DRAFT

PALAEONTOLOGICAL IMPACT ASSESSMENT REPORT

THE PROPOSED QUMBU WIND ENERGY FACILITY

Qumbu, Eastern Cape Province South Africa

Communal Land, Mhlontlo Municipality within the
Oliver Tambo *District Municipality*

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26 September 2011

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EXECUTIVE SUMMARY

The development of a Wind Energy Facility near Qumbu in the Eastern Cape is an initiative of InnoWind (Pty) Ltd. Coastal and Environmental Services (CES) commissioned this Palaeontological Impact Assessment as part of the Heritage Impact Assessment. The purpose of the Palaeontological Impact Assessment is to identify exposed and potential palaeontological heritage on the site of the proposed development, to assess the impact the development may have on this resource, and to make recommendations as to how this impact might be mitigated.

The proposed development sites are on communal land to the east of the town of Qumbu which is situated in the Eastern Cape Province. The proposed project is planned to host approximately 30 turbines, each with a nominal power output of between 2 and 3 megawatts (MW). The maximum total potential output of the wind farm is 80MW.

A basic assessment of the topography and geology of the area was made by using appropriate geological (1:250 000) maps in conjunction with Google Earth. A review of the literature on the geological formations exposed at surface in the development site and the fossils that have been associated with these geological strata was undertaken. A site field investigation was conducted on 20 September 2011, with the aim to document any exposed fossil material and to assess the palaeontological potential of the region in terms of the type and extent of rock outcrop in the area.

The Qumbu area consists predominantly of the Adelaide and Tarkastad Subgroups of the Beaufort Group of the Karoo Supergroup. The Tarkastad Subgroup comprises mostly of a lower sandstone rich Katberg Formation and overlying red mudstone rich Burgersdorp Formation. The Adelaide Subgroup comprises of grey and brownish-red mudstones and sandstones. Karoo Dolerite intrusions are present over the entire study area and due to its resistance to weathering, underlie most of the higher topography in the region.

The field investigation confirms that the development site is dominated by rolling hill topography with poor outcrops of the Katberg Formation. These outcrops consist of relatively extensive beds of yellowish-grey to light greenish-grey sandstones and bluish-grey and reddish-grey mudstones. There is a high potential for fossil material in the underlying mudstones that could be uncovered during excavations.

The Katberg Formation areas in the development site have a high palaeontological sensitivity rating. Through adequate monitoring and mitigation measures during excavations, the high impact severity can be lowered to beneficial. The exposure and subsequent reporting of fossils (that would otherwise have remained undiscovered) will be a beneficial palaeontological impact.

It is recommended that a collection and rescue permit be obtained from SAHRA prior to construction. That all earth-moving activities with potential impact on the Katberg formation be monitored by a palaeontologist. That a monitoring report be submitted to SAHRA after the completion of the earth works phase. That the resident ECO be trained by a professional palaeontologist in the recognition of fossil material. If fossil material is later discovered it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof.

<table>
<tr><th colspan="8">SIGNIFICANCE RATING</th></tr>
<tr><th rowspan="2">Rock Unit</th><th rowspan="2">Temporal Scale</th><th rowspan="2">Spatial Scale</th><th rowspan="2">Degree of Confidence</th><th colspan="2">Impact Severity</th><th colspan="2">Overall Significance</th></tr>
<tr><th>With mitigation</th><th>Without mitigation</th><th>With mitigation</th><th>Without mitigation</th></tr>
<tr><td>Katberg Formation</td><td>permanent</td><td>international</td><td>possible</td><td>beneficial</td><td>very severe</td><td>beneficial</td><td>High negative</td></tr>
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1. INTRODUCTION

The development of a Wind Energy Facility near Qumbu in the Eastern Cape is an initiative of InnoWind (Pty) Ltd. Coastal and Environmental Services (CES) commissioned this Palaeontological Impact Assessment as part of the Heritage Impact Assessment. The purpose of the Palaeontological Impact Assessment is to identify exposed and potential palaeontological heritage on the site of the proposed development, to assess the impact the development may have on this resource, and to make recommendations as to how this impact might be mitigated.

