

## **RECOMMENDED EXEMPTION FROM FURTHER PALAEOLOGICAL STUDIES:**

### **PROPOSED CONSTRUCTION OF THE ESKOM KARUSA SWITCHING STATION COMPLEX, 132 KV DOUBLE CIRCUIT OVERHEAD POWER LINE, KARUSA FACILITY SUBSTATION COMPLEX AND ANCILLARY DEVELOPMENTS NEAR SUTHERLAND, NORTHERN CAPE**

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#### **EXECUTIVE SUMMARY**

A recent combined desktop and field-based assessment of the Karusa Wind Energy Facility project area (Almond 2015a) determined that scientifically important fossil remains (*e.g.* vertebrate bones and teeth, petrified wood) are very scarce within the development site (the same area within which the electrical connection infrastructure is proposed). The impact significance of the construction phase of the proposed electrical connection infrastructure - including switching station complex, 132 kV overhead power line, Karusa Substation complex and ancillary developments - is therefore assessed as **LOW** as far as palaeontological heritage is concerned.

It is recommended that, pending the possible discovery of significant new fossil remains during construction, for which the relevant mitigation measures have been included in the Environmental Management Programme (EMPr), exemption from further specialist palaeontological studies and mitigation is granted for the proposed electrical grid connection and ancillary developments for the Karusa Wind Energy Facility near Sutherland, Northern Cape.

#### **1. OUTLINE OF THE PROPOSED DEVELOPMENT**

The Proponent, ACED Renewable Hidden Valley (Karusa Wind Farm), intends to develop the authorised Karusa Wind Energy Facility (Department of Environmental Affairs Ref: 12/12/20/2370/1) on a site some 50 km south of Sutherland, Namakwa District Municipality, Northern Cape.

In order to connect and evacuate the power from the Karusa Wind Energy Facility into the National Eskom grid, the following infrastructure will be required (Fig. 1):

- Construction of the **Eskom Karusa Switching Station** (approximately 120 m x 120 m);
- Construction of a **132 kV double circuit overhead power line**;
- **Ancillaries** (including access tracks/roads, laydown areas, system metering installation, operational and management facilities);
- Construction of the **Karusa Facility Substation Complex** (120 m X 120 m) and ancillaries (including a facility metering station, laydown areas and operational and management facilities).

The proposed overhead power line will have associated access tracks (approximately 4 m in width) for its construction, operation and maintenance where these are required. A 300 m wide corridor has been assessed as part of the Basic Assessment for the project. The proposed infrastructure will fall within this assessed corridor, the final placement of which will depend on local geotechnical, topographical conditions and potential environmental sensitivities. The following properties will be affected by the construction of the proposed overhead power line, switching station, substation complex and ancillaries:

- Remainder of the Farm De Hoop 202;
- Remainder of the Farm Rheeboeke Fontein 209;
- Portion 3 of the Farm Rheeboeke Fontein 209;
- Remainder of the Farm Standvastigheid 210; and
- Farm Standvastigheid 210.

In response to Interim Comments from SAHRA (Case IDs 8654, 8655, dated 9 December 2015) this palaeontological heritage assessment comment covering the proposed grid connection infrastructure for the Karusa Wind Energy Facility has been commissioned as part of two comprehensive Basic Assessments of the projects coordinated by Savannah Environmental (Pty) Ltd, Woodmead (Contact details: Ms Tebogo Mapinga. Savannah Environmental (Pty) Ltd. 1<sup>st</sup> Floor, Block 2, 5 Woodlands Drive Office Park, Woodlands Drive, Woodmead, 2191. Tel: +27 11 656 3237. Fax: +27 86 684 0547. Cell: +27 72 738 3836. Email: tebogo@savannahsa.com. Postal address: P.O. Box 148, Sunninghill, 2157).

### **1.1. Legislative context**

This report falls under Sections 35 and 38 (Heritage Resources Management) of the South African Heritage Resources Act (Act No. 25 of 1999), and it will also inform the EMP for these projects.

The various categories of heritage resources recognised as part of the National Estate in Section 3 of the National Heritage Resources Act include, among others:

- geological sites of scientific or cultural importance;
- palaeontological sites; and
- palaeontological objects and material, meteorites and rare geological specimens.

According to Section 35 of the National Heritage Resources Act, dealing with archaeology, palaeontology and meteorites:

(1) The protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.

(2) All archaeological objects, palaeontological material and meteorites are the property of the State.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority—

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
  - (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
  - (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
  - (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
- (5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—
- (a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
  - (b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
  - (c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
  - (d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Minimum standards for the palaeontological component of heritage impact assessment reports (PIAs) have recently been published by SAHRA (2013).



