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Specialist Statement – Palaeontology Mulilo De Aar 2 South Wind Energy Facility: EA Amendment Application

Scope: Palaeontology Specialist Inputs for the Application for Amendment of the EA.

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): Application for Amendment of the Environmental Authorisation

Executive Summary

Part 1 EA Amendment Application

As far as the palaeontology is concerned:

1. The baseline environment has NOT changed significantly since the original assessments and will not change so the assessment remains valid.
2. The proposed amendments will NOT result in an increased level or change in the nature of the impact, which was initially assessed and considered when application was made for the environmental authorisation and subsequent Part 2 EA amendment in 2015 – 2016
3. The final layout is acceptable and the proposed Amendments will have no additional or different impact on the palaeontology. The original impact assessment and mitigation are still valid.
4. No additional walkthrough is required because Almond has already surveyed the sites and routes (Almond, 2012).

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 by Aurecon South Africa (Pty) Ltd in 2012 and Environmental Authorisation for the proposed project was granted by DEA on 1 March 2013. The EIA listed activities for which environmental authorisation has been granted includes Items 10, 11 and 18 of GN R.544, Item 1 of GN R. 545 and Item 14 of GN R.546 published in

terms of NEMA EIA Regulations (2010). Furthermore, on 24 July 2014, a further environmental authorisation for the project was granted in respect of Items 13 and 16 of GN 546 by the Northern Cape Department of Environment and Nature Conservation (DENC) for activities that had not been applied for in the original EIA for the project.

The original EA for the project authorised 103 wind turbines with a potential capacity of 155 – 258MW and associated infrastructure. Eight 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 Amendments and Final Layout Plan

The currently authorised project description includes 25 – 61 turbines and associated infrastructure, including the following specifications:

Component	Description	Palaeontological impact
Hub height from ground level	120m	none
Rotor Diameter	165m	none
Maximum number of turbines	25-61	Depends on location
Permanent affected areas (foundations)	3.5m depth Underground 18.4m diam ground level 10.6m diam	Depends on location
Generation Capacity per turbine	2.3MW – 6.0MW	None
Maximum output of WEF	140MW	None

The proposed final turbine layout for the project consists of up to 28 possible Wind Turbine Generator (WTG) positions, of which up to 26 WTGs would be constructed, with a maximum total capacity of up to 140MW.

The following amendments (underlined below for ease of reference) to the currently authorised project description are proposed:

Proposed Amendment	Palaeontological impact
Internal roads (widths): <ul style="list-style-type: none"> • New roads: 6m width (i.e. change from the authorised 4m wide roads to 6m wide roads); • Upgrading sections of existing roads: 6m width (i.e. upgrading from 4m width, to 6m width). 	Depends on location. Important on sensitive sites; irrelevant in non-sensitive sites (Refer to Section D below)
Foundations: <ul style="list-style-type: none"> • Change from the authorised “18.4m in diameter that narrows up to 10.6m at the surface (the visible portion) with a depth of 3.5 once completed” to “26 x WTG foundations (24 m diameter maximum at lowest point, 12 m diameter at surface)”. 	Depends on location. Important on sensitive sites; irrelevant in non-sensitive sites

	(Refer to Section D below)
Hardstands: <ul style="list-style-type: none"> Change from the authorised ““A permanent hard standing made of compacted gravel and approximately 50 m x 40 m would be constructed adjacent to each turbine location for the crane”, to: “26 x WTG hardstands: Complex geometry (0.47 HA per WTG)” 	None
IPP Substation Control and O&M building: <ul style="list-style-type: none"> No changes to development footprint proposed. Coordinates in EA to be amended 	Depends on location (Refer to Section D below)
Temporary Laydown Areas: <ul style="list-style-type: none"> No changes proposed, but further detail provided (WTG component laydown, concrete batching plant, office yard). 	None
Internal reticulation: <ul style="list-style-type: none"> Change from the authorised “22 kV transmission line” or “Each turbine would have a transformer that steps up the voltage from 690 Volt to 22 kilovolt (kV)”, to “Internal 33 kV reticulation”. 	None
Number of turbines: Change from the authorised “25 – 61” to “up to 26”.	Positive – fewer turbines means lower impact
Generation capacity per turbine: <ul style="list-style-type: none"> Removal of the MW designation per turbine (generation capacity per turbine) 	None
Turbine Dimensions <ul style="list-style-type: none"> Hub height from ground level: Addition of the words “<i>up to</i>”, i.e. from the authorised “120m”, to “<u>up to</u> 120m” Rotor diameter: Addition of the words “<i>up to</i>”, i.e. from the authorised “165m”, to “<u>up to</u> 165m”. 	None; only below ground activities would impact any fossils.