1.1. Legal Requirements

This report forms part of the Environmental Impact Assessment for the Qumbu Energy Facility and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the Qumbu Wind Energy Facility Project.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

2. PROPOSED DEVELOPMENT DESCRIPTION

InnoWind (Pty) Ltd, a Franco-South African renewable energy generator that develops, finances, builds, operates and maintains commercial wind powered generation facilities, plans to develop a wind generation facility on communal land to the east of the town of Qumbu, which is situated approximately 60km north of Umtata in the Eastern Cape Province of South Africa (Figure 2.1)

The proposed project is planned to host approximately 30 turbines, each with a nominal power output of between 2 and 3 megawatts (MW) each. The maximum total potential output of the wind farm is 80MW. Other infrastructure associated with the proposed wind farm will include the following.

- Concrete foundations to support the wind towers.
- Approximately 5 meter wide internal access roads to each turbine.
- Underground cables connecting the wind turbines.
- A building to house the control instrumentation and backup power support.
- A storeroom for maintenance equipment.

The ultimate size of the wind turbines will depend on further technical assessments but will typically consist of rotor turbines (3 x 50m blades) with rotor diameters of around 80 - 100 meters atop a 100 meter high steel or hybrid tower. The tower and turbine design and colour will be optimised to minimise visual impact.

Figure 2.1 Location and Layout of the Proposed Qumbu Wind Energy Facility

3. AIMS AND METHODS

After discussions with CES a request for a Phase 1 Palaeontological Impact Assessment (PIA) was received. Following the *"SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports"* the aims of the PIA were:

- identifying exposed and subsurface rock formations that are considered to be palaeontologically significant;
- assessing the level of palaeontological significance of these formations;
- conducting fieldwork to assess the immediate risk to exposed fossils as well as to document and sample these localities;
- commenting on the impact of the development on these exposed and/or potential fossil resources;
- making recommendations as to how the developer should conserve or mitigate damage to these resources.

A basic assessment of the topography and geology of the area was made by using appropriate geological (1:250 000) maps in conjunction with Google Earth. The only limitation on this methodology is the scale of mapping, which restricts comparison of the geology to the 1:250 000 scale. This restriction only applies in areas where major changes in the geological character of the area occur over very short distances or on the geological transformation zones.

A review of the literature on the geological formations exposed at surface in the development site and the fossils that have been associated with these geological strata was undertaken.

A field investigation of the site was conducted on 20 September 2011 by Dr G Groenewald who is an experienced fieldworker. The aims of the fieldwork were to document any exposed fossil material and to assess the palaeontological potential of the region in terms of the type and extent of rock outcrop in the area.

4. GEOLOGY OF THE AREA

The Qumbu area consists predominantly of the Adelaide and Tarkastad Subgroups of the Beaufort Group of the Karoo Supergroup. The Tarkastad Subgroup comprises mostly of a lower sandstone rich Katberg Formation and overlying red mudstone rich Burgersdorp Formation (Groenewald, 1996). The Adelaide Subgroup comprises of grey and brownish-red mudstones and sandstones. Karoo Dolerite intrusions are present over the entire study area and due to its resistance to weathering, underlie most of the higher topography in the region (Figure 4.1).

