

BRANDVALLEY 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 Brandvalley Wind Energy Facility (WEF) proposed by Red Rocket (Pty) Ltd, 32-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 Brandvalley 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 11.6-km, and it parallels two existing Eskom power lines for short sections along its journey.

The proposed Brandvalley 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 Brandvalley is one of four WEFs) we were requested by Red Rocket (Pty) Ltd 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 11.60-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 Brandvalley 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 Brandvalley site and they overlapped the proposed grid connection routing (Figure 1).

Results: We found:

- Seven collision-prone Priority species were observed – of which four were Red Data species – within the Brandvalley environs. They were *Endangered* Black Harriers, Martial Eagles, and Ludwig's Bustards, and *Vulnerable* Verreaux's Eagles.



- However, no eagle or harrier flights were recorded over the grid corridor routing (Figure 1) in 10-hours' observation over two days in May 2021.
- The only Priority species recorded near any section of the line was the Jackal Buzzard *Buteo rufofuscus* 1.6-km south of the routing.
- Our May 2021 surveys also noted that only one of 48 flights (2%) of the Jackal Buzzard here were at 1-20-m (within the height of the power poles used). Thus, little collision-risk is likely.

The flights of the Jackal Buzzards are shown in Figure 1 (yellow lines) and none were recorded over the corridor. However, because they may occur – and Priority birds regularly collide with power lines (Jenkins et al. 2010, Shaw et al. 2020) – we offer several old and new mitigation measures to reduce the risk to this suite of birds.

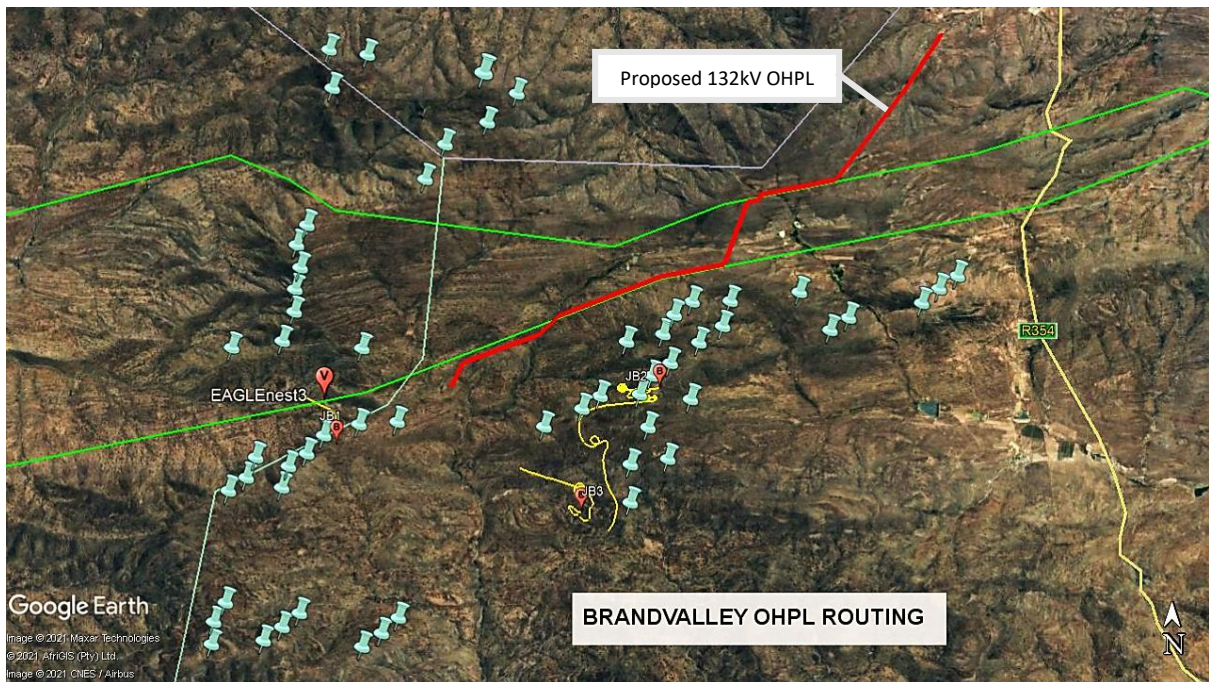


Figure 1: The 11.6-km grid connection (= red line) of the 132 kV OHPL from the authorised turbine layout at the Brandvalley WEF (= light blue pins) down to the national grid. The proposed Brandvalley OHPL will bisect the Eskom OHPL (=green lines) at certain stages. Those areas that run parallel to the existing Eskom line should be staggered, and the lines that do not parallel the Eskom lines should be mitigated with bird diverters to reduce avian collision fatalities. Yellow lines depict flights by Jackal Buzzards, the only Priority bird species found near the OHPL in May 2021.