In addition to the abovementioned proposed amendments, the Applicant wishes to extend the validity period of the EA by 2 years (i.e. until 1 March 2025), and include an erroneously omitted Listed Activity (Activity 15 of GN R. 545 (Listing Notice 2) to the EA. The Applicant also wishes to add Portion 7 of Farm Vendussie Kuil No. 165 into the EA (given that a section of a proposed road will cross the corner of Portion 7 of Farm No. 165, which was not included in the original EA). Portion 7 of Farm No. 165 was however included and assessed in the combined EIA process and reporting for the De Aar 2 South WEF and De Aar 2 North WEF in 2012- 2013, and was included in the Final Layout that was recently assessed (2022).

The baseline environment has not changed significantly since the original assessments, and the proposed extension of the EA validity period will not result in an increased level or change in the nature of the potential palaeontological impacts. The proposed inclusion

of (the erroneously omitted) Activity 15 of GN R. 545 (Listing Notice 2) into the EA relates to the physical alteration and transformation of 20 ha or more. The physical alteration of more than 20 ha of the land was assessed in detail as part of the 2012 EIA process and subsequent Part 2 EA amendment process in 2015 for the project.

The proposed amendments to the project description require an amendment to the text of the DFFE EA for the project, accordingly a “Part 1” Application for Amendment of the Environmental Authorisation will be submitted to DFFE.

3. 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 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 Environmental Management Programme (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.

Note: This specialist statement focusses on the proposed Application for Amendment of the Environmental Authorisation (i.e. amendments to the project description in the EA, extension of the validity period of the EA, and proposed inclusion of an erroneously omitted Listed Activity and farm portion into the EA). A separate palaeontological specialist statement has been compiled for inclusion in the EMPr and Layout Plan finalisation process documentation that will be submitted to DFFE for approval in due course.

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 reads were visited by Almond. Only a few fossils were found in the southern area.

On Farm Vendussieskraal 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 turbine footprint.

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. Potential palaeontological impacts

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

Extent	Local (restricted to development footprint)
Duration	Impacts occur only during construction phase but are permanent in effect
Magnitude	Low
Probability	Low
Significance	LOW

With mitigation

Local (restricted to development footprint)
Impacts occur only during construction phase but are permanent in effect
Low
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>i.e.</i> not unique)	Possible, but the limited fossil resources concerned may well also be represented outside the development area (<i>i.e.</i> 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).

Part 1 EA Amendment Application

Baseline Status of the environment – fossils were formed millions of years ago and do not move or change from their site of deposition. The fossils or their locations have not changed since the initial assessment by Dr Almond.

The current status of the assessed environment has not changed since the initial assessment. Since fossils do not move by themselves there has been no change to their presence or absence during this time. Other projects in the area are not applicable because fossils are unique to their location (diversity, abundance, taxa, preservation, etc).

The palaeontological environment (rocks, fossils if any) has not changed since the initial EA was issued.

Site sensitivity verification – The site sensitivity has not changed since Dr Almond completed his site visit because fossils do not move or change. They are inert. The DFFE Screening Tool shows then and now that there has been no change (Figure 1). It should be noted that only some marginal areas in the east and southeast are sensitive (dark red on the DFFE map and red on the SAHRIS Palaeosensitivity map). Dr Almond's site visit is STILL VALID, and no new site visit is required.