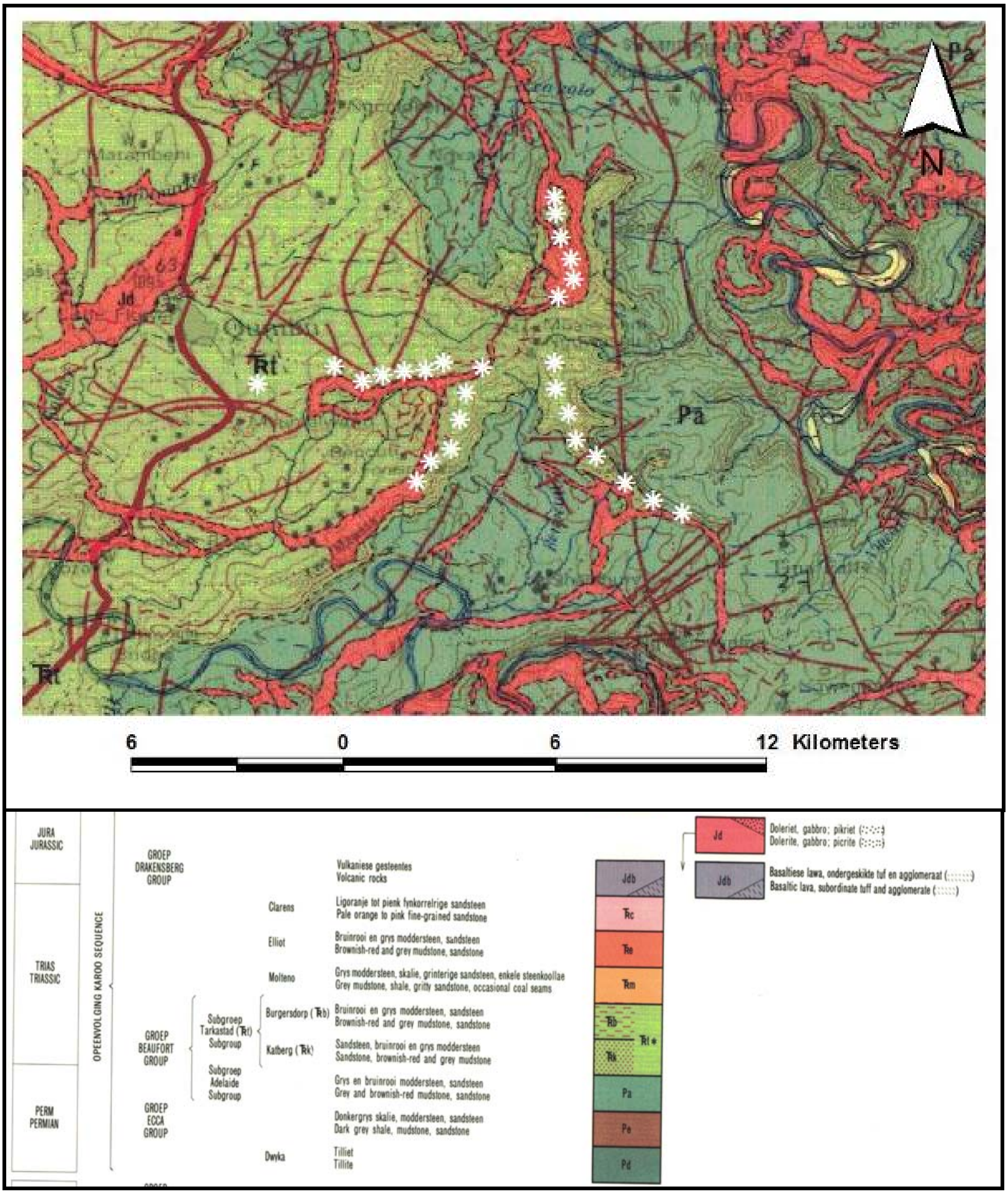

Figure 4.1 **The Geology of Qumbu (Geological Map 3128- Umtata)**

4.1. The Katberg Formation

The study area is specifically underlain by the Katberg Formation of the Tarkastad Subgroup, Beaufort Group (shale, mudstones and sandstones). The Katberg Formation consists of relatively extensive beds of yellowish-grey to light greenish-grey sandstones and bluish-grey and reddish-grey mudstones.

Soils on sandstone hills are deep, freely drained and highly weathered. Soils that are derived from underlying mudstone are generally shallow and low in fertility. Due to the nature of the dispersive soils derived from the underlying mudstone, erosion of the topsoil happens fast. The erosion leads to high percentages of suspended solids in the rivers, reducing the quality of water in the rivers and dams, as well as silting up of dams.

