NATURA VIVA cc
Palaeontological Impact Assessments & Heritage Management, Natural History Education, Tourism, Research

Attn: Ms Caroline Evans
CES - Environmental and Social Advisory Services
67 African Street
Grahamstown, RSA

Date: 7 August 2019

PALAEONTOLOGICAL HERITAGE COMMENT:

PROPOSED AMENDMENT OF THE AUTHORIZED DASSIESRIDGE WIND ENERGY FACILITY (WEF) NEAR UITENHAGE, EASTERN CAPE PROVINCE, SOUTH AFRICA

Dear Ms Evans,

I have reviewed (a) the design layout as well as (b) the scope of the proposed 47-turbine Amendment for the authorized 140 MW Dassiesridge WEF near Uitenhage, Cacadu District, Eastern Cape (DEA Reference Number: 14/12/16/3/3/2/643; authorised on 18/05/2016, amended 31/10/2016) in the context of my earlier combined desktop and field-based palaeontological assessment report for this alternative energy development (Almond 2014). The proposed amendments to the Environmental Authorisation for the Dassiesridge WEF are summarized in Table 1. Key components of the amended 47-turbine layout of particular relevance to palaeontological heritage are shown in the satellite image Figure 1.

1. Effect on current impacts

Proposed amendments to the turbine output, hub height and rotor diameter do not have substantial implications for the assessed palaeontological heritage impact significance of the WEF (*i.e.* they are neutral). Reduced palaeontological impact severity due the smaller number of turbine positions and shorter total access road length (notably within one of the palaeontologically-sensitive areas identified) will, to some extent, be offset by high impacts due to more voluminous excavation for turbine footings, larger (but fewer) hard standing areas and wider access roads.

The overall impact significance of the amended WEF design layout remains unchanged (moderate, negative significance, before and after mitigation), as argued in the original assessment by Almond (2014):

Due to (1) the general scarcity of fossil remains within most of the development footprint, (2) the high levels of bedrock weathering and tectonic deformation as well as (3) the extensive superficial sediment cover overlying most potentially fossiliferous bedrocks within the Dassiesridge WEF study area, the overall impact significance of the construction phase of the proposed wind energy project is assessed as only MODERATE (negative). This applies to the wind turbines and associated infrastructure, access roads, substations as well as to the 132 kV transmission line connection to the Eskom grid. No significant further impacts on fossil heritage are anticipated during the operational and decommissioning phases of the WEF.

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2. Effect on mitigation measures

Substantial excavations / surface clearance during the construction phase are now anticipated in only one of the two palaeontologically sensitive areas within the original WEF footprint identified by Almond (2014) – *viz*. Area A indicated in Figure 1 below. Construction phase specialist palaeontological mitigation is therefore only recommended within Area A and *not* in Area B as shown on Figure 1, pending the discovery elsewhere of substantial new fossil remains during construction. Once excavations for infrastructure such as access roads within the first sensitive area are opened, they should be inspected for fossil remains by a professional palaeontologist. 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). The default mitigation recommendations for the remainder of the WEF footprint remain as before:

During the construction phase all deeper (> 1 m) bedrock excavations should be monitored for fossil remains by the responsible Environmental Control Officer (ECO). Should substantial fossil remains - such as vertebrate bones and teeth, fossil shell beds or petrified logs of fossil wood - be exposed during construction, the responsible Environmental Control Officer should safeguard these, preferably in situ, *and alert ECPHRA (i.e. The Eastern Cape Provincial Heritage Resources Agency. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za) as soon as possible so that appropriate action can be taken by a professional palaeontologist at the developer's expense.*

3. Effect on current EA Conditions

The only specific conditions regarding palaeontological heritage resources attached to the original and amended Environmental Authorisations for the Dassiesridge WEF include:

130. If concentrations of fossils are uncovered during construction, all work must cease immediately and be reported to the South Africa Heritage Resources Agency (SAHRA) so that a systematic and professional investigation / excavation can be undertaken.
131. Construction managers / foremen must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.
132. The final layout should be shown to the appointed archaeologist before implementation to confirm that all significant heritage resources have been adequately protected.

All these conditions still stand, albeit the responsible Provincial Heritage Resources Agency is now ECPHRA. The appointed archaeologist should consult a qualified palaeontologist to ensure that Condition 132 is effectively implemented.

