

## RIETKLOOF WIND ENERGY FACILITY, WESTERN CAPE PROVINCE

### Walk-through Avian Specialist Assessment of Overhead Power Line, 2021

This specialist walk-through is required as a final assessment for the associated infrastructure for the Rietkloof Wind Energy Facility (WEF) proposed by Red Rocket (Pty) Ltd, 24-km north of Matjiesfontein. This walk-through is to determine if Priority bird species may be impacted by the proposed 132kV overhead power line (OHPL) that exports energy from the Rietkloof wind farm to the national grid.

Avian impacts of the proposed WEF and three alternative power line routings, were originally assessed by avian specialist Dr Tony Williams in 2016 (African Insights 2016a, b). Given the passage of time since the original (2015) study was undertaken a re-assessment is necessary, given that environmental conditions may have changed since the drought-years of 2015. The final routing of the OHPL has changed to a path of 13.8-km, and it parallels two existing Eskom power lines for short sections along its journey.

The proposed Rietkloof wind farm lies in the Roggeveldberg a north-south lying mountain range rising to about 1500-m asl. The habitat is described as *Central Mountain Shale Renosterveld* (Mucina & Rutherford 2006, p178). The vegetation comprises components of both the Nama and Succulent Karoo biomes, but mainly with Karoo bushes. The habitat is described as *Least Threatened*, with none conserved in formal protected areas.

Given the involvement of Birds & Bats Unlimited (BBU) in re-assessing all aspects of the avian component throughout the Euronotus cluster (of which Rietkloof is one of four WEFs) Red Rocket (Pty) Ltd requested us to undertake a walk-through survey now that the power line routing has been finalised.

**The aims** in this 2021 walk-through re-assessment are to:

- Determine possible impacts to the Priority avifauna of the overhead power line (a 132kV line of 13.8-km). These impacts may occur in the form of (i) direct collisions by Priority birds; (ii) electrocution on the support infra-structure; or (iii) displacement from around the line.
- Assess any buffers, or no-go areas, to ensure they have been complied with for sensitive bird species and provide mitigations where necessary.

### METHODS

Three observers (Dr RE Simmons, Francois le Roex and Dillon Joubert) spent two days on the Rietkloof site in May 2021 re-assessing all Priority bird species in the area and recording flights of the breeding Verreaux's Eagle *Aquila verreauxii* and Black Harriers *Circus maurus* on site. We did so for a minimum of six hours from Vantage Points around the Rietkloof site and they overlapped the proposed grid connection routing (Figure 1). Given that few birds were active in May we re-visited the OHPL section in July 2021 and spent 36 hours in the Vantage Points (VPs) that coincided with the new OHPL routing.

## RESULTS

We found:

- Five collision-prone Priority species were recorded on site – three of which are Red Data species – within the Rietkloof environs. They were *Endangered* Black Harriers and *Vulnerable* Verreaux's Eagles and Ludwig's Bustards. *Least Concern* but priority species included Booted Eagles, Jackal Buzzards, and Pale Chanting Goshawks.
- All of these species were recorded in flight over the grid corridor routing (Figure 1) in 36-hours' observation over three days in late July 2021. Only one Jackal Buzzard was present in May 2021.
- The Passage Rate of the three Red Data species (Black Harrier, Verreaux's Eagle, Ludwig's Bustard) combined was 19 flights in 36-hours or 0.53 flights per hour – a medium-high rate.
- The Passage Rate of the two non-threatened species (Jackal Buzzard, Pale Chanting Goshawk) was three flights in 36-hours or 0.08 flights per hour – a very low rate.
- To determine the risks for these species we determined the flight heights and assumed any flights between 1-m and 20-m would put the birds at risk of impacting the OHPL. Our May 2021 surveys noted no flights here but in July, with the return of Black Harriers, there were numerous flights.
- Of all the (5) species Black Harriers flew 49% of the time ( $n = 59$ , 15-second records) between 1-20-m (i.e., within the height of the power poles proposed to be used for the 132kV lines).
- The other Red Data species spent much less time flying at these heights. Verreaux's Eagles ( $n = 71$ ) were recorded 11% of the time between 1-m and 20-m, and Ludwig's Bustards only 4% of the time ( $n = 25$ ).
- The *Least Concern* species flew 44% (Jackal Buzzard) and 29% (Pale Chanting Goshawk) of the time at these risky heights.

