cuckoo	*Chrysococcyx caprius*	-	-	X		X			-	-	-
Burchell's Coucal	*Centropus burchellii*	-	-			X	X		-	-	-
Alpine Swift	*Tachymarptis melba*	-	-	X	X		X		-	-	-
Common Swift	*Apus apus*	-	-	X	X		X		-	-	-
African Black Swift	*Apus barbatus*	-	-	X	X		X		-	-	-
Little Swift	*Apus affinis*	-	-	X	X		X	X	-	-	-
White-rumped Swift	*Apus caffer*	-	-	X	X		X	X	-	-	-
Barn Owl	*Tyto alba*	-	-	X	X	X		X	-	Moderate	-
Spotted Eagle-Owl	*Bubo africanus*	-	-	X	X	X		X	-	High	Moderate
Fiery-necked Nightjar	*Caprimulgus pectoralis*	-	-	X	X	X			-	-	Moderate
Rock Dove	*Columba livia*	-	-		X	X		X	-	-	-
Speckled	*Columba guinea*	-	-	X	X	X			-	-	-

				Preferred habitat					Susceptibility to		
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Pigeon											
Laughing Dove	*Streptopelia senegalensis*	-	-	X	X			X	-	-	Moderate
Cape Turtle-Dove	*Streptopelia capicola*	-	-	X	X			X	-	-	Moderate
Red-eyed Dove	*Streptopelia semitorquata*	-	-	X	X	X		X	-	-	Moderate
Namaqua Dove	*Oena capensis*	-	-	X	X				-	-	-
Southern Black Korhaan	*Afrotis afra*	-	Endemic	X	X				Moderate	-	Moderate
Blue Crane	*Anthropoides paradiseus*	Vulnerable	Endemic	X	X		X		High	-	Moderate
Red-chested Flufftail	*Sarothrura rufa*	-	-	X					-	-	Moderate
African Rail	*Rallus caerulescens*	-	-				X		-	-	-
Black Crake	*Amaurornis flavirostris*	-	-				X		-	-	-
African Purple Swamphen	*Porphyrio madagascariensis*	-	-				X		-	-	-
Common Moorhen	*Gallinula chloropus*	-	-				X		-	-	-
Red-knobbed Coot	*Fulica cristata*	-	-				X		-	-	-
Namaqua Sandgrouse	*Pterocles namaqua*	-	Near-endemic	X	X				-	-	-
African Snipe	*Gallinago nigripennis*	-	-				X		-	-	-
Marsh Sandpiper	*Tringa stagnatilis*	-	-				X		-	-	-
Common Greenshank	*Tringa nebularia*	-	-				X		-	-	-
Wood Sandpiper	*Tringa glareola*	-	-				X		-	-	-
Common Sandpiper	*Actitis hypoleucos*	-	-				X		-	-	-
Curlew Sandpiper	*Calidris ferruginea*	-	-				X		-	-	-
Ruff	*Philomachus pugnax*	-	-				X		-	-	-

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Greater Painted-snipe	*Rostratula benghalensis*	Near-threatened	-				X		-	-	-
African Jacana	*Actophilornis africanus*	-	-				X		-	-	-
Water Thick-knee	*Burhinus vermiculatus*	-	-				X		-	-	-
Spotted Thick-knee	*Burhinus capensis*	-	-	X	X				-	-	Moderate
African Black Oystercatcher	*Haematopus moquini*	Near-threatened	Endemic				X		-	-	-
Black-winged Stilt	*Himantopus himantopus*	-	-				X		-	-	-
Pied Avocet	*Recurvirostra avosetta*	-	-				X		-	-	-
Common Ringed Plover	*Charadrius hiaticula*	-	-				X		-	-	-
Kittlitz's Plover	*Charadrius pecuarius*	-	-				X		-	-	-
Three-banded Plover	*Charadrius tricollaris*	-	-				X		-	-	-
White-fronted Plover	*Charadrius marginatus*	-	-				X		-	-	-
Blacksmith Lapwing	*Vanellus armatus*	-	-				X		-	-	-
Crowned Lapwing	*Vanellus coronatus*	-	-	X	X				-	-	Moderate
Kelp Gull	*Larus dominicanus*	-	-		X		X		-	Moderate	-
Hartlaub's Gull	*Larus hartlaubii*	-	Endemic				X		-	-	-
Caspian Tern	*Sterna caspia*	Near-threatened	-				X		-	-	-
Whiskered Tern	*Chlidonias hybrida*	-	-				X		-	-	-
White-winged Tern	*Chlidonias leucopterus*	-	-				X		-	-	-
Osprey	*Pandion haliaetus*	-	-				X		-	Moderate	-
Black-shouldered Kite	*Elanus caeruleus*	-	-	X	X	X			-	-	Moderate
Black Kite	*Milvus migrans*	-	-	X	X	X			-	-	Moderate

