

**PALAEONTOLOGICAL HERITAGE COMMENT: PROPOSED EXEMPTION FROM FURTHER SPECIALIST PALAEONTOLOGICAL STUDIES**

**PROPOSED ESTABLISHMENT OF BATTERY ENERGY STORAGE SYSTEMS FOR THE AUTHORIZED IMPOFU WIND FARMS (EAST, WEST AND NORTH), KOUGA LOCAL MUNICIPALITY, EASTERN CAPE**

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**EXECUTIVE SUMMARY**

Battery Energy Storage Systems (BESS) are proposed for each of the authorized Impofu Wind Farms (Impofu North, Impofu West and Impofu East), located on the southern coastal platform near Humansdorp, Kouga Local Municipality, Eastern Cape Province. All three BESS sites lie in disturbed agricultural lands and are underlain by Ordovician fluvial bedrocks of the Peninsula Formation (Table Mountain Group) that are generally (but not invariably) poorly-exposed and of low palaeosensitivity in this region.

The impact significance of the 3 proposed BESS developments in the Construction Phase is assessed as VERY LOW in terms of fossil heritage resources. There are no known Fatal Flaws with the Impofu BESS proposals and there are no objections on palaeontological heritage grounds to authorization of these 3 BESS projects. This assessment applies equally to both BESS technologies under consideration (viz. Lithium-Ion and Redox-Flow) and there is no preference for either technology type on palaeontological grounds. No further significant palaeontological impacts are anticipated in the operational and decommissioning phases.

It is concluded that, pending the discovery of any significant new fossil remains in the pre-construction or construction phase, no further specialist palaeontological studies (including assessments) are necessary for the three Impofu BESS projects because:

- The footprints of all three sites are very small compared with the outcrop area of the bedrock units concerned (*i.e.* Peninsula Formation, Table Mountain Group);
- The Peninsula Formation bedrocks are poorly exposed here and generally of low palaeosensitivity, as are also the overlying superficial sediments (gravels, sands, ferricrete soils *etc*);
- There are no known fossil sites at the three BESS localities.

A Chance Fossil Finds Procedure (tabulated in Appendix 1) should be implemented by the ECO / ESO during the construction phase. These monitoring and mitigation recommendations should be incorporated into the Environmental Management Programmes (EMPrs) for the three Impofu BESS projects.

**1. INTRODUCTION**

Red Cap Impofu East (Pty) Ltd, Red Cap Impofu West (Pty) Ltd and Red Cap Impofu (Pty) Ltd each propose to establish a Battery Energy Storage System (BESS) adjacent to the approved and planned Impofu East, West and North Wind Farm substations, situated on the southern coastal platform near Humansdorp in the Kouga Municipality, Eastern Cape Province. Each BESS area will be up to 4 ha in extent, with a maximum of 140 MW capacity and up to 8 hours storage. Lithium-Ion and Redox-Flow BESS Technologies are being assessed. The 3 proposed locations are at: BESS North: 34°3'34.29"S 24°32'7.34"E; BESS West: 34°5'4.62"S 24°33'16.72"E; BESS East: 34°6'36.36"S 24°37'7.46"E (Fig. 1).

The BESS sites are planned adjacent to the approved (but not yet constructed) substations on each of the 3 Wind Farms to reduce impacts. The Environmental Impact Assessment processes for the approved Wind Farms included a detailed assessment of the biophysical environment in the area, and developed a set of 'no-go' areas to guide placement of turbines and other supporting infrastructure. The BESS sites are situated outside of these 'no-go' areas.

A Basic Assessment application for each of the 3 BESS sites is being submitted to the National Department of Forestry, Fisheries and Environment (DFFE) in terms of EIA Regulations (2014 as amended) under Section 24 of the National Environmental Management Act (No. 107 Of 1998). The responsible EAP for these developments is the CEN IEM Unit, Port Elizabeth (Contact details: Dr Mike Cohen / Belinda Clark. Address: CEN IEM Unit, 36 River Road, Walmer, Gqeberha (Port Elizabeth) 6070. Phone: (041) 581 2983 / 082 320 3111 / 072 725 6400. Fax: (086) 504 2549. E-mail (preferred): steenbok@aerosat.co.za / bclark@telkomsa.net).