4.2. Karoo Dolerite

Karoo Dolerite intrusions are present over the entire study area. Due to its resistance to weathering, it underlies most of the higher topography in the region.

5. PALAEONTOLOGY OF THE AREA

The value of vertebrate fossils in rocks of the Beaufort Group lies in its use as distinguishable biostratigraphic criteria to refine further subdivision of the group. The biozones employed are based on the vertebrate fossil remains that are so abundant in these rocks.

5.1. The Katberg Formation

The Triassic Katberg Formation overlies the Palingkloof Member of the Balfour Formation and contains important international biostratigraphic information. The Balfour and Katberg Formations represent a time period that includes the Middle Permian to Middle Triassic and contain fossil remains of animals that transcends from reptiles to mammals. The Katberg Formation correlates with the middle and upper part of the *Lystrosaurus* Assemblage Zone, containing fossils of both vertebrates and invertebrates of the Triassic era.

The Katberg Formation also contains some unique well-preserved vertebrate burrows (Groenewald, 1991) that are associated with the *Lystrosaurus* and *Procolophon* fauna that dominates this stratigraphic unit.

Excavations for the foundations of the turbine towers, as well as the roads and other infrastructure, may provide an opportunity to inspect fresh unweathered rock of this assemblage zone in the study area.

5.2. Karoo Dolerite

Due to the igneous character of this rock type it does not contain fossils.

6. FIELD INVESTIGATION

The development area is dominated by rolling hill topography with poor outcrops of the Katberg Formation. These outcrops consist of relatively extensive beds of yellowish-grey to light greenish-grey sandstones and bluish-grey and reddish-grey mudstones (Figure 6.1).

The Katberg Formation's sandstones characteristically comprise repeating, mutually truncating, trough cross-bedded channel-fill sand lenses, and mud-pebble conglomerates are often present at the base (Figure 6.2). The sandstones are by far the dominant element, with mudstones tending to be thin (2-10m) and of limited lateral extent (Groenewald, 1996).