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

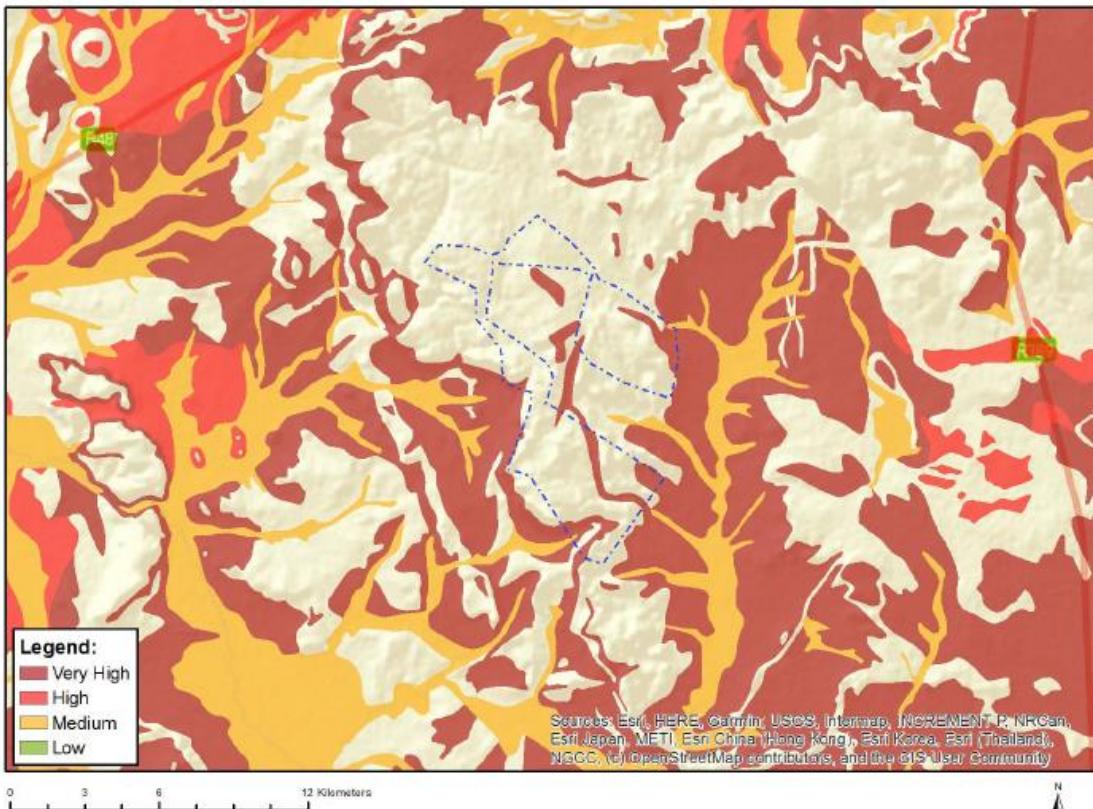


Figure 1: DFFE Sensitivity map for Palaeontology for the De Aar 2 South WEFs, October 2022

The impact rating provided by Dr Almond (see above) was LOW and this would not change with the proposed amendments because the fossil distribution has not changed. It remains valid.

There are no new guidelines for palaeontology, only a requirement for the cumulative Impact of the project. As stated above, each fossil deposit is unique and one does not impact upon another.

The biostratigraphy has been updated since the report by Dr Almond (2012/2013) but this has already been updated in this statement. It makes no difference to the assessment.

Cumulative Impacts

The surrounding environment is varied and the fossil deposits, if present, are unique. Similar developments within a 30km radius will only impact their own footprint. There will be no cumulative impact for the palaeontology. i.e. the impact for the De Aar 2 South WEFs remains LOW.

Conclusion

As far as the palaeontology is concerned:

- The baseline status of the receiving environment has not changed significantly since the original EIA in 2012.

- The initial impact rating undertaken during the initial assessment is still valid.
- The mitigation measures provided in the initial assessment (and subsequent updated assessments) are still applicable.
- No new mitigation measures should be added to the EA or EMPr if the DFFE decides to approve the proposed amendments to the EA.
- The proposed amendments are acceptable and will have no additional or different impact on the palaeontology, i.e. the proposed amendments will not result in an increased level or change in the nature of impacts. The original impact assessment and mitigation are still valid.
- No additional walkthrough is required because Almond has already surveyed the sites and routes (Almond, 2012).

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.

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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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