

DRAFT

Pongola – Candover corridor routes for a 132 kV power line. Assessment of the implications for avifauna.

1. INTRODUCTION

The proposed Pongola – Candover power line and substation project will require environmental authorisation from the National Department of Environmental Affairs. This report, together with other specialist reports forms part of a package of information that will allow Eskom to consider all recommendations made and by taking these into account, prepare an environmentally acceptable proposal and plan for the future power line development. An Environmental Authorization application by Eskom to the Department is required in order to assess the environmental implications and consequences of the proposed power line project. Specifically this report details the implications of the proposed project on the avifauna within the study area as defined and its immediate environs. The report compares the three alternative corridors in terms of their potential adverse impacts of the proposed power line project on sensitive avifauna species present and or that breed within the study area and its immediate environs.

Adverse impacts on vulture and large raptor species may occur during both the construction and operation phases (including inspection and maintenance) of a power line. Such impacts include disturbance and possible desertion particularly during the nesting period and from habituated feeding sites (vulture restaurants), collision with the earth and / or conductor cables of the power line by flying birds particularly when there is poor light or strong winds, and electrocution of birds either perched on or taking-off from a pylon. Adverse impacts therefore relate to power line proximity to nesting sites, feeding / foraging areas, and possible specific or unique habitats that are essential for the continued survival of the species in the area.

The report identifies and recommends on which of the three corridor alternatives are considered to result in the greatest adverse ongoing impacts on sensitive avifauna species and which of the alternatives that would be expected to have fewer major or moderate adverse affects.

1.2 Proposed projects

The proposed project is to enhance the security of the supply of electricity to the Makhatini substations of Ndumo, Gezisa and Mbazwana. This will require the construction of a second 132kV line from Pongola to Candover and the modification of the Pongola substation and Candover switching station to accommodate the additional power line. The intention is to use the Delta type pylon structures.

1.3 Location of the project

The study area, shown in Figure 1 is located in northern Kwa-Zulu Natal between the towns of Mkhuze and Pongola and south of the Golela border post with Swaziland. The area is bounded by:

- The railway line to the east which determines the eastern extent of the study area.
- The R66 on the west that determines the western extent of the study area,

- The farm boundaries to the south of the R69 determine the southern extent of the study area.
- The farm boundaries to the west of the untitled tar road from the N2 to the Golela border post, approximate coordinates 31°49'31.335"E 27°21'55.134"S, determines the north western extent of the study area.
- The farm boundaries north of the existing Pongola-Candover line were used to assist in the determination of the northern extent.

The total study area is in the region of ~65 000ha.

Within the study area are located three alternative corridors for assessment as to the suitability or otherwise for the proposed 132 kV power line.

The Northern Corridor is an Eskom vacant power line servitude parallel to and south of the existing 132kV power line between Candover Switching Station and Pongola Substation. The western and central sections of the route lie within a short distance to the south of the Pongola River. The two other alternative corridors are a central and a southern route that traverse the study area.

Importantly, the final servitude width of 36 m wide will be located within the preferred corridor and remains to be negotiated with landowners. During construction of the power line access roads will be established or tracks driven. Such tracks will be about 4m wide. These tracks will also be used during the operational phase for maintenance vehicles to obtain access to the power line servitude. Bush clearing will also be undertaken along the centre line of the power line of 4m wide to enable stringing of the conductor cables. At each tower / pylon location an area of 40 m X 40 m (1600 m²) would be cleared. Similarly all access roads and tracks will be cleared of vegetation to a width of 4 m.

1.4 Proposed pylon structure.

The intention of Eskom is to use the classic 132kV Delta type pylon structure to support the electrified conductors and earth cables. This type of structure usually has one phase running on one side of the pylon and two phases stacked above one another on the opposite side of the structure. Alternatively, there may be double lines i.e. stacked power lines on each of the two sides of the pylon. The Delta type of pylon is notorious in its adverse impacts on large birds that may perch on such structures, often referred to as 'vulture killers'. Birds are electrocuted should they perch between the stacked power cables and cause a short circuit; such an event kills any other birds that are sitting elsewhere on the pylon.

2. LAND USE AND CORRIDOR ROUTES

Most of the properties that comprise the study area are either commercial game ranches or land that is part of the Somkhanda Nature Reserve, these are:

- **Zimanga Game Farm** – Ulrica 14116, Lot 13139, Lot 622, and Lot 13778. The eastern section of the Southern Corridor (also part of the Central Corridor) passes over this game farm being 6,1 km in length.
- **Magudu Game Reserve** – Bosveld 745. The Northern Corridor (5,7 km) passes over the northern part of this farm, with a relatively short part of the Central Corridor (3,2 km). While it's eastern area (4,4 km) and all the cattle ranching farms to the south are impacted by the Southern Corridor.

