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Specialist Statement – Palaeontology
Mulilo De Aar 2 South Wind Energy Facility: Update of Environmental Management Programme (EMPr) and Layout Plan Finalisation Process

Scope: Palaeontology Specialist Inputs for the update of the Environmental Management Programme (EMPr) and Layout Plan Finalisation Process

Project: Establishment of a Wind Energy Facility situated on the Eastern Plateau (South) near De Aar, Northern Cape Province (DFFE Ref No: 12/12/20/2463/1): Finalisation of the Environmental Management Programme (EMPr) and site layout plan process.

Executive Summary
Update of the EMPr and Layout Plan Finalisation Process
Based on the review provided it is concluded that as far as the palaeontology is concerned:

- The proposed Final Layout Plan is acceptable.
- There are no additional mitigation measures required for the Final Layout Plan.
- The mitigation measures recommended in the original palaeontology report (Almond, 2012) and addendum to the report (Almond, 2015) are valid and relevant and do not need to be updated.

A. Introduction and Background

Mulilo Renewable Energy (Pty) Ltd (later updated to Mulilo De Aar 2 South (Pty) Ltd, i.e. the current holder of the Environmental Authorisation) applied for Environmental Authorisation from the Department of Environmental Affairs (DEA) in 2011 to establish a Wind Energy Facility (WEF) and associated infrastructure on the eastern plateau of De Aar (approximately 20 km to the east of the town). The EIA process for the proposed project was undertaken in 2012 and Environmental Authorisation for the proposed project was granted by DEA (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) on 1 March 2013.

The original EA for the project authorised 103 wind turbines with a potential capacity of 155 – 258MW and associated infrastructure. Amendments to the DEA (now DFFE) EA have been applied for by the Applicant, and granted by DFFE, in 2013, 2014, 2016, 2018, 2019, 2020 and 2021 respectively, including a change in the name of the holder of the EA,

extensions of the EA validity period, amendments to Conditions of the EA, amendments to the project description and amendments to the turbine specifications.

B. Proposed Final Layout Plan

The proposed final turbine layout for the project consists of up to 28 Wind Turbine Generator (WTG) positions, of which up to 26 will be developed, with a maximum total capacity of up to 156 MW, including the following:

Project Component	Palaeontological impact
Internal roads (widths): • New roads: 6m width • Upgrading sections of existing roads: 6m width	Depends on location. Important on sensitive sites; irrelevant in non-sensitive sites
Foundations: • 26 x WTG foundations (24 m diameter maximum at lowest point, up to 12 m diameter at surface).	Depends on location. Important on sensitive sites; irrelevant in non-sensitive sites
Hardstands: • 26 x WTG hardstands: Complex geometry (approximate footprint up to 0.47 ha per WTG)	None
IPP Substation Control and O&M building • 2ha	Depends on location
Temporary Laydown Areas: • Total footprint of approximately 24ha (including WTG component laydown area, concrete batching plant, construction office/ yard).	None
Internal reticulation: • 33 kV reticulation.	None
Number of turbines: • Up to 26	Positive – fewer turbines means lower impact
Turbine Hub Height from ground level • Up to 120m	None
Rotor diameter • Up to 165m	None

Update of the EMPr and Layout Plan Finalisation Process

In terms of Condition of Authorisation 13 of the EA, "a copy of the final site layout plan must be submitted with the amended EMPr to the Department for written approval prior to commencement of the activity". Mulilo De Aar 2 South (Pty) Ltd are in the process of finalising the Layout Plan and updating the EMPr for the project, in accordance with the Conditions of Authorisation of EA, for submission to DFFE for approval.

Holland & Associates Environmental Consultants has been appointed by Mulilo De Aar 2 South (Pty) Ltd to undertake the finalisation of the EMPr and Final Layout Plan process, as required in terms of Conditions 13, 14, 15 and 16 of the Environmental Authorisation. The EMPr and Site Layout Plan finalisation process will require inputs from the specialist team, including confirmation of acceptability of the proposed Final Site Layout Plan.

With reference to the kmz "20220721_Mulilo De Aar 2 South WEF Layout" provided with the specialist's Terms of Reference dated 21 July 2022, please note the following:

- Hardstand buffers shown in KMZ – no difference to palaeontological impact
- The layout shows 28 WTG positions, of which up to 26 will be selected. As default, it can be assumed that Turbines 26 & 27 will be removed, but as a backup option turbines 14 & 15 will not be utilised – only 27 is near a highly sensitive palaeontological area, although its location is still acceptable and requires no further PIA.
- Road upgrades – not relevant except for access A and B on routes that are potentially sensitive but have been surveyed - no fossils found.

C. Comment on Almond's work

The comprehensive site visit and walkthrough by Dr John Almond in 2011/2012 (full citation at end) and detailed report covered both the De Aar 2 North WEF and De Aar 2 South proposed WEF areas. Only the De Aar 2 South WEF area will be considered here.

The underlying geology comprises rocks of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup; most likely the Abrahamskraal Formation), intrusive Jurassic dolerite that mostly forms the ridges and plateaux and Quaternary alluvium along the valleys and water courses. This information is still valid.