The DFFE Screening reports for the three BESS sites identified them all as being of High palaeosensitivity (Figs. 3 to 5). The present short, combined Palaeontological Heritage Compliance Statement has accordingly been commissioned as part of the Basic Assessments for these projects by CEN IEM Unit.

## 2. PALAEONTOLOGICAL HERITAGE COMPLIANCE STATEMENT

Combined field-based and desktop palaeontological heritage reports for all three Impofu WEF projects and the associated grid connection have been submitted by the author (Almond 2010a-d). Google Earth® satellite imagery shows that the three proposed Impofu BESS sites are all situated in disturbed agricultural lands with no bedrock exposure. All three proposed BESS sites are situated within the relevant Impofu WEF project areas (Fig. 1) and overlie the outcrop area of the quartzite-dominated, fluvial **Peninsula Formation** (Table Mountain Group, Cape Supergroup) of Ordovician age (Fig. 2). Within the topographically subdued, combined Impofu WEF project area the Peninsula Formation is generally poorly-exposed due to coastal planation and superficial sediment cover (ferricretes, gravels, aeolian sand, soils). Where exposed, the Peninsula bedrocks are often karstified and may be secondarily mineralized, chemically weathered and tectonically deformed, compromising fossil preservation. In general, the palaeosensitivity of the Peninsula Formation in the southern Cape region is correspondingly LOW (Important marine trace fossil assemblages have been recorded at a quarry site excavated into the Peninsula Formation near Rosenhof farmstead in the Impofu West Wind Farm project area (Almond 2018b) (red dot in Fig. 1) but this is considered exceptional) .

The High palaeosensitivity suggested by the DFFE Screening Reports (Figs. 3 to 5) is therefore *contested*. A LOW palaeosensitivity for all three BESS sites is inferred here.

The impact significance of the proposed BESS developments in the Construction Phase is assessed as VERY LOW in terms of fossil heritage resources. This assessment applies equally to both BESS technologies under consideration (viz. Lithium-Ion and Redox-Flow) and there is no preference for either technology type on palaeontological grounds.

No further significant palaeontological impacts are anticipated in the operational and decommissioning phases. It is concluded that, pending the discovery of any significant new fossil remains in the pre-construction or construction phase, no further specialist palaeontological studies (including assessments) are necessary for the three Impofu BESS projects because:

- The footprints of all three sites are very small compared with the outcrop area of the bedrock units concerned (*i.e.* Peninsula Formation, Table Mountain Group);
- The Peninsula Formation bedrocks are poorly exposed here and generally of low palaeosensitivity, as are also the overlying superficial sediments (gravels, sands, ferricretes soils *etc*);
- There are no known fossil sites at the three BESS localities.

Cumulative impacts on local palaeontological heritage assessed for the three Impofu WEF projects and associated grid connection in the context of other renewable energy and powerline projects in the region (Almond 2018a-d) have been assessed as minor / low. The three additional BESS developments proposed will not affect this cumulative impact rating.

There are no known Fatal Flaws with the Impofu BESS proposals and there are no objections on palaeontological heritage grounds to authorization of these BESS projects.

### 3. RECOMMENDATIONS FOR THE EMPs

The Environmental Control Officer (ECO) and Environmental Site Officers (ESO) responsible for the BESS development construction phase should be made aware of the potential occurrence of scientifically-important fossil remains within the development footprint. During the construction phase all major clearance operations and deeper (> 1 m) excavations should be monitored for fossil remains on an ongoing basis by the ECO / ESO. Should substantial fossil remains be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ* (See Appendix 1: Chance Fossil Finds Procedure). They should then alert the Eastern Cape Provincial Heritage Resources Agency, ECPHRA (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za) as soon as possible. This is to ensure that appropriate action (*i.e.* recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the proponent's expense. These monitoring and mitigation recommendations should be incorporated into the Environmental Management Programmes (EMPs) for the three Impofu BESS projects.