- **Pongola Game Reserve** – Leeuwkop 791, Klipfontein Helena 673, and Helena 673. The Northern Corridor passes through this property for approximately 9,2 km and is close to established habitual feeding stations (i.e. vulture restaurants) for scavenger birds.
- **Somkhanda Nature Reserve** – Paardenfontein 674, Bloemhof 649, Verwijderd 618 and Vergelegen 252. Approximately 11,2 km of the Southern Corridor lies within the nature reserve.
- **Somkhanda Nature Reserve (unproclaimed)** – Leeuwkop 580, Erfinis 621, uitsig 15126, Uitzicht 624, Welverdieno 104, Sanduinen 652, Langgewacht 646, Badrog en Ontrecht, Bethel 247, Ptn 801, Goedgeloop 197, Uitgevallen 599, and Burgersrust 672. A relatively short section of the Southern Corridor (9,3 km) and the whole of the central section (14,4 km) of the Central Corridor pass through the area.

The southern portion of Somkhanda Nature Reserve was proclaimed in Provincial Government Notice No 552 Volume 5 dated 17 February 2011 and the Emvokweni Community Trust was appointed as the Management Authority for the protected area. The northern portion of Sokhanda is currently not proclaimed due to protracted court actions between the previous land owner and the Gumbi Tribal Authority where the land is now owned by the community but the wild animals, including rhinoceros, are owned by the previous land owner. This dispute has held up the process to proclaim the entire area as an enlarged Somkhanda Nature Reserve since 2008.

Small areas of rural villages, crop lands and grazing areas for domestic animals are also present.

The approximate length and percentage of each of the alternative corridor routes that traverses across game farms and or nature reserve land is given in Table 1 below.

Table 1. The approximate length (km) and % of the Northern, Central and Southern power line corridor routes that traverse game farms and or the Somkhanda Nature Reserve.

	Northern Route	Central Route	Southern Route
Total Length (km)	41,2	41,6	45,2
Length (km)	16,6	33,1	21,7
Percentage %	53,6	79,5	48,0