Palaeontology

Almond referred to the biostratigraphic system of Rubidge et al. (1995) which still stands but has now been refined by Day and Rubidge (2020). The area northwest of De Aar is the Abrahamskraal Formation and the Assemblage Zone is the *Tapinocephalus* Assemblage Zone. In this section of the Karoo Basin, however, it is not possible to determine which of the two subzones of the *Tapinocephalus* Assemblage Zones is represented because of the lack of index fossils.

All the original proposed turbine sites and access roads were visited by Almond. Only a few fossils were found in the southern area.

On Farm Vendussies Kuil 165 in the borrow pit near the Klipfontein homestead, Almond found fragments of the vertebrate *Diictodon* (Almond, 2012, fig 33, page 39; 2012).

On Farm Die Dam a large piece of fossil wood was reported and collected by the previous landowner; precise locality unknown (Almond, 2012, fig 38, page 41).

In the southeast part of Farm Knapdaar 8 Almond found bone fragments (Almond, 2012).

These fossils were not in any proposed turbine footprints.

Almost all the proposed turbine sites and access routes are on non-fossiliferous Jurassic dolerite. There are two exceptions:

1. Access route A around the south of Vendussies Kuil homestead is on the Abrahamskraal Formation. Almond visited this site but found no fossils. The nearby turbines 11 and 12 are on dolerite.
2. Access route B on farm Knapdaar 8, southwest of Rooiwal homestead, is on the Abrahamskraal Formation. Almond visited this route but found no fossils. (Note: The section of access road (from Access B to turbine 23), indicated in the kmz of the proposed Final Layout Plan will be included in a separate Basic Assessment process, and therefore falls outside the scope of the EA amendment process and Final Site Layout Plan process).

D. Conclusion

The impact assessment and recommendation by Almond (2012) and confirmed in the Addendum document (Almond, 2015), remains unchanged and is reproduced below.

The proposed final layout will have no additional impact on the palaeontology, in fact it will be reduced because the number of turbines and access routes is greatly reduced.

Nature of impact: *Disturbance, damage, destruction or sealing-in of scientifically valuable fossil remains preserved at or beneath the ground surface within the development area, most notably by surface clearance and bedrock excavations during the construction phase (e.g. WTG foundations)*

Without mitigation	***With mitigation***	
Extent	*Local (restricted to development footprint)*	*Local (restricted to development footprint)*
Duration	*Impacts occur only during construction phase but are permanent in effect*	*Impacts occur only during construction phase but are permanent in effect*
Magnitude	*Low*	*Low*
Probability	*Low*	*Low*
Significance	***LOW***	***LOW***
Status	*Negative*	*Negative (loss of fossils) & positive (improved fossil database following mitigation)*
Reversibility	*Irreversible*	*Irreversible*
Irreplaceable loss of resources	*Possible, but the limited fossil resources concerned may well also be represented outside the development area (i.e. not unique)*	*Possible, but the limited fossil resources concerned may well also be represented outside the development area (i.e. not unique)*
Can impacts be mitigated?	*Yes*	*Yes.*

Mitigation: *Monitoring of all substantial bedrock excavations for fossil remains by ECO, with reporting of substantial new palaeontological finds (notably fossil vertebrate bones & teeth) to SAHRA for possible specialist mitigation.*

Cumulative impacts*: Unknown (Insufficient data on local alternative energy and other developments available) but probably LOW given rarity of fossil reports from the region and high levels of dolerite intrusion in the De Aar plateau region.*

***Residual impacts**: Negative impacts due to loss of local fossil heritage will be partially offset by positive impacts resulting from mitigation (i.e. improved palaeontological database). (Almond, 2015).*

Conclusion

Based on the review provided above it is concluded that, in terms of potential palaeontological impacts:

- The Final Layout Plan is acceptable
- The proposed final layout will not result in an increased level or change in the nature of palaeontological impacts. There are no additional mitigation measures required as a result of the Final Layout Plan.
- The palaeontology mitigation measures included in the original EMPr are valid and relevant and do not need to be updated.

References

Almond, J.E., 2012. FIELD-BASED ASSESSMENTS. Two wind energy facilities on the Eastern Plateau near De Aar, Northern Cape Province proposed by Mulilo Renewable Energy (Pty) Ltd. January 2012.

Almond, J.E., 2015. PALAEONTOLOGICAL SPECIALIST STUDY: ADDENDUM Proposed application for amendment of the Environmental Authorisation for the proposed Wind Energy Facility situated on the Eastern Plateau (South) near De Aar, Northern Cape Province (DEA Ref No: 12/12/20/2463/AM3): Addendum to Specialist Paleontological Impact Assessment. July 2015.

Day, M.O., Rubidge, B.S., 2020. Biostratigraphy of the Tapinocephalus Assemblage Zone (Beaufort Group, Karoo Supergroup), South Africa. South African Journal of Geology 123, 149-164. doi:10.25131/sajg.123.0012

Rubidge, B.S., Johnson, M.R., Kitching, J.W., Smith, R.M.H., Keyser, A.W., Groenewald, G.H., 1995. Biostratigraphy of the Beaufort group (Karoo Supergroup). In: Biostratigraphic Series 1, South African Committee for Stratigraphy.

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