**Figure 1: Google Earth© satellite image showing the locations of the 3 planned Battery Energy Storage Sites within the authorized Impofu WEF project area. The internal road network of the approved Impofu North, West and East Wind Farms is shown in red (Image abstracted from the BID document produced by the CEN Integrated Environmental Management Unit, Port Elizabeth). The red dot shows the location of important trace fossil assemblages within the Peninsula Formation near Rosenhof farmstead.**



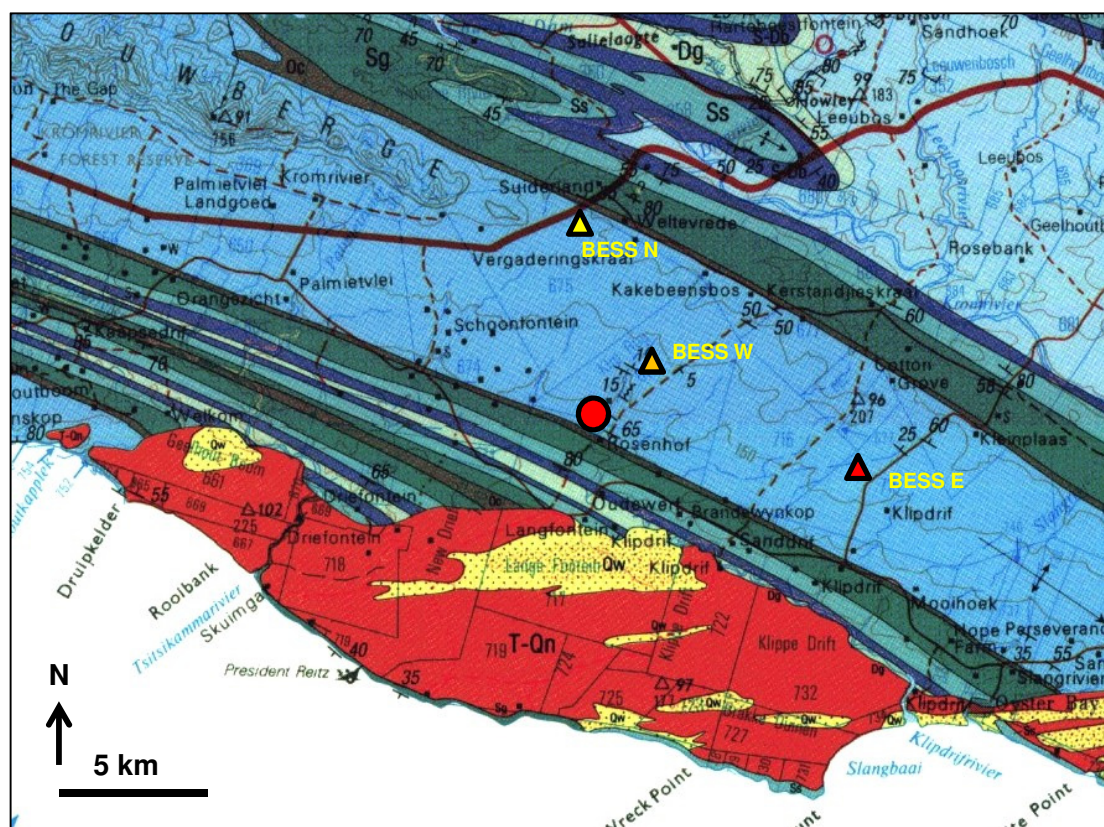


Figure 2: Extract from 1: 250 000 geology sheet 3324 Port Elizabeth (Council for Geoscience, Pretoria) showing the *approximate* locations (small triangles) of the three proposed BESS sites within the authorized Impofu WEF project area near Humansdorp, Eastern Cape (North - yellow, East - red and West - orange). All three BESS sites are underlain by Ordovician fluvial quartzites of the Peninsula Formation (Op, middle blue) that are generally of low palaeosensitivity. Exceptionally, important trace fossil assemblages are recorded in a quarry near Rosenhof farmstead in the Impofu West WEF project area (red dot) but these are very unlikely to also be represented within the proposed three BESS footprints.