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. 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.

MITIGATIONS for POWER LINES

Diverters: 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 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.

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



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 certain sections of the proposed line do, indeed, parallel the existing Eskom 400kV lines for 4.5-km of its 11.6-km path. This represents only 39% 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.
- Increase the alignment (and thus the staggered pylons) for the remaining 2.4-km at the west end of the proposed line. At present this is planned to run along the roadway some distance from the existing power line.
- Add bird diverters to all sections of the line that cannot be aligned, or the towers staggered (Photo 1).

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 are in contact with the conductors whilst the bird is simultaneously earthed.

All such poles and pylons are attractive as perch sites for raptors.

Photo 2: Raptors that perch-hunt from power poles are highly susceptible to electrocution. This Long-crested Eagle illustrates this risk – should the bird simultaneously touch the earth stanchion close to its tail and either of the two conductors it would be killed.

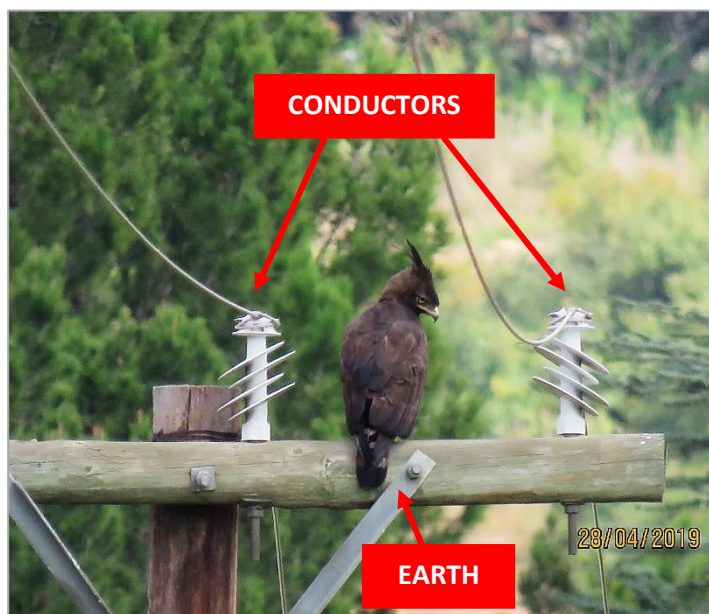
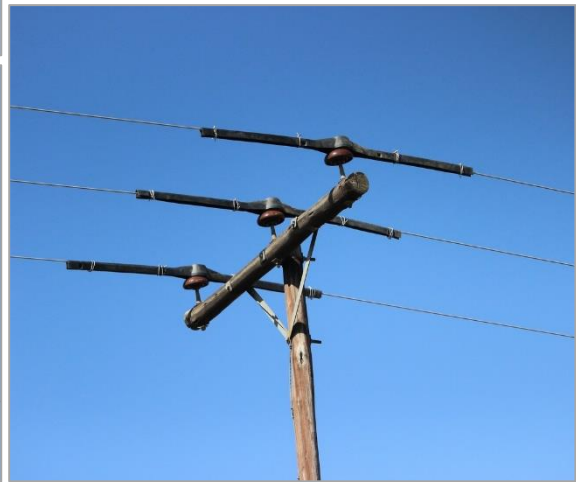
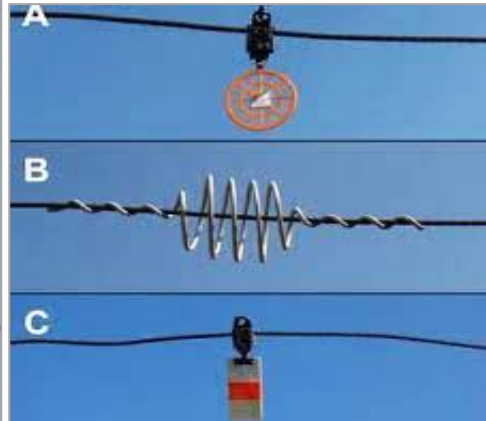




Photo 3a,b,c,d: Making power lines safe for birds of prey, and other species.



CONCLUSIONS and RECOMMENDATIONS

In conclusion:

- We see few adverse negative effects of the latest layout for the Brandvalley 132kV OHPL grid connection.
- However, where the proposed and the existing lines parallel, the pylons would be staggered to reduce large bird collisions.
- The last 2.4-km of the western portion of the 11.6-km grid connection should also be aligned with the existing OHPL and all pylons staggered to correspond with the mid-span of the existing line where possible.
- Where the proposed line and existing lines cannot be aligned bird diverters must be added as the line is erected, to reduce collisions by large collision-prone species.
- Bird-friendly support structures must be used for the 132-kV 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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27 September 2021