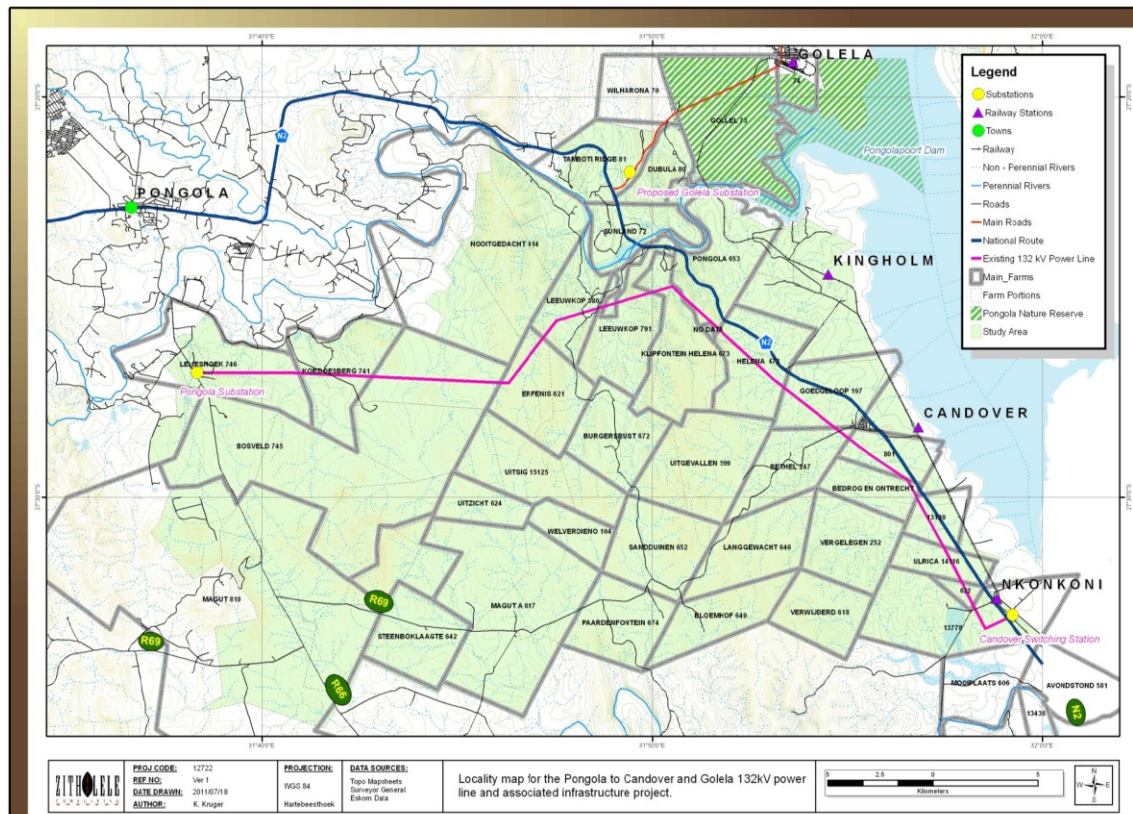


Figure 1. Location of the study area

3. METHOD

The habitats for avian species were assessed during a site visit over two days during May 2012. This was done by driving each of the corridor routes through the study area with frequent stops made at key locations important for large birds of prey. The assessment focused on evaluating foraging areas in particular, in terms of the natural features that included topography, altitude, woodland vegetation types, land use, and man-made artificial structures in the landscape. Sensitive areas for these birds were identified while in the field and noted. Presence and identification of large birds particularly raptors and vultures was noted. Several ornithologists were also consulted and information was gathered from the literature.

4. RESULTS

4.1 Presence of sensitive avifauna species.

The sub tropical woodland vegetation, topography and climate combine to provide important habitat for five vulture species, at least 15 large raptor species, and three stork species, as well as for many other animal, reptile and bird species that form part of the diet for these birds. For vulture species and large raptors the main vegetation types, that is Zululand Lowveld and Northern Zululand Sourveld, are of little relevance to their presence and population size. What is of particular significance is that the properties that

lie within study area and its environs provide ideal environmental conditions and habitats for the continued survival of these birds all of which have large home ranges that extend beyond the boundaries of the study area. Populations of these species are also present outside of the study area and therefore it was necessary to extend the scope of the study beyond the study area's boundaries and include its environs given that such artificial boundaries are irrelevant to these birds. The home ranges are relatively large areas in which a species undertakes aerial searches, hunts, or scavenge for their food and or prey. Within a bird's home range lies its nest site, except for non-breeding migrant species. It is therefore of little surprise that there is a high species richness of resident and migratory bird species recorded for the study area and the region in which it is located, given the protection afforded by game farms, cattle ranches and a nature reserve.

4.1.1 The following birds of prey have been recorded for the study area:

African fish-eagle – *Haliaeetus vocifer*
Black-chested Snake-eagle – *Circaetus pectoralis*
Brown Snake-eagle – *Circaetus cinereus*
Bateleur – *Terathopius ecaudatus*
 Jackal buzzard – *Buteo rufofuscus*
 * Steppe buzzard – *Buteo vulpinus*
 African harrier-hawk – *Polyboroides typus*
Tawny eagle – *Aquila rapax*
 Verreauxs' eagle (*Aquila verreauxii*)
 Booted eagle (*Aquila pennatus*)
 * Lesser spotted eagle – *Aquila pomarina*
 African hawk-eagle – *Aquila spilogaster*
Wahlberg's eagle *Aquila wahlbergi*
 Martial eagle – *Polemaetus bellicosus*
 Long-crested eagle – *Lophaetus occipitalis*
African crowned eagle – *Stephanoaetus coronatus*
Secretarybird – *Sagittarius serpentarius*

4.1.2 The following scavenger bird species have been recorded for the study area:

White-necked raven – *Covus albicollis*
White-backed vulture – *Gyps africanus*
 Cape vulture – *Gyps coprotheres*
Lappet-faced vulture – *Aegypius tracheliotos*
White-headed vulture – *Aegypius occipitalis*
 Hooded vulture – *Necrosyrtes monachus*

4.1.3 The following stork species have been recorded for the study area:

Black stork – *Ciconia nigra*
 * White stork - *Ciconia eiconia*
Marabou stork – *Leptoptilos crumeniferus*

* = non breeding migrant species. **Species in bold have been recorded breeding either within the study area or its immediate environs.**

In order to obtain an indication of the presence of the above species within the study area over time, information currently available from the Animal Demography Unit (ADU), University of Cape Town was obtained. For several years the ADU have undertaken a nation-wide avifauna project being the Southern African Bird Atlas Project. Field observers adhere to strict protocols to gather presence data for all species recorded within each geographic pentad and revisit these at various times during each year if possible. Results are given in terms of reporting rates (Table 2). Some pentads are remotely situated making access very difficult and therefore these have a very low reporting rate, pentad data from these areas has not been included in Table 2.