It is noted that all mitigation measures listed in the palaeontological specialist report must be included in the EMPr and implemented (Section 16.3 of the EA).

4. Effect on cumulative impacts

The conclusion by Almond (2014) that the cumulative impact significance regarding palaeontological

heritage resources posed by the Dassiesridge WEF in the context of other renewable energy projects in the region is (LOW) still stands.

5. Land use changes to the study area

There have been no significant changes to the current land use in the areas affected by the WEF.

Conclusions

There are no fatal flaws in the amended Dassiesridge WEF development proposal as far as fossil heritage is concerned. Provided that the recommendations for palaeontological monitoring and mitigation outlined in the original palaeontological impact assessment report for the project by Almond (2017), as amended herein (Section 2), are followed through, there are no objections on palaeontological heritage grounds to the proposed amendment of the Environmental Authorisation for the Dassiesridge WEF project.

The Environmental Control Officer (ECO) responsible for the WEF development 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 (*e.g.* for new access roads, turbine placements) and deeper (> 1 m) excavations should be monitored for fossil remains on an on-going basis by the ECO. Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ*. They should then alert the relevant provincial heritage agency as soon as possible - *i.e.* The Eastern Cape Provincial Heritage Resources Agency, ECPHRA. (Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za). 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 developer's expense. These recommendations must be incorporated into the Environmental Management Programme for the construction phase of the Dassiesridge WEF (See tabulated Chance Fossil Finds Procedure appended).