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African Fish-Eagle	*Haliaeetus vocifer*	-	-				X		-	High	Moderate
Black-chested Snake-Eagle	*Circaetus pectoralis*	-	-	X	X				-	Moderate	-
Brown Snake-Eagle	*Circaetus cinereus*	-	-	X	X				-	Moderate	-
African Marsh-Harrier	*Circus ranivorus*	Vulnerable	-	X	X		X		-	-	Moderate
Black Harrier	*Circus maurus*	Near-threatened	Endemic	X	X		X		-	-	Moderate
African Harrier-Hawk	*Polyboroides typus*	-	-			X			-	-	-
African Goshawk	*Accipiter tachiro*	-	-			X			-	-	Moderate
Rufous-chested Sparrowhawk	*Accipiter rufiventris*	-	-	X		X			-	-	Moderate
Black Sparrowhawk	*Accipiter melanoleucus*	-	-	X	X	X			-	-	Moderate
Steppe Buzzard	*Buteo vulpinus*	-	-	X	X	X			-	Moderate	-
Jackal Buzzard	*Buteo rufofuscus*	-	Endemic	X	X	X			-	Moderate	Moderate
Verreauxs' Eagle	*Aquila verreauxii*	-	-	X	X				Moderate	High	-
Booted Eagle	*Aquila pennatus*	-	-	X	X				-	-	-
Martial Eagle	*Polemaetus bellicosus*	Vulnerable	-	X	X				Moderate	High	-
Secretarybird	*Sagittarius serpentarius*	Near-threatened	-	X	X				High	-	Moderate
Lesser Kestrel	*Falco naumanni*	Vulnerable	-	X	X				-	-	-
Rock Kestrel	*Falco rupicolus*	-	-	X	X			X	-	-	-
Lanner Falcon	*Falco biarmicus*	Near-threatened	-	X	X				High	Moderate	-
Peregrine Falcon	*Falco peregrinus*	Near-threatened	-	X	X				High	Moderate	-
Little Grebe	*Tachybaptus ruficollis*	-	-				X		-	-	-
Great Crested Grebe	*Podiceps cristatus*	-	-				X		-	-	-
Black-necked Grebe	*Podiceps nigricollis*	-	-				X		-	-	-