**Fig. 1. Google earth© satellite image showing the outline of the authorised Karusa Wind Energy Facility on the eastern side of the R354 c. 50 km south of Sutherland, Northern Cape (blue polygon), as well as the location of the existing Komsberg Substation (southern yellow marker), the proposed Karusa Facility Substation complex / Karusa Switching Station (northern yellow marker) and the corridor for the proposed new 132 kV double circuit overhead power line connecting the two (green line).**

## **2. GEOLOGICAL BACKGROUND**

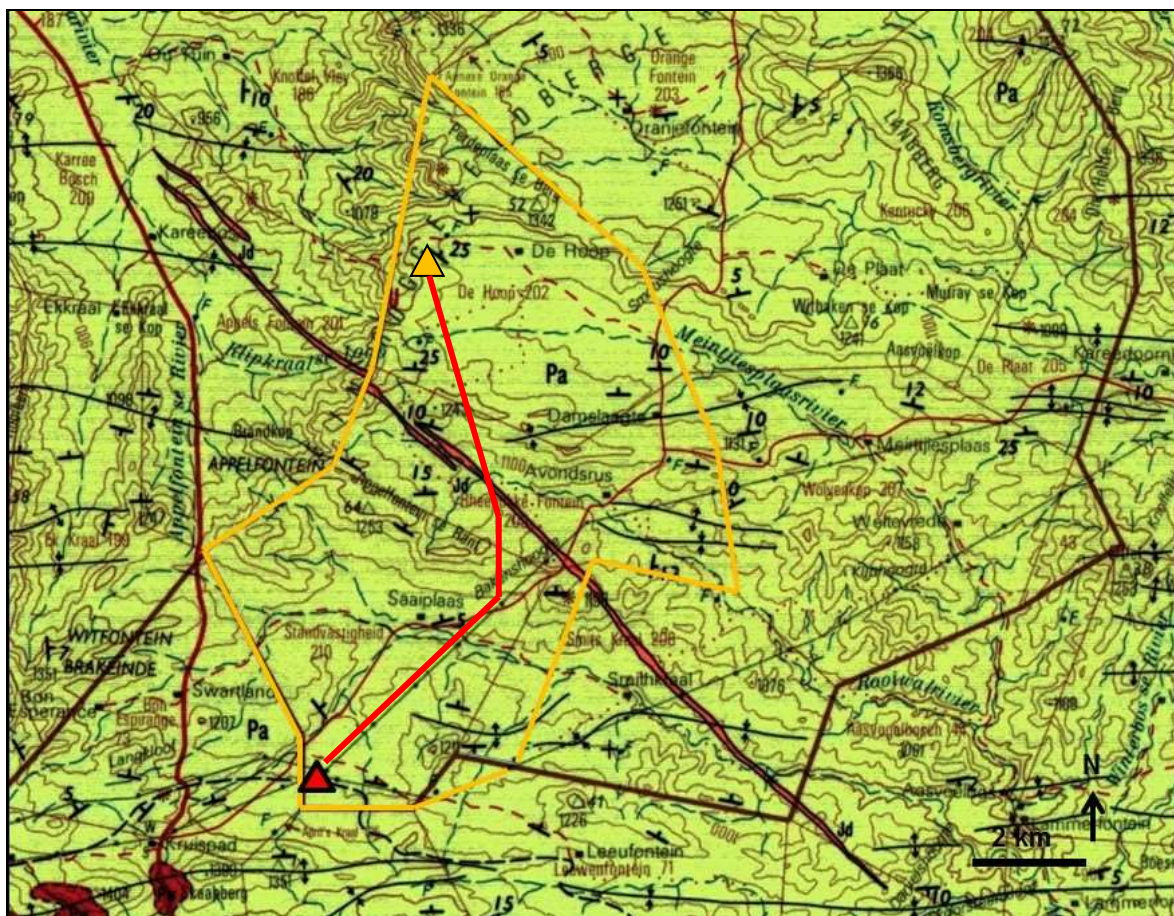
The Karusa Wind Energy Facility project area is underlain by Middle Permian fluvial sediments of the Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) (Fig. 2). These are intruded by a narrow NW-SE trending swarm of Early Jurassic dykes of the Karoo Dolerite Suite in the central part of the area. Bedrock exposure levels in the region are generally very poor due to the pervasive cover by superficial sediments (colluvium, alluvium, soils, calcrete) and vegetation (See recent palaeontological heritage assessment by Almond 2015a).