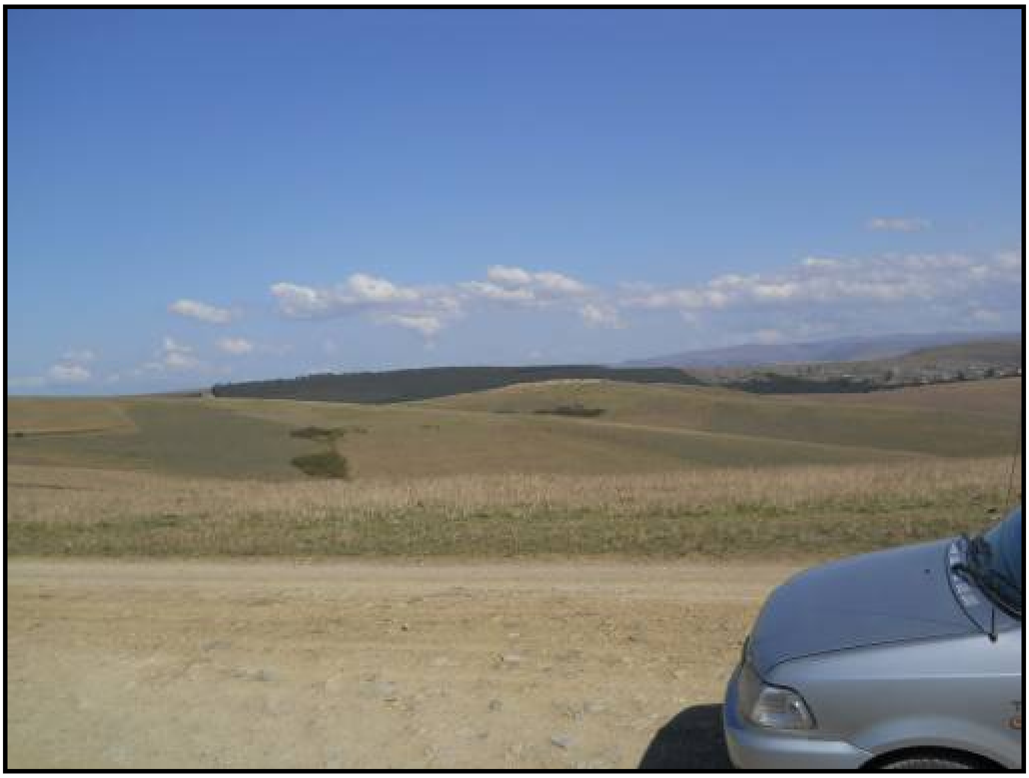

Figure 6.1 **Rolling Hill Topography of Interbedded Sandstone and Mudstone of the Katberg Formation (S31.19207; E28.88456)**

Figure 6.2 **Characteristic Extensive Mudstone Beds of the Balfour Formation (Adelaide Subgroup), underlying the Katberg Formation (Tarkastad Subgroup) in the study area (S32.43602; E27.28911)**

Figure 6.3 Dolerite Outcrops on Higher Topography (S31.17248; E28.93834)

The upper boundary of the Katberg Formation conformably grades into the Burgersdorp Formation, a predominantly red mudstone unit that is not present in the study area.

The ridges and higher topography of the study area consist of dolerite sills and dykes with some prominent outcrops (Figure 6.3)

Field investigations confirmed that very few outcrops of potential fossil-rich mudstone beds are present in the study area. Sandstone outcrops are abundantly present on the steeper hill slopes, in river valleys and in road cuttings. Careful examination of these outcrops did not reveal fossil material. The absence of fossils in the few outcrops examined should not be seen as an indication of the general absence of fossils from these beds, as fossils can be concentrated in specific rock units over very short distances.

7. PALAEONTOLOGICAL SIGNIFICANCE AND RATING

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews, as well as information gathered during the field investigation.

The palaeontological significance and rating is summarised in Table 7.1 and 7.2. For the methodology and definitions of impact rating and significance see Appendix A (CES 2011).

There is a possibility that fossils could be encountered during excavation of non-dolerite bedrock within the development footprint, and these fossils would be of international significance. If effective mitigation is in place at the time of exposure, and the fossils are successfully excavated for study, this would represent a beneficial palaeontological impact.

Table 7.1 Palaeontological Significance of Geological Units on Site

Geological Unit	Rock Type and Age	Fossil Heritage	Vertebrate Biozone	Palaeontological Sensitivity
Drakensberg Group	Dolerite Dykes & Sills (Igneous Intrusions)	None	None	Nil
Katberg **Formation**	Medium to Coarse-Grained Sandstone EARLY TRIASSIC	Vertebrate fossils including amphibians, *Captorhinids, Eosuchids, Dicynodonts, Therocephalians, Cynodonts* and trace fossils.	*Lystrosaurus* Assemblage Zone	High sensitivity

Table 7.2 Significance Rating Table as Per CES Template

Rock Unit	Temporal Scale (duration of impact)	Spatial Scale (area in which impact will have an effect)	Degree of confidence (confidence with which one has predicted the significance of an impact)	Impact severity (severity of negative impacts, or how beneficial positive impacts would be)		Overall Significance (The combination of all the other criteria as an overall significance)	
				With mitigation	Without mitigation	With mitigation	Without mitigation
Katberg Formation	permanent	international	possible	beneficial	very severe	beneficial	High negative

Unfortunately within the Katberg Formation there is no way of assessing the likelihood of encountering fossils during excavation. As evidenced in other similar areas with exposures, fossils were apparently absent or very scarce over large areas, but locally dense accumulations were found.