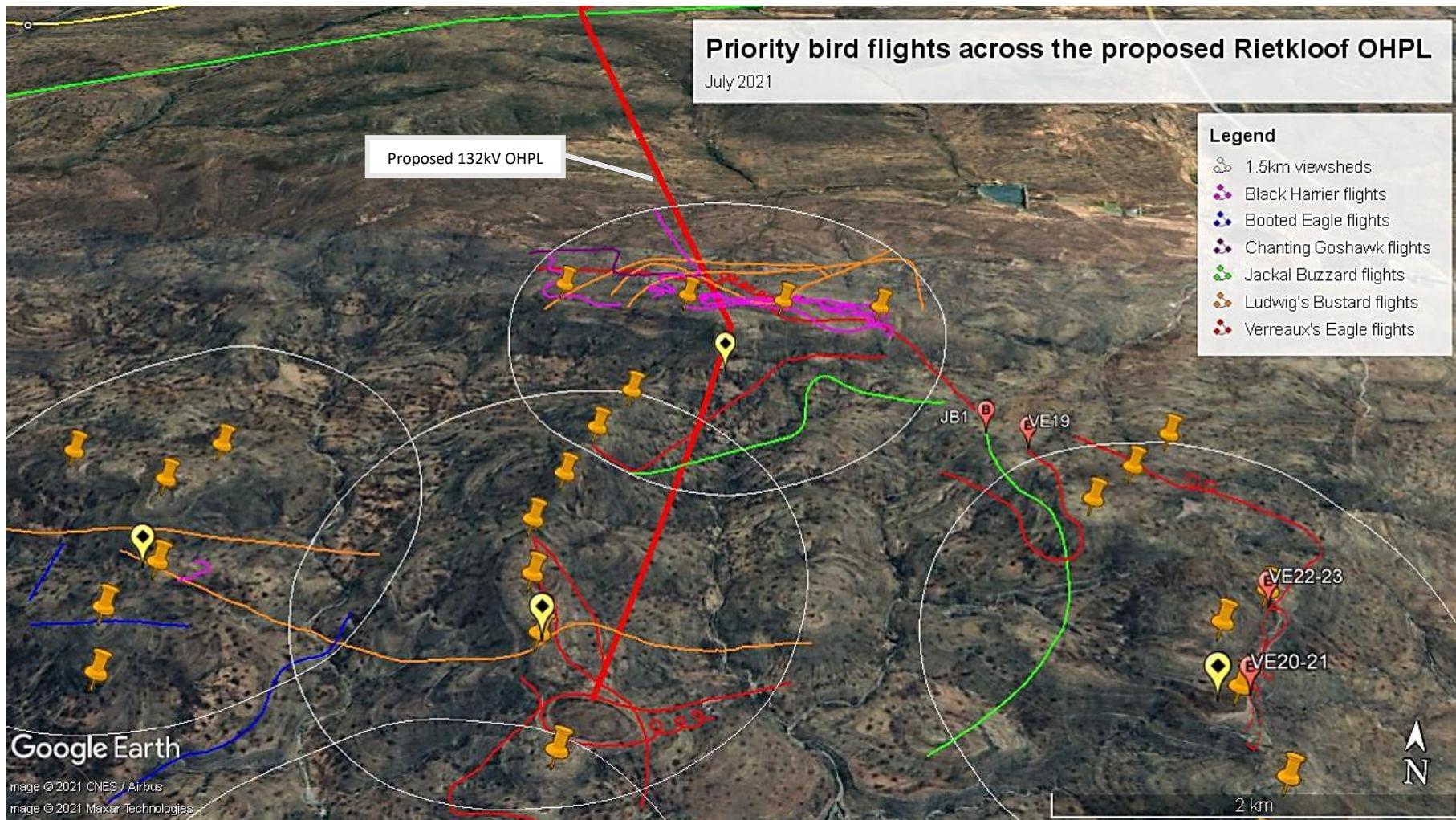
Thus:

- Priority birds regularly collide with power lines (Jenkins et al. 2010, Shaw et al. 2020) – so we offer several old, and one new, mitigation measure to reduce the risk to this suite of birds.
- Of all the species that occurred around the lines it was the *Endangered* Black Harriers that are most at risk to powerline collisions as they flew at heights of 1-20-m, 49% of the time.
- Ludwig's bustards are the most collision-prone species that occur in this site and thousands are killed per year in South Africa by flying into power lines (Shaw et al. 2015).