Table 2 lists 30 species of vultures, raptors, and storks thus confirming their presence within the study area in recent times; all of which can be considered as power-line collision prone species. To this list one may also add some water bird species given the proximity of the Pongolopoort Dam and other water bodies. Such species would include the following:

White pelican and Pink-back pelican, Spurwing goose and Egyptian goose,
Wood stork, Goliath heron and possibly other heron species.

Table 2. Percentage reporting rates for six selected pentads that are situated within the study area. These data are from 'The Southern African Bird Atlas Project 2' (SABAP2).

Note Red Data listed species are indicated by an *.

Name	2720_3135	2720_3150	2725_3135	2725_3140	2730_3140	2730_3150
* Cape Vulture		10.7				
* Lappet faced Vulture		22.4		9.5		
* White backed Vulture	11.1	78.6	9.1	81.8	51.9	50.0
* White headed Vulture		17.9		27.3	11.1	
Fish Eagle			9.1			
Black chested snake eagle		3.6				
Brown snake Eagle	11.1	10.7			29.6	
* Bateleur	11.1	21.4			25.9	50.0
Jackal	22.2			18.2	33.3	

Buzzard						
Steppe Buzzard	33.3		9.1	27.3	44.4	50.0
African Harrier Hawk				9.1	37.0	50.0
African hawk Eagle		7.1		18.2	3.7	
* Tawny Eagle	11.1			9.1	3.7	50.0
Booted Eagle						
Walberg's Eagle	11.1		18.2	9.1	40.7	50.0
* Martial Eagle			9.1	18.2	29.6	50.0
Long crested Eagle	22.2				22.2	
* Crowned Eagle			9.1	9.1	51.9	
Booted Eagle				18.2		
* Black Stork					3.7	
* Marabou Stork		28.6	9.1			
White Stork					7.4	
Wooly Necked Stork	11.1		9.1	9.1	14.8	
Yellow bill Stork		75				
Openbill		35.7				

Pentads with high reporting rates show that the species is possibly resident or regularly observed in that area for much of the year, where as the other pentads having lower reporting rates indicate that the species was either not present or was not sighted by the observers during their visit.

4.2 The national conservation status of vultures, large raptors and stork species.

There are four near threatened, seven vulnerable and one endangered bird species listed in the IUCN and or South African Red Data Book on threatened birds in South Africa.

The conservation or threatened status of vulture and raptor species occurring in the study area is as follows:

- Endangered (n = 1)- White-backed vulture – *Gyps africanus*.
- Vulnerable (n = 7) - Tawny eagle – *Aquila rapax* Martial eagle – *Polemaetus bellicosus*, Bateleur – *Terathopius ecaudatus* , Cape vulture – *Gyps coprotheres*, Lappet-faced vulture – *Aegypius tracheliotos*, White-headed vulture – *Aegypius occipitalis*, Hooded vulture – *Necrosyrtes monachus* (recorded during site visit).
- Near threatened (n = 4) - African crowned eagle – *Stephanoaetus coronatus*, Secretarybird – *Sagittarius serpentarius*, Black stork – *Ciconia nigra*, Marabou stork – *Leptoptilos crumeniferus*.

There are therefore 12 threatened large bird species occurring within the study area.

4.3 Breeding of vultures, large raptors, and storks.

KZN Wildlife has conducted aerial censuses of breeding vultures and raptors in northern Zululand focusing mainly on the protected areas but has incorporated certain privately owned game farms and nature reserves with the permission of the land owner. These surveys have been done annually during the month of August since 2007. Properties either inside the study area or within its immediate environs subject to this census are:

Phongolo Nature Reserve, Pongola Game Reserve (private), Somkhanda Nature Reserve (private), Zimanga Game Farm (private) and Magudu Game Reserve (private).

It must be emphasized that aerial censuses do not provide a totally accurate absolute number of either a species or of nests, as these may simply be overlooked or the area missed out of the counting transect. Its value is that it does allow population trends to be determined over a period of time within a degree of certainty. Therefore the numbers and estimates of nests given below must be considered as possibly below what may actually be the on-ground circumstances in the area.

August is the time when it is most suitable to find and observe nesting vultures. However many of the other raptor and stork species are summer breeders and therefore are not actively nesting and thus are unrecorded during the census. Species (n=13) that have been noted as breeding are list in bold above (paragraphs 4.1.1 to 4.1.3).