Therefore, fossils within the development site could be characterised as rare but highly significant. The damage and/or loss of these fossils due to inadequate mitigation would be a highly negative palaeontological impact. The exposure and subsequent reporting of fossils (that would otherwise have remained undiscovered) to a qualified palaeontologist for excavation will be a beneficial palaeontological impact.

8. PALAEONTOLOGICAL IMPACT AND MITIGATION

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews as well as information gathered during the field investigation. The field investigation confirms that most of the area is underlain by the Katberg Formation with Dolerite intrusions.

The Katberg Formation is interbedded with mud- and siltstones that do have potential to yield fossils. The excavation of foundations as well as access roads to the various turbines on the slopes will have the potential to uncover the mud rock and sandstone of the Katberg Formation. Therefore monitoring and mitigation in terms of the palaeontological heritage are required.

Due to the igneous character of Dolerite it does not contain fossils and any excavations into dolerite do not require monitoring or mitigation in terms of palaeontological heritage.

The following colour coding method is used to classify a development area's palaeontological impact as illustrated in Figure 8.1:

- Red colouration indicates a very high possibility of finding fossils of a specific assemblage zone. Fossils will most probably be present in all outcrops on the site/route and the chances of finding fossils during the construction phase are very high.
- Orange colouration indicates a possibility of finding fossils of a specific assemblage zone either in outcrops or in bedrock on the site/route.
- Green colouration indicates that there is no possibility of finding fossils in that section of the site/route development.