Southern African Bird Atlas (SABAP2) records indicate that this species occurs with a relatively low reporting rate of 9.1% from 122 full protocol cards in the Euronotus cluster (Rietkloof, Brandvalley, and Karrebosch combined).

As a measure of the likelihood of occurring this means this species is unlikely to be at great risk due to the proposed power line.





**Figure 1:** The 13.8-km grid connection (= thick red line) of the 132kV OHPL from the authorised turbine layout at the Rietkloof WEF (= orange pins) to the national grid. Five priority species were recorded over or near the proposed Rietkloof line in July 2021. Black Harrier (= purple lines) and Verreaux's Eagles (= red lines) were the most numerous of these species. Passage Rates for the three Red Data species near the proposed lines were relatively high at 0.53 flights per hour (about 6 flights per day). The proposed Rietkloof OHPL will bisect the Eskom OHPL (=green lines) at certain stages. Any sections of the 132kv OHPL that parallel the existing Eskom line should be staggered, and the lines that do not parallel the Eskom lines must be mitigated with bird diverters to reduce avian collision fatalities.

## MITIGATIONS for POWER LINES

**Diversers:** Bird diverters (to increase line visibility) are now shown to reduce collisions by large Karoo species by between 50% and 90% depending on the species (Shaw et al. 2020). However, the bustards do not see power lines and other mitigations must be sought.

**Staggered pylons:** Given the large number of bustard victims to power line collisions a new mitigation measure has recently been proposed (Pallett et al. in press). This entails positioning the support towers (pylons) of the proposed line such that the towers of one OHPL are aligned with the mid-span of the adjacent (proposed) OHPL (Photo 1).

This relies on the widespread finding that most collision fatalities occur in the mid-span of the lines, and fatalities become progressively fewer closer to the towers (Shaw et al. 2015, Pallett et al in press). This suggests that birds – especially the bustards – do see, or hear, the pylons and take evasive action.

Staggering of the pylons is proposed as a means to reduce bustard deaths, without the need for additional diverters. Theoretical considerations suggest that, with staggering, fatalities may be reduced by up to 67% (Pallett et al. in press).



**Photo 1:** Example of staggered pylons, in which the tower of one OHPL is aligned with the mid-span of the adjacent OHPL in the Karoo. Theoretically, this should decrease the collision frequency of species such as bustards by 67%.

We note that just one section of the proposed line (1.3-km of its 13.8-km path) will parallel the existing Eskom 400kV lines. This represents only 9.4% of the line.

We therefore suggest the following mitigations -

- Stagger the pylons of the proposed line relative to the existing lines where they run in parallel (Photo 1).
- Add bird diverters to all sections of the line that cannot be aligned.

## ELECTROCUTIONS

Electrocutions of raptors are common on poorly designed support structures (Photo 2).