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African Darter	*Anhinga rufa*	-	-				X		-	-	-
Reed Cormorant	*Phalacrocorax africanus*	-	-				X		-	-	-
White-breasted Cormorant	*Phalacrocorax lucidus*	-	-				X		-	Moderate	-
Little Egret	*Egretta garzetta*	-	-				X		-	-	-
Grey Heron	*Ardea cinerea*	-	-			X	X		-	Moderate	-
Black-headed Heron	*Ardea melanocephala*	-	-	X	X	X	X		-	Moderate	-
Purple Heron	*Ardea purpurea*	-	-				X		-	-	-
Cattle Egret	*Bubulcus ibis*	-	-	X	X		X		-	-	-
Black-crowned Night-Heron	*Nycticorax nycticorax*	-	-			X	X		-	-	-
Little Bittern	*Ixobrychus minutus*	-	-				X		-	-	-
Hamerkop	*Scopus umbretta*	-	-				X		-	-	-
Greater Flamingo	*Phoenicopterus ruber*	Near-threatened	-				X		High	-	-
Lesser Flamingo	*Phoenicopterus minor*	Near-threatened	-				X		High	-	-
Glossy Ibis	*Plegadis falcinellus*	-	-				X		-	-	-
Hadeda Ibis	*Bostrychia hagedash*	-	-	X	X	X			-	-	Moderate
African Sacred Ibis	*Threskiornis aethiopicus*	-	-		X		X		-	-	-
African Spoonbill	*Platalea alba*	-	-				X		-	-	-
Great White Pelican	*Pelecanus onocrotalus*	Near-threatened	-				X		High	-	-
Black Stork	*Ciconia nigra*	Near-threatened	-		X		X		High	Moderate	-
White Stork	*Ciconia ciconia*	-	-		X		X		High	High	-
African Paradise-Flycatcher	*Terpsiphone viridis*	-	-			X			-	-	Moderate
Southern Boubou	*Laniarius ferrugineus*	-	Endemic			X			-	-	Moderate

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Bokmakierie	*Telophorus zeylonus*	-	Near-endemic	X		X			-	-	Moderate
Cape Batis	*Batis capensis*	-	Endemic	X		X			-	-	Moderate
Cape Crow	*Corvus capensis*	-	-	X	X				-	-	-
Pied Crow	*Corvus albus*	-	-	X	X	X		X	-	-	Moderate
White-necked Raven	*Corvus albicollis*	-	-	X	X				-	-	-
Common Fiscal	*Lanius collaris*	-	-	X	X	X		X	-	-	Moderate
Cape Penduline-Tit	*Anthoscopus minutus*	-	Near-endemic	X					-	-	Moderate
Grey Tit	*Parus afer*	-	Endemic	X					-	-	Moderate
Brown-throated Martin	*Riparia paludicola*	-	-				X		-	-	-
Banded Martin	*Riparia cincta*	-	-				X		-	-	-
Barn Swallow	*Hirundo rustica*	-	-	X	X		X		-	-	-
White-throated Swallow	*Hirundo albigularis*	-	-				X		-	-	-
Pearl-breasted Swallow	*Hirundo dimidiata*	-	-	X	X		X		-	-	-
Greater Striped Swallow	*Hirundo cucullata*	-	-	X	X		X	X	-	-	-
Rock Martin	*Hirundo fuligula*	-	-	X	X				-	-	-
Common House-Martin	*Delichon urbicum*	-	-	X	X		X		-	-	-
Cape Bulbul	*Pycnonotus capensis*	-	Endemic	X					-	-	Moderate
Cape Grassbird	*Sphenoeacus afer*	-	Endemic	X					-	-	Moderate
Long-billed Crombec	*Sylvietta rufescens*	-	-	X					-	-	Moderate
Little Rush-Warbler	*Bradypterus baboecala*	-	-				X		-	-	-
African Reed-Warbler	*Acrocephalus baeticatus*	-	-				X		-	-	-
Lesser Swamp-Warbler	*Acrocephalus gracilirostris*	-	-				X		-	-	-
Layard's Tit-Babbler	*Parisoma layardi*	-	Endemic	X					-	-	-