## **3. PALAEOLOGICAL HERITAGE**

The fluvial Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) that underlies the Karusa Wind Farm project area is known for its diverse fauna of Permian fossil vertebrates - notably various small- to large-bodied therapsids and reptiles - as well as fossil plants of the *Glossopteris* Flora and low diversity trace fossil assemblages. However, desktop analysis of known fossil distribution within the Main Karoo Basin shows a marked paucity of fossil localities in the wider study region between Matjiesfontein and Sutherland where sediments belonging only to the lower part of the thick Abrahamskraal Formation succession, below the Moordenaars



Member, are represented. The recent palaeontological heritage assessments of the Karusa Wind Farm (which also included a walkthrough assessment) and Bontberg Substation project areas (Almond 2015a, 2015b) only recorded common low-diversity trace fossil assemblages (small-scale invertebrate burrows, possible plant stem or root casts) and locally abundant but fragmentary plant remains. The latter include horsetail ferns (arthrophytes) as well as moulds of woody plant material weathering out from the base of channel sandstones high up within the local Abrahamskraal Formation succession (probably the Leeuvlei Member). No fossil vertebrate remains (bones, teeth, coprolites) were recorded within the Karusa Wind Farm project area, but a few equivocal vertebrate burrows-like structures were seen. It was therefore concluded that the Lower Beaufort Group bedrocks in the Karusa Wind Farm project area are generally of **low palaeontological sensitivity** and this also applies to the overlying Late Caenozoic superficial sediments (colluvium, alluvium, calcrete, surface gravels, soils etc).



**Fig. 2. Extract from the 1: 250 000 scale geology sheet 3220 Sutherland (Council for Geoscience, Pretoria, 1999) showing the location of the authorised Karusa Wind Energy Facility, c. 50 km south of Sutherland, Northern Cape Province (yellow polygon). The study area is entirely underlain by Middle Permian sediments of the Abrahamskraal Formation, Lower Beaufort Group (Pa, pale green). The sediments are intruded by a NW-SE trending swarm of dolerite dykes of the Karoo Dolerite Suite (Jd, red) in the central part of the area (Image abstracted from Almond 2015a). The red triangle indicates the position of the existing Komsberg Main Transmission Substation. The orange triangle marks the proposed Karusa Switching Station and Substation Complex. The red line shows the course of the proposed 132 kV double circuit overhead power line.**

#### 4. CONCLUSIONS & RECOMMENDATIONS

Due to the general great scarcity of scientifically important fossil remains as well as the extensive superficial sediment cover observed within the Karusa Wind Farm project area (the same area within which the electrical connection infrastructure is proposed) as determined by recent desktop and field-based palaeontological heritage assessments (Almond 2015a, 2015b), the impact significance of the construction phase of the proposed electrical connection infrastructure - including switching station, 132 kV overhead power line, Karusa Substation and ancillary developments - is assessed as LOW.

**It is therefore recommended that, pending the possible discovery of significant new fossil remains during construction, exemption from further specialist palaeontological studies and mitigation is granted for the proposed electrical grid connection and ancillary developments for the Karusa Wind Energy Facility near Sutherland, Northern Cape.**

Should substantial fossil remains such as vertebrate bones and teeth, plant-rich fossil lenses, fossil wood or dense fossil burrow assemblages be exposed during construction, the responsible ECO/EO/Environmental Representative should safeguard these, preferably *in situ*, and alert SAHRA, *i.e.* The South African Heritage Resources Authority, as soon as possible (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: cscheermeyer@sahra.org.za) so that appropriate action can be taken by a professional palaeontologist, at the Proponent's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy) by a suitably qualified palaeontologist.

These mitigation recommendations have already been incorporated into the EMPr for the Karusa Wind Energy Facility electrical grid connection projects.

Any substantial fossil remains (*e.g.* vertebrate bones and teeth, shells) encountered during excavation should be reported to SAHRA for possible mitigation by a professional palaeontologist (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)).

#### 5. KEY REFERENCES

ALMOND, J.E. 2015a. Authorised Karusa Wind Farm near Sutherland, Namaqua District Municipality, Northern Cape Province. Palaeontological heritage assessment: combined desktop & field-based study, 57 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2015b. Proposed expansion of the existing Komsberg Main Transmission Substation on Farm Standvastigheid 210 near Sutherland, Northern Cape Province. Palaeontological heritage assessment: combined desktop & field-based study (basic assessment), 39 pp. Natura Viva cc, Cape Town.

SAHRA 2013. Minimum standards: palaeontological component of heritage impact assessment reports, 15 pp. South African Heritage Resources Agency, Cape Town.

## 6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Free State, Mpumalanga and Northwest Province under the aegis of his Cape Town-based company *Natura Viva* cc. He was a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

### **Declaration of Independence**

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project, application or appeal in respect of which I was 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 my performing such work.



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