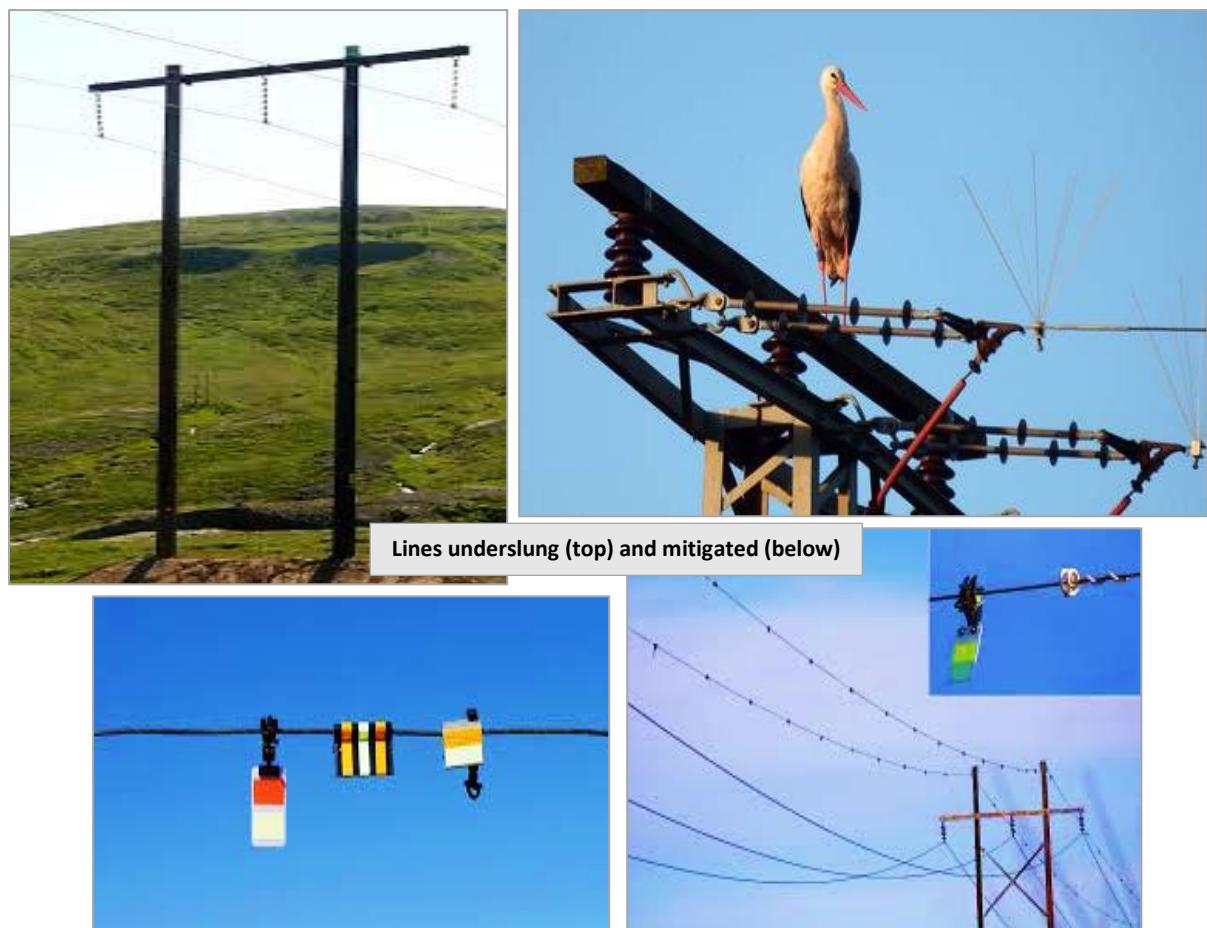
The conductors must always be slung beneath the support poles to reduce the possibility of electrocution, which is achieved when the bird's wings come into contact with the conductors, whilst the bird is simultaneously earthed.



**Photo 2 :** Raptors that perch-hunt from power poles are highly susceptible to electrocution. Should the bird simultaneously touch the earth close to its right wing and conductors with its left wing, it would be killed.



All such poles and pylons are attractive as perch sites for raptors and other species and making them bird-safe is vital (Photos 3a-d).



**Photo 3a-d (above):** Methods used to reduce avian collision fatalities on power lines (by using dynamic bird flappers) and bird-friendly structures (conductors slung beneath the towers) to avoid electrocutions.

## CONCLUSIONS and RECOMMENDATIONS

In conclusion:

- We see some adverse negative effects of the latest layout for the Rietkloof 132kV OHPL grid connection, because of the medium-high flight activity of five priority species around the proposed route (Passage Rate of the three threatened species was 0.56 birds/hour)
- Therefore, the entire line must be fitted with bird diverters to reduce collision frequency.
- However, where the proposed and the existing lines parallel, the pylons should be staggered (Photo 1) to reduce large bird collisions.
- Bird-friendly support structures must be used for the 132kV line such that the conductors are slung below the towers to avoid avian electrocutions.
- If these simple mitigations are followed, we see no reason why the chosen routing should not be authorised.



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