



**PROPOSED 33 KV POWERLINE NEAR DEALESVILLE,  
WITHIN THE LEJWELEPUTSWA DISTRICT MUNICIPALITY, IN THE FREE STATE**

**PALAEONTOLOGICAL IMPACT ASSESSMENT**

**DFFE Reference:** To be Allocated

**Report Prepared by:** Elize Butler (BANZAI Environmental Pty Ltd)

**Issue Date:** 25 October 2021

**Version No.:** 01

## EXECUTIVE SUMMARY

Banzai Environmental was appointed by SLR Consulting (South Africa) (Pty) Ltd to conduct the Palaeontological Impact Assessment for the proposed development of a 33 kV powerline northwest of Dealesville, Tokologo Local Municipality, within the Lejweleputswa District Municipality, in the Free State. This proposed powerline will be situated on the Remaining Extent of the Farm Walkerville 1031, Portion 1 of Walkerville 1031, Farm Overshot 31 and the Remaining Extent of the Farm Oxford 1030.

The proposed 33kV powerline construction is primarily underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013)

A site-specific field survey of the proposed 33kV powerline was conducted on foot and by motor vehicle on 11 September and 27 October 2021. No visible evidence of fossiliferous outcrops was found. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the proposed 33kV powerline will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is feasible and will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may thus be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO or site manager in charge of these developments. Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)) so that suitable mitigation (recording and collection) can be carried out.



**NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA)**  
**AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 (AS AMENDED) -**  
**REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)**

| Regulation GNR 326 of 4 December 2014, as amended 7 April 2017,<br>Appendix 6  | Section of Report         |
|--|---------------------------|
| 1. (1) A specialist report prepared in terms of these Regulations must contain-<br><br>a) details of-<br><br>i. the specialist who prepared the report; and<br><br>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | Page vi<br><br>Appendix 2 |
| b) a declaration that the specialist is independent in a form as may be specified by the competent authority;  | Page iv                   |
| c) an indication of the scope of, and the purpose for which, the report was prepared;  | Section 2.3               |
| (cA) an indication of the quality and age of base data used for the specialist report;   | Section 5                 |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;  | Section 7                 |
| d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;   | Section 9                 |

|   |             |
|---|-------------|
| e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;  | Section 2.3 |
| f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Section 5   |
| g) an identification of any areas to be avoided, including buffers;   | N/A         |
| h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;   | Section 5   |
| i) a description of any assumptions made and any uncertainties or gaps in knowledge;  | Section 2.4 |
| j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;  | Section 9   |
| k) any mitigation measures for inclusion in the EMPr;   | Section 8   |
| l) any conditions for inclusion in the environmental authorisation;   | Section 8   |
| m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;  | N/A         |
| n) a reasoned opinion- <ul style="list-style-type: none"> <li>i. (as to) whether the proposed activity, activities or portions thereof should be authorised;</li> </ul>   | Section 9   |

|  |           |
|--|-----------|
| <p>(iA) regarding the acceptability of the proposed activity or activities; and</p> <p>ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;</p> |           |
| <p>o) a description of any consultation process that was undertaken during the course of preparing the specialist report;</p>  | N/A       |
| <p>p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and</p>  | No        |
| <p>q) any other information requested by the competent authority.</p>  | No        |
| <p>2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.</p>  | Section 3 |



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

### DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

|                        | (For official use only) |
|------------------------|-------------------------|
| File Reference Number: |                         |
| NEAS Reference Number: | DEA/EIA/                |
| Date Received:         |                         |

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

#### PROJECT TITLE

**PROPOSED CONSTRUCTION AND OPERATION OF THE 132KV/400KV ON-SITE MAIN TRANSMISSION SUBSTATION (MTS) AND ASSOCIATED INFRASTRUCTURE LOCATED NEAR DEALESVILLE IN THE TOKOLOGO LOCAL MUNICIPALITY, LEJWELEPUTSWA DISTRICT IN THE FREE STATE PROVINCE**