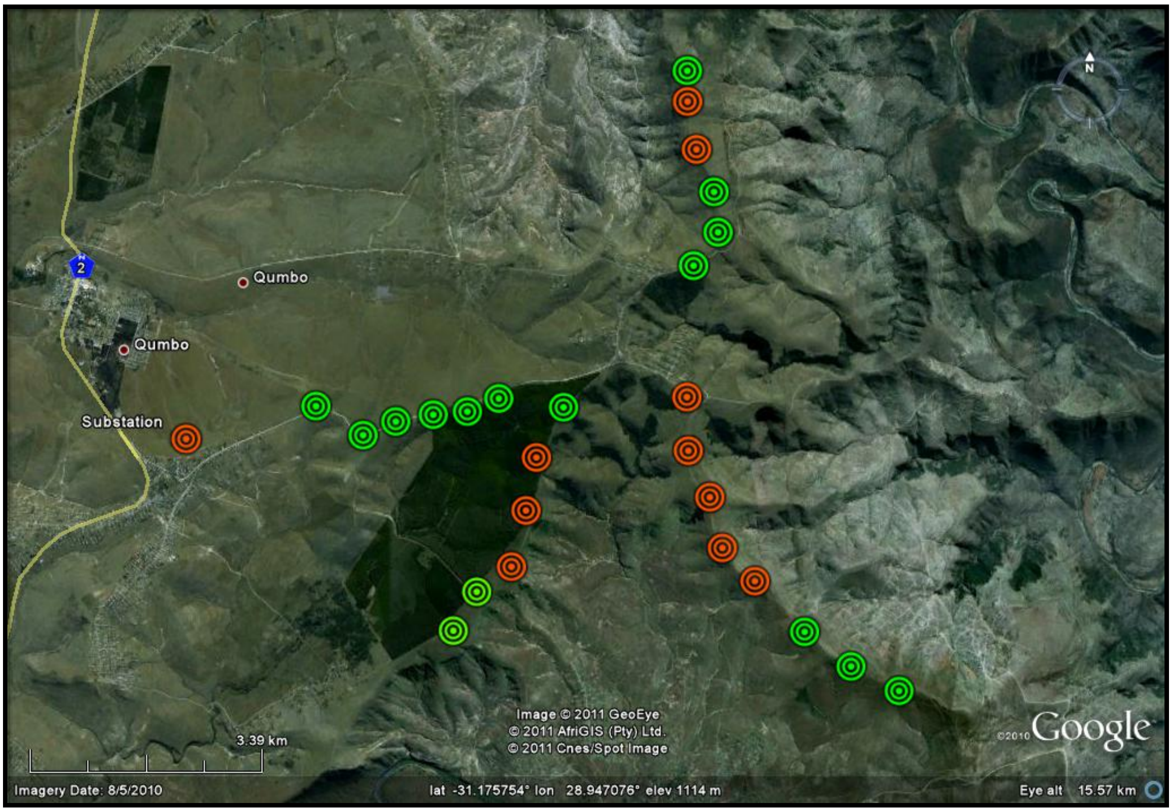

Figure 8.1 Palaeontological Impact of the Proposed Qumbu Wind Energy Facility

The proposed development involves the installation of wind turbines and infrastructure such as roads and buildings. The construction phase will require excavation of bedrock and has the potential to impact directly on fossil heritage if the Katberg Formation's mudstone is exposed. From Figure 8.1 the following mitigation measures are recommended:

Table 8.1 Site Specific Mitigation Measures

Colour Coding (Figure 8.1)	Mitigation Recommended
Green Sites	Igneous or metamorphic rocks underlie these zones, with no potential for fossils.
Orange Sites	All earth-moving activities with potential impact on the Katberg formation are to be monitored by a palaeontologist. A monitoring report should be submitted to SAHRA after completing of the earth-moving activity. The resident ECO must be trained by a professional palaeontologist in the recognition of fossils. If fossil material is later discovered it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation

9. CONCLUSION

The Qumbu Energy Facility site is dominated by rolling hill topography with poor outcrops of the Katberg Formation. These outcrops consist of relatively extensive beds of yellowish-grey to light greenish-grey sandstones and bluish-grey and reddish-grey mudstones. There is a high potential for fossil material in the underlying mudstones that could be uncovered during excavations.

The Katberg Formation areas in the development site have a high palaeontological sensitivity rating. Through adequate monitoring and mitigation measures during excavations, the high impact severity can be lowered to beneficial. The exposure and subsequent reporting of fossils (that would otherwise have remained undiscovered) will be a beneficial palaeontological impact.

It is recommended that:

- A permit for the collection and rescue of fossils from the Katberg Formation must be obtained from SAHRA prior the construction phase.
- All earth-moving activities with potential impact on the Katberg formation are to be monitored by a palaeontologist. A monitoring report should be submitted to SAHRA after completing of the earth-moving activity.
- The resident ECO must also be trained by a professional palaeontologist in the recognition of fossil material. If fossil material is later discovered it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation.

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11. QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the Nelson Mandela Metropolitan University (1996) and the National Diploma in Nature Conservation from the University of South Africa (1990). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

Declaration of Independence

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Dr Gideon Groenewald
Geologist

12. APPENDIX A - METHODOLOGY FOR ASSESSING THE SIGNIFICANCE OF IMPACTS

Although specialists will be given relatively free rein on how they conduct their research and obtain information, they will be required to provide their reports to the EAP in a specific layout and structure, so that a uniform specialist report volume can be produced.

To ensure a direct comparison between various specialist studies, a standard rating scale has been defined and will be used to assess and quantify the identified impacts. This is necessary since impacts have a number of parameters that need to be assessed. Four factors need to be considered when assessing the significance of impacts, namely:

1. Relationship of the impact to **temporal** scales - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.

2. Relationship of the impact to **spatial** scales - the spatial scale defines the physical extent of the impact.

3. The severity of the impact - the **severity/beneficial** scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.

   The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.

4. The **likelihood** of the impact occurs - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

The ***environmental significance*** scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

Negative impacts that are ranked as being of "**VERY HIGH**" and "**HIGH**" significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. lots of **HIGH** negative impacts may bring about a negative decision.

For impacts identified as having a negative impact of "**MODERATE**" significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed.

For impacts ranked as "**LOW**" significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.