The numbers of nests recorded during the annual census or subsequently estimated for known breeding birds within or in the environs of the study area are:

- White backed vulture = no less than 80 nests,
- Lappet faced vulture = 6 nest are known,
- White headed vulture = no less than 3 nests,

- Bateleur = 1 nest known, but the area is highly suitable and is estimated to have a total of 4 nests. Nests of this species are extremely difficult to find. Territorial displays are frequently observed.
- Tawny eagle = 3 nests are known, but the area is highly suitable and is estimated to have at least 8 nests.
- Crowned eagle and Fish eagle = 1 nest of each species is known east of the study area near to the Pongolopoort Dam.
- Secretarybird = 1 nest to the north of the study area.
- Walberg's eagle = estimate of 30 nests (summer breeder).
- Marabou stork = 7 nests. This is the first breeding site for the species in South Africa and has grown in size since discovered. Formally only known breeding in Swaziland.
- Black stork = 2 nests immediately south of the study area.

4.4 Vulture nest sites in relation to Corridor Routes.

The Northern Corridor. There are 3 nests of White backed vulture, 2 nests of Lappet faced vulture and 1 nest of White headed vulture near the eastern leg of the corridor. Between the N2 freeway road and the Pongolopoort Dam there are 33 White backed and 2 Lappet faced vulture nests. The Phongolo Nature Reserve that lies immediately to the north and east of this corridor has 18 White backed, 1 White headed, and 2 Lappet faced vulture nests. There are also nests of a Fish and a Walberg's eagle.

Northern and Southern Corridor. The eastern part of Somkhanda Nature Reserve (Farm Vergelegen 252) has a very suitable site being a cluster of tall trees with 3 White backed and 1 White headed vulture nests.

Central Corridor. The central part of this corridor passes through a site where all three vulture species breed. There are 9 nests of White backed, 2 nests of Lappet faced and 1 nest of White headed vulture.

5. CONCLUSIONS

It is apparent that the area in which the project is located is of critical conservation value and importance for five vulture, 17 large raptor and possibly six stork species that are prone and vulnerable to collisions and or electrocution by power lines. A total of 12 of these species are listed as threatened in either the IUCN or Southern African Red Data Book. At least 13 species are known to breed in the area including six listed Red Data (threatened) species. The possibility exists that some of the very rare vulture species (e.g. White headed and Lappet faced vultures) could become extinct in KwaZulu Natal province should the proposed development by Eskom be undertaken if the recommendations listed below were to be ignored.

It is concluded that a 132 kV power line running within either the southern or central corridors would result in relatively greater adverse impacts on the above listed large bird species that live within and in the environs of the study area, when compared to the

northern corridor route. The advantage of the northern corridor is that there is an existing power line to which resident birds have become adapted to its presence in the landscape. A parallel second power line would increase the visibility of this hazard to flying birds and thus it would be expected to result in lower rates of bird collisions particularly if additional mitigation measures were applied. A disadvantage of the northern route is its proximity, in part, to the Pongola River where these birds possibly obtain their drinking water.

The central and southern corridor routes pass through and adjoin areas where a power line hazard to flying large raptors presently does not exist. Also the resident large bird species populations would be unaware of the risk posed to their lives should such a power line be constructed and pass through their home ranges. In addition the central route lies far to close or may even pass through a highly sensitive breeding site comprising at least 12 nests of three endangered vulture species and thus constitutes a high risk through disturbance, collision and or electrocution to both adult breeding and newly fledged birds. The central and southern areas currently constitute safe habitat for foraging and breeding large raptor species and thus should not be interfered with by the proposed power line development but remain in its present protective state.

6. RECOMMENDATIONS

It is recommended that:

1. The preferred corridor route for the proposed 132 kV power line must be the northern corridor.
2. The central and southern corridor routes must not be used for the proposed 132 kV power line.
3. The Delta pylon design must not be used. A design that avoids any risk of electrocution to birds would be correct for this specific proposed development that is to be undertaken in such a highly sensitive area for vultures and large raptor species.
4. For the northern route, pylons should preferably be positioned so as to alternate with those of the existing power line and not be placed opposite one another. This mitigation will increase the visibility of both sets of power lines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action.
5. The western section of the northern power line that passes over the Farms Lelieshoek 746, Koedoesberg 741 and Bosveld 745 as well as its central section that passes over the Farm Leeuwkop 580, Leeukop 791, Sunland 72 and Pongola 653 must be provided with 'bird flappers' or such devices to increase the visibility of the power lines in these positions. Importantly it is these properties that lie within the flight paths of large birds as they fly to and from the Pongola River where they bathe and obtain their drinking water, and the established habitual feeding stations for them.

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