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

### **Departmental Details**

**Postal address:**

Department of Environmental Affairs

Attention: Chief Director: Integrated Environmental Authorisations

Private Bag X447

Pretoria

0001

**Physical address:**



Department of Environmental Affairs

Attention: Chief Director: Integrated Environmental Authorisations

Environment House

473 Steve Biko Road

Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support  
at:

Email: [EIAAdmin@environment.gov.za](mailto:EIAAdmin@environment.gov.za)

## SPECIALIST INFORMATION

|  |  |         |   |     |
|--|--|---------|---|-----|
| Specialist Company Name:               | Banzai Environmental Pty Ltd                             |         |   |     |
| B-BBEE                                 | Contribution level<br>(indicate 1 to 8 or non-compliant) | Level 4 | Percentage<br><br>Procurement recognition | 51% |
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## DECLARATION BY THE SPECIALIST

I, Elize Butler, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

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Signature of the Specialist

Banzai Environmental Pty Ltd

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Name of Company:

---

Date:

## CONTENTS

|   |    |
|---|----|
| SPECIALIST INFORMATION                              | ix |
| DECLARATION BY THE SPECIALIST                       | x  |
| 1 INTRODUCTION                                      | 16 |
| 2 ASSESSMENT METHODOLOGY                            | 19 |
| 2.1 Specialist Credentials                          | 19 |
| 2.2 Terms of Reference (ToR)                        | 19 |
| 2.3 Approach  | 20 |
| 2.4 Assumptions and Limitations                     | 21 |
| 3 LEGAL REQUIREMENT AND GUIDELINES                  | 22 |
| 4 PROJECT DESCRIPTION                               | 24 |
| 4.1 Project Location                                | 24 |
| 4.2 Alternatives                                    | 25 |
| 5 BASELINE DESCRIPTION OF THE RECEIVING ENVIRONMENT | 25 |
| 6 SENSITIVITY MAPPING                               | 32 |
| 7 SPECIALIST FINDINGS ASSESSMENT OF IMPACTS         | 33 |
| 7.1 Impact assessment                               | 35 |
| 7.2 Alternatives                                    | 37 |
| 7.3 Cumulative Impacts                              | 37 |
| 8 MITIGATION AND EMP <sub>r</sub> REQUIREMENTS      | 40 |
| 8.1 CHANCE FIND PROTOCOL                            | 40 |
| 8.2 Legislation                                     | 40 |
| 8.3 Background                                      | 40 |
| 8.4 Introduction                                    | 41 |
| 8.5 Chance Find Procedure                           | 41 |
| 9 CONCLUSION AND SUMMARY                            | 43 |
| 9.1 Summary of Findings                             | 43 |
| 10 Conclusion and Impact Statement                  | 43 |
| 11 REFERENCES                                       | 44 |

## LIST OF TABLES

|   |    |
|---|----|
| Table 4-1: <i>GPS coordinates</i> .....   | 25 |
| Table 5-1: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold)..... | 29 |
| Table 7-1: Rating of impacts template and example.....  | 35 |

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 1-1: Google Earth Image (2021) of the proposed 33kV powerline connecting the authorised 75MW Sonoblomo PV facility to the authorised Kentani on-site substation.....  | 18 |
| Figure 1-2: Extract from the 1:50 000 topographic map 2825DA and 2825DB indicating the location of the proposed powerline (in orange) relative to Dealesville in the Free State.....   | 19 |
| <i>Figure 5-2: Close-up view of the extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating the proposed 33kV powerline (in blue) connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealesville in the Free State.</i> ..... | 28 |
| Figure 6-1: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in orange. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High Sensitivity (orange).....   | 32 |
| Figure 7-1: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors).....  | 39 |

## **LIST OF APPENDICES**

Appendix 1: Impact Assessment Methodology

Appendix 2: E. Butler CV

## **GLOSSARY OF TERMS**

### **Fossil**

Mineralized bones of vertebrate and invertebrate animals, as well as plants. A trace fossil is the traces of animals/plants preserved in stone.