Yours sincerely,

Dr John E. Almond
Palaeontologist
***Natura Viva* cc**

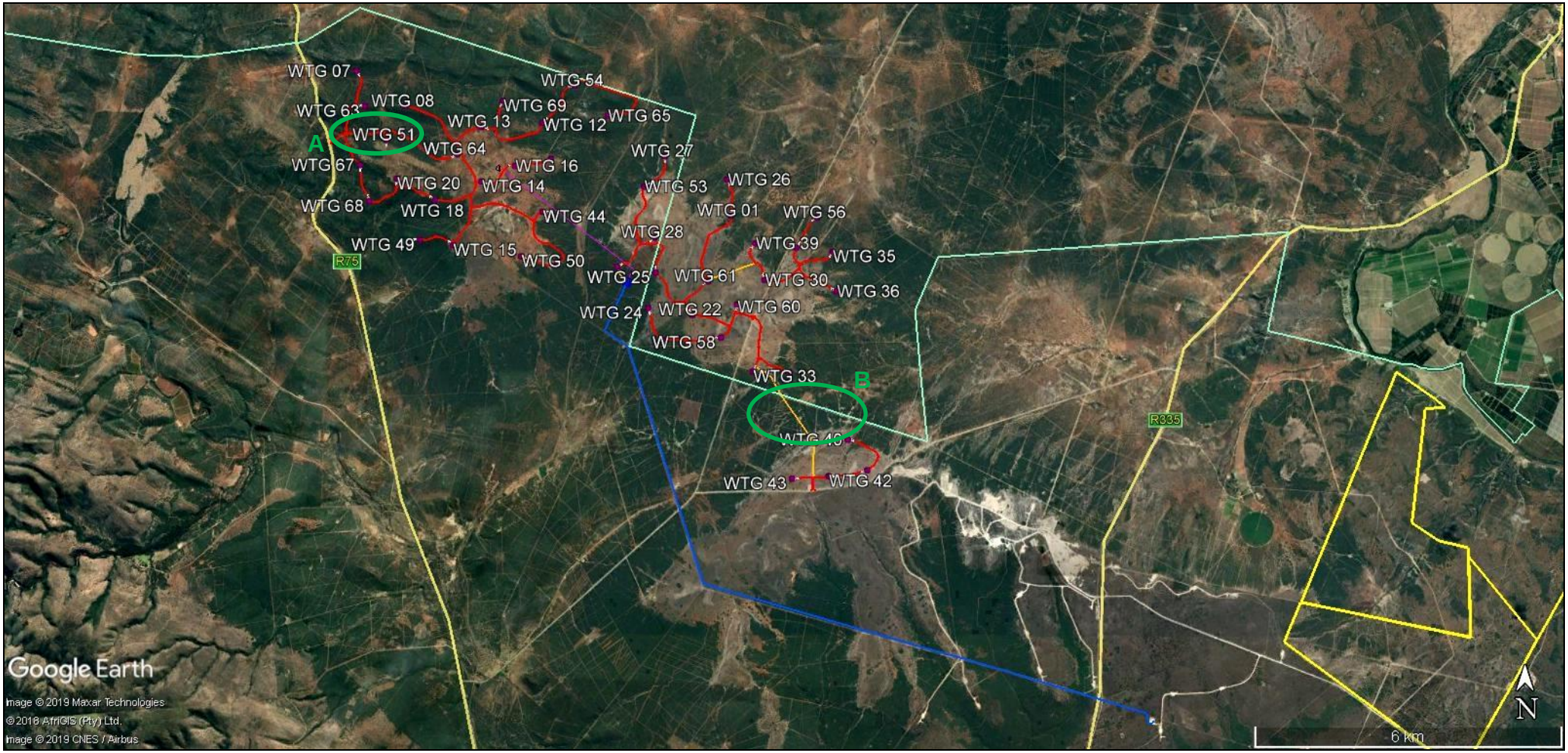
REFERENCES

ALMOND, J.E. 2014. Proposed Dassiesridge Wind Energy Facility near Uitenhage, Cacadu District, Eastern Cape. Palaeontological specialist assessment: combined desktop and field-based study, 66 pp. Natura Viva cc, Cape Town.

Table 1: Proposed amendments to the 140 MW Dassiesridge WEF Environmental Authorisation

SPECS	CURRENT	AMENDMENT
Access roads	Construction width 13m rehabilitated to operational width of 6m	Construction width 14m rehabilitated to operational width of 8m
Turbines	67	47
Output	140MW	140MW
Hub Height	137m	"up to 137m"
Rotor Diameter	132m	"up to 175m"
Concrete Foundations	20m x 20m	30m x 30m
Hard Standing Area	2800m^2	3600m^2

Figure 1 (following page): Google earth© satellite image of the amended design layout for the authorized Dassiesridge WEF near Uitenhage, Cacadu District, Eastern Cape. The proposed 47 wind turbine positions are numbered and the associated access roads are shown in red. Yellow lines = underground cables. Red line = overhead grid connection to Olifantskop Substation. The two small areas outlined by green ellipses represent areas of high palaeontological sensitivity within which construction phase specialist palaeontological monitoring was originally recommended following the palaeontological assessment of the WEF project by Almond (2014). For the amended design layout shown here this recommendation still applies to Area A but *not* to Area B since the latter will now only be traversed by underground cables.



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APPENDIX: CHANCE FOSSIL FINDS PROCEDURE: DASSIESRIDGE WIND ENERGY FACILITY NEAR UITENHAGE		
Province & region:	Eastern Cape, Cacadu District	
Responsible Heritage Management Agency	ECPHRA (*i.e.* The Eastern Cape Provincial Heritage Resources Agency. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za	
Rock unit(s)	Voorstehoek Formation (Lower Bokkeveld Group), Kirkwood & Sundays River Formations (Uitenhage Group), Alexandria Formation (Algoa Group), Late Caenozoic alluvium	
Potential fossils	Shelly invertebrates (Bokkeveld Group); petrified wood, other plant remains, shelly invertebrates, rare vertebrate bones and teeth in Uitenhage Group; shelly invertebrates and trace fossils in Algoa Group; fossil bones, teeth and horn cores, non-marine molluscs and trace fossils within Late Caenozoic alluvium.	
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (*N.B.* safety first!), safeguard site with security tape / fence / sand bags if necessary.	
	2. Record key data while fossil remains are still *in situ:* • Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo • Context – describe position of fossils within stratigraphy (rock layering), depth below surface • Photograph fossil(s) *in situ* with scale, from different angles, including images showing context (*e.g.* rock layering)	
	3. If feasible to leave fossils *in situ*: • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation • Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume	3. If *not* feasible to leave fossils *in situ* (emergency procedure only): • *Carefully* remove fossils, as far as possible still enclosed within the original sedimentary matrix (*e.g.* entire block of fossiliferous rock) • Photograph fossils against a plain, level background, with scale • Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags • Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	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 (e.g. 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.	