Table 9-1: Criterion used to rate the significance of an impact

Significance Rating Table	
Temporal Scale (The duration of the impact)	
Short term	Less than 5 years (Many construction phase impacts are of a short duration)
Medium term	Between 5 and 20 years
Long term	Between 20 and 40 years (From a human perspective almost permanent).
Permanent	Over 40 years or resulting in a permanent and lasting change that will always be there
Spatial Scale (The area in which any impact will have an affect)	
Individual	Impacts affect an individual.
Localised	Impacts affect a small area, often only a portion of the project area.
Project Level	Impacts affect the entire project area.
Surrounding Areas	Impacts that affect the area surrounding the development
Municipal	Impacts affect either the Local Municipality, or any towns within them.
Regional	Impacts affect the wider district municipality or the province as a whole.
National	Impacts affect the entire country.
International/Global	Impacts affect other countries or have a global influence.
Will definitely occur	Impacts will definitely occur.
Degree of Confidence or Certainty (The confidence to predicted the significance of an impact)	
Definite	More than 90% sure of a particular fact. Should have substantial supportive data.
Probable	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Only over 40% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or of the likelihood of an impact occurring.

Table 9-2: The severity rating scale

Impact severity (The severity of negative impacts, or how beneficial positive impacts would be on a particular affected system or party)	
Very severe	**Very beneficial**
An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example the permanent loss of land.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example the vast improvement of sewage effluent quality.
Severe	**Beneficial**
Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation.	A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example an increase in the local economy.
Moderately severe	**Moderately beneficial**
Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated. For example constructing the sewage treatment facility where there was vegetation with a low conservation value.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example a 'slight' improvement in sewage effluent quality.
Slight	**Slightly beneficial**
Medium or short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example a temporary fluctuation in the water table due to water abstraction.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect	**Don't know/Can't know**
The system(s) or party(ies) is not affected by the proposed development.	In certain cases it may not be possible to determine the severity of an impact

Table 3: Overall significance appraisal

<table>
<tr><td colspan="2">Overall Significance (The combination of all the above criteria as an overall significance)</td></tr>
<tr><td>VERY HIGH NEGATIVE</td><td>VERY BENEFICIAL</td></tr>
<tr><td colspan="2">These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.
Example: The loss of a species would be viewed by informed society as being of VERY HIGH significance.
Example: The establishment of a large amount of infrastructure in a rural area, which previously had very few services, would be regarded by the affected parties as resulting in benefits with VERY HIGH significance.</td></tr>
<tr><td>HIGH NEGATIVE</td><td>BENEFICIAL</td></tr>
<tr><td colspan="2">These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.
Example: The loss of a diverse vegetation type, which is fairly common elsewhere, would have a significance rating of HIGH over the long term, as the area could be rehabilitated.
Example: The change to soil conditions will impact the natural system, and the impact on affected parties (such as people growing crops in the soil) would be HIGH.</td></tr>
<tr><td>MODERATE NEGATIVE</td><td>SOME BENEFITS</td></tr>
<tr><td colspan="2">These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.
Example: The loss of a sparse, open vegetation type of low diversity may be regarded as MODERATELY significant.</td></tr>
<tr><td>LOW NEGATIVE</td><td>FEW BENEFITS</td></tr>
<tr><td colspan="2">These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.
Example: The temporary change in the water table of a wetland habitat, as these systems is adapted to fluctuating water levels.
Example: The increased earning potential of people employed as a result of a development would only result in benefits of LOW significance to people who live some distance away.</td></tr>
<tr><td colspan="2">NO SIGNIFICANCE</td></tr>
<tr><td colspan="2">There are no primary or secondary effects at all that are important to scientists or the public.
Example: A change to the geology of a particular formation may be regarded as severe from a geological perspective, but is of NO significance in the overall context.</td></tr>
<tr><td colspan="2">DON'T KNOW</td></tr>
<tr><td colspan="2">In certain cases it may not be possible to determine the significance of an impact. For example, the significance of the primary or secondary impacts on the social or natural environment given the available information.
Example: The effect of a particular development on people's psychological perspective of the environment.</td></tr>
</table>