### **Heritage**

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

### **Heritage resources**

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures, and equipment of cultural significance.
- places to which oral traditions are attached or which are associated with living heritage.
- historical settlements and townscapes.
- landscapes and natural features of cultural significance.
- geological sites of scientific or cultural importance.
- archaeological and palaeontological sites.
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa.

### **Palaeontology**

Any fossilised remains or fossil trace of animals or plants which lived in the geological past (other than fossil fuels or fossiliferous rock intended for industrial use) and any site which comprises of fossilised remains or traces of past life.

### LIST OF ABBREVIATIONS

| <b>Abbreviations</b> | <b>Description</b>                                |
|----------------------|---|
| DEA                  | Department of Environmental Affairs               |
| DEFF                 | Department of Environment, Forestry and Fisheries |
| DIA                  | Desktop Impact Assessment                         |
| EO                   | Environmental Officer                             |
| EIA practitioner     | Environmental Impact Assessment Practitioner      |
| EIA                  | Environmental Impact Assessment                   |
| HIA                  | Heritage Impact Assessment                        |
| I&AP                 | Interested & Affected Party                       |
| Ma                   | Million years ago                                 |
| NEMA                 | National Environmental Management Act             |
| NHRA                 | National Heritage Resources Act                   |
| PIA                  | Palaeontological Impact Assessment                |
| PSSA                 | Palaeontological Society of South Africa          |
| SAHRA                | South African Heritage Resources Agency           |
| ToR                  | Terms of Reference                                |



## 1 INTRODUCTION

*Banzai Environmental Pty Ltd* has been appointed by SLR South Africa Consulting (PTY) Ltd, on behalf of South Africa Mainstream Renewable Power Developments (Pty) Ltd, hereafter referred to as “Mainstream”, to undertake a Palaeontological Impact Assessment for the proposed addition of one (1) Main Transmission Substation (MTS) and three (3) powerlines (namely 1 x 132kV powerline and 2 x 400kV powerlines) and Li-Ion Battery Energy Storage System to their authorised Kentani Cluster of solar photovoltaic (PV) developments near the town of Dealesville in the Free State Province (the ‘proposed development’). The proposed development will also involve the re-routing of eight (8) 132 kilovolt (kV) powerlines within the grid connection corridor authorised as part of the Kentani Cluster and making provision for this routing in the new proposed MTS. The proposed development area falls within the Tokologo Local Municipality, within the Lejweleputswa District Municipality (refer to Figure 0-2 to Figure 1-2).

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy, Gwede Mantashe announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and six (6) of the aforementioned Solar Energy Facilities received Preferred Bidder status i.e.:

- Kentani Solar PV
- Klipfontein Solar PV
- Klipfontein 2 Solar PV
- Leliehoek Solar PV
- Sonoblomo Solar PV
- Braklaagte Solar PV

These Solar Energy Facilities have now become Strategic Infrastructure Projects i.e. SIPs 8 and 10. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010) and support bio-fuel production facilities.

- SIP 10 Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity

The Kentani Cluster consists of eleven (11) solar PV projects and associated electrical infrastructure (including a powerline), each of which received their own Environmental Authorisation (EA) in 2016 from the Department of Environmental Affairs (DEA) [now referred to as the Department of Forestry, Fisheries, and the Environment (DFFE)]<sup>1</sup>. The proposed MTS and associated infrastructure [i.e., eleven (11) powerlines] will service eleven (11) of Mainstream's solar PV projects authorised as part of the Kentani Cluster.

It should be noted that the proposed MTS and associated infrastructure will be located within the authorised Klipfontein PV facility (14/12/16/3/3/2/722), which is proposed on the Remaining Extent of the Farm Klipfontein No. 305 (SG Code: F00400000000030500000). Of the eleven (11) powerlines, eight (8) are 132kV powerlines which are located within the authorised corridor, and which have been included as part of the authorised solar PV developments. The remaining powerlines [i.e., two (2) 400kV and one (1) 132kV powerlines] fall outside of the authorised corridor and therefore will be assessed as part of the Basic Assessment (BA) process for the MTS

**However**, one of the four powerlines (33kV) mentioned above does not activate a listed activity under the National Environmental Management Act (No. 107 of 1998; NEMA) and was consequently not incorporated in the terms of reference for the BA. This powerline is longer than 300m, and consequently trigger the provisions of S.38(1) of the National Heritage Resources Act No. 25 of 1999 (NHRA). The present report assesses the potential palaeontological impacts from this powerline on its own.