#### 4. KEY REFERENCES

ALMOND, J.E., DE KLERK, W.J. & GESS, R. 2008. Palaeontological heritage of the Eastern Cape. Draft report for SAHRA, 20 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2018a. Proposed Impofu East Wind Farm near Humansdorp, Sarah Baartman District Municipality, Eastern Cape. Palaeontological heritage: combined desktop & field-based scoping assessment, 48 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. 2018b. Proposed Impofu West Wind Farm near Humansdorp, Sarah Baartman District Municipality, Eastern Cape. Palaeontological heritage: combined desktop & field-based scoping assessment, 27 pp. Natura Viva cc, Cape Town.

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ALMOND, J.E. 2018d. Grid connection for the proposed Impofu North, Impofu West & Impofu East Wind Farms near Humansdorp, Eastern Cape. Palaeontological heritage: combined desktop & field-based basic assessment, 51 pp. Natura Viva cc, Cape Town.

LE ROUX, F.G. 2000. The geology of the Port Elizabeth – Uitenhage area. Explanation of 1: 50 000 geology Sheets 3325 DC and DD, 3425 BA Port Elizabeth, 3325 CD and 3425 AB Uitenhage, 3325 CB Uitenhage Noord and 3325 DA Addo, 55pp. Council for Geoscience, Pretoria.

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

TOERIEN, D.K. & HILL, R.S. 1989. The geology of the Port Elizabeth area. Explanation to 1: 250 000 geology Sheet 3324 Port Elizabeth, 35 pp. Council for Geoscience, Pretoria.

#### 5. 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, Limpopo, Northwest Province,

Mpumalanga, KwaZulu-Natal and the Free State under the aegis of his Cape Town-based company *Natura Viva* cc. He has served as 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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| APPENDIX 1: CHANCE FOSSIL FINDS PROCEDURE: Proposed BESS developments within the combined Impofu Wind Farm project area near Humansdorp |  |  |
|---|--|--|
| Province & region:  | EASTERN CAPE, NELSON MANDELA BAY MUNICIPALITY  |  |
| Responsible Heritage Resources Agency   | Eastern Cape Provincial Heritage Resources Agency, ECPHRA (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za)  |  |
| Rock unit(s)  | Peninsula Formation (Table Mountain Group) bedrocks , Late Caenozoic superficial deposits (gravels / ferricrete. aeolian sands, soils).  |  |
| Potential fossils   | Peninsula Formation: Low-diversity trace fossil assemblages; microfossils within rare mudrock interbeds.<br>Superficial sediments: rare bones / teeth of vertebrate, trace fossils, stone artefacts.   |  |
| ECO / ESO protocol  | 1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately ( <i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.   |  |
|   | 2. Record key data while fossil remains are still <i>in situ</i> : <ul style="list-style-type: none"> <li>• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo</li> <li>• Context – describe position of fossils within stratigraphy (rock layering), depth below surface</li> <li>• Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (<i>e.g.</i> rock layering)</li> </ul>               |  |
|   | 3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> <li>• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</li> <li>• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</li> </ul>   | 3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> <li>• <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (<i>e.g.</i> entire block of fossiliferous rock)</li> <li>• Photograph fossils against a plain, level background, with scale</li> <li>• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags</li> <li>• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist</li> <li>• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</li> </ul> |
|   | 4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.  |  |
|   | 5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency   |  |
| Specialist palaeontologist  | Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository ( <i>e.g.</i> museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards. |  |