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Chestnut-vented Tit-Babbler	*Parisoma subcaeruleum*	-	Near-endemic	X					-	-	-
Cape White-eye	*Zosterops virens*	-	Endemic	X		X		X	-	-	Moderate
Grey-backed Cisticola	*Cisticola subruficapilla*	-	Near-endemic	X					-	-	Moderate
Levaillant's Cisticola	*Cisticola tinniens*	-	-	X			X		-	-	Moderate
Zitting Cisticola	*Cisticola juncidis*	-	-	X	X				-	-	Moderate
Cloud Cisticola	*Cisticola textrix*	-	Near-endemic	X	X				-	-	Moderate
Karoo Prinia	*Prinia maculosa*	-	Endemic	X					-	-	Moderate
Cape Clapper Lark	*Mirafra apiata*	-	Endemic	X	X				-	-	Moderate
Karoo Lark	*Calendulauda albescens*	-	Endemic	X	X				-	-	Moderate
Cape Long-billed Lark	*Certhilauda curvirostris*	-	Endemic	X	X				-	-	Moderate
Grey-backed Sparrowlark	*Eremopterix verticalis*	-	Near-endemic	X	X				-	-	-
Red-capped Lark	*Calandrella cinerea*	-	-	X	X				-	-	Moderate
Large-billed Lark	*Galerida magnirostris*	-	Endemic	X	X				-	-	Moderate
Olive Thrush	*Turdus olivaceus*	-	-	X		X		X	-	-	Moderate
Fiscal Flycatcher	*Sigelus silens*	-	Endemic	X		X		X	-	-	Moderate
African Dusky Flycatcher	*Muscicapa adusta*	-	-			X			-	-	-
Cape Robin-Chat	*Cossypha caffra*	-	-	X		X		X	-	-	Moderate
Karoo Scrub-Robin	*Cercotrichas coryphoeus*	-	Endemic	X					-	-	Moderate
African Stonechat	*Saxicola torquatus*	-	-	X	X				-	-	Moderate
Capped Wheatear	*Oenanthe pileata*	-	-		X				-	-	Moderate
Familiar Chat	*Cercomela familiaris*	-	-	X	X				-	-	Moderate

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Red-winged Starling	*Onychognathus morio*	-	-	X	X			X	-	-	Moderate
Pied Starling	*Spreo bicolor*	-	Endemic	X	X				-	-	-
Wattled Starling	*Creatophora cinerea*	-	-	X	X				-	-	-
Common Starling	*Sturnus vulgaris*	-	-					X	-	-	-
Orange-breasted Sunbird	*Anthobaphes violacea*	-	Endemic	X					-	-	Moderate
Malachite Sunbird	*Nectarinia famosa*	-	-	X		X		X	-	-	Moderate
Southern Double-collared Sunbird	*Cinnyris chalybeus*	-	Endemic	X		X		X	-	-	Moderate
Cape Sugarbird	*Promerops cafer*	-	Endemic	X					-	-	Moderate
Cape Weaver	*Ploceus capensis*	-	Endemic	X	X	X	X	X	-	-	Moderate
Southern Masked-Weaver	*Ploceus velatus*	-	-	X	X	X	X	X	-	-	Moderate
Red-billed Quelea	*Quelea quelea*	-	-	X	X				-	-	-
Southern Red Bishop	*Euplectes orix*	-	-	X	X		X		-	-	Moderate
Yellow Bishop	*Euplectes capensis*	-	-	X			X		-	-	Moderate
African Quailfinch	*Ortygospiza atricollis*	-	-		X				-	-	-
Common Waxbill	*Estrilda astrild*	-	-	X			X		-	-	Moderate
Pin-tailed Whydah	*Vidua macroura*	-	-	X			X		-	-	-
House Sparrow	*Passer domesticus*	-	-		X			X	-	-	-
Cape Sparrow	*Passer melanurus*	-	Near-endemic	X	X	X		X	-	-	Moderate
Cape Wagtail	*Motacilla capensis*	-	-	X	X		X		-	-	Moderate
Cape Longclaw	*Macronyx capensis*	-	Endemic	X	X				-	-	Moderate

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African Pipit	*Anthus cinnamomeus*	-	-	X	X				-	-	Moderate
Plain-backed Pipit	*Anthus leucophrys*	-	-	X	X				-	-	Moderate
Long-billed Pipit	*Anthus similis*	-	-	X	X				-	-	Moderate
Cape Canary	*Serinus canicollis*	-	Endemic	X	X	X		X	-	-	Moderate
Yellow Canary	*Crithagra flaviventris*	-	Near-endemic	X	X				-	-	Moderate
White-throated Canary	*Crithagra albogularis*	-	Near-endemic	X	X				-	-	Moderate
Streaky-headed Seedeater	*Crithagra gularis*	-	-	X	X				-	-	Moderate
Cape Bunting	*Emberiza capensis*	-	Near-endemic	X	X				-	-	Moderate