**The 33kV powerline of about 2km will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723) to the authorised Kentani on-site substation (14/12/16/3/3/2/724).**

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<sup>1</sup> It should be noted that the validity period of the EA issued for the Klipfontein Solar PV Energy Facility in 2016 was extended by the Holder of the EA in April 2021 (14/12/16/3/3/2/722/AM1). The EA issued in 2016 is now valid until 06 June 2026 (i.e., EA lapses on 06 June 2026).



*Figure 0-1: Google Earth Image (2021) of the proposed 33kV powerline connecting the authorised 75MW Sonoblomo PV facility to the authorised Kentani on-site substation.*

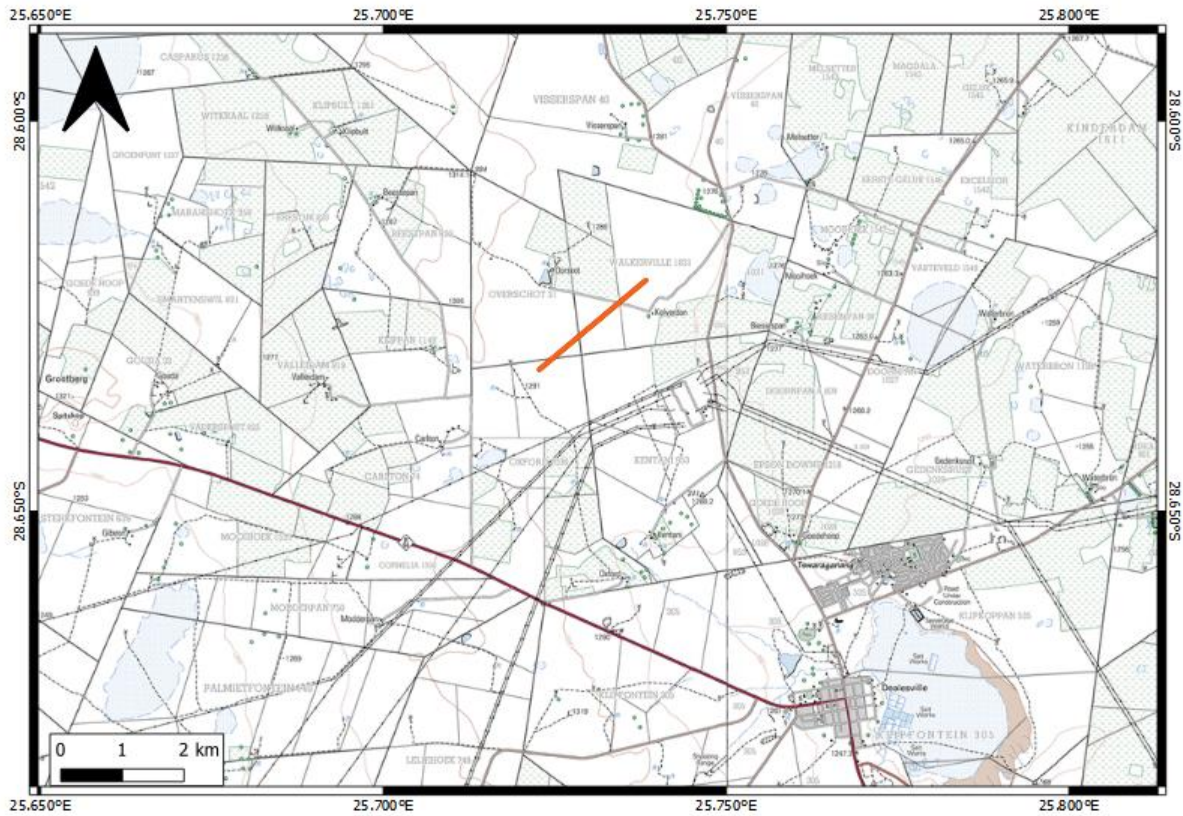


Figure 0-2: Extract from the 1:50 000 topographic map 2825DA and 2825DB indicating the location of the proposed powerline (in orange) relative to Dealesville in the Free State

## 2 ASSESSMENT METHODOLOGY

### 2.1 Specialist Credentials

Please see Appendix 1 (E. Butler CV)

### 2.2 Terms of Reference (ToR)

The terms of reference for the appointment have two elements namely

(1) Site Sensitivity Verification Report; and

(2a) Specialist Assessment Report / Compliance Statement (as applicable in terms of GN 320 of 20 March 2020 and GN 1150 of 30 October 2020); **OR**

(2b) Appendix 6 of the EIA Regulations, 2014 (as amended) (should no protocols apply to the discipline).

## 2.3 Approach

The aim of a Palaeontological Impact Assessment (PIA) is to decrease the effect of the development on potential fossils at the development site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the purpose of the PIA is: 1) to identify the palaeontological importance of the rock formations in the footprint; 2) to evaluate the palaeontological magnitude of the formations; 3) to clarify the impact on fossil heritage; and 4) to suggest how the developer might protect and lessen possible damage to fossil heritage.

The palaeontological status of each rock section is calculated as well as the possible impact of the development on fossil heritage by a) the palaeontological importance of the rocks, b) the type of development and c) the quantity of bedrock removed.

When the development footprint has a moderate to high palaeontological sensitivity a field-based assessment is necessary. The desktop and the field survey of the exposed rock determine the impact significance of the planned development and recommendations for further studies or mitigation are made. **Destructive impacts on palaeontological heritage usually only occur during the construction phase while the excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.**

Mitigation usually precede construction or may occur during construction when potentially fossiliferous bedrock is exposed. Mitigation comprises the collection and recording of fossils. Preceding excavation of any fossils a permit from SAHRA must be obtained and the material will have to be housed in a permitted institution. When mitigation is applied correctly, a positive impact as possible because our knowledge of local palaeontological heritage may be increased

he terms of reference of a PIA are as follows:

### **General Requirements:**

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended.
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements.
- Submit a comprehensive overview of all appropriate legislation, guidelines.
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study.
- Description and location of the proposed development and provide geological and topographical maps.
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kml's) in the proposed development.
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
  - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
  - b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
  - c. **Cumulative impacts** result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.
- Fair assessment of alternatives (infrastructure alternatives have been provided):
- Recommend mitigation measures to minimise the impact of the proposed development; and
- Implications of specialist findings for the proposed development (such as permits, licenses etc).

## 2.4 Assumptions and Limitations

When conducting a Paleontological Impact Assessment (PIA) several factors can affect the accuracy of the assessment. The focal point of geological maps is the geology of the area, and the sheet

explanations were not meant to focus on palaeontological heritage. Many inaccessible regions of South Africa have not been reviewed by palaeontologists and data is generally based on aerial photographs. Locality and geological information of museums and universities databases have not been kept up to date or data collected in the past have not always been accurately documented.

Comparable Assemblage Zones in other areas is used to provide information on the existence of fossils in an area which was not yet been documented. When similar Assemblage Zones and geological formations for Desktop studies is used it is generally **assumed** that exposed fossil heritage is present within the footprint. A field-assessment is thus necessary to improve the accuracy of the desktop assessment.

### **3 LEGAL REQUIREMENT AND GUIDELINES**

#### **National Heritage Resources Act (25 of 1999)**

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

The identification, evaluation and assessment of any cultural heritage site, artefact or finds in the South African context is required and governed by the following legislation:

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

The next section in each Act is directly applicable to the identification, assessment, and evaluation of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998

- Basic Assessment Report (BAR) – Regulations 19 and 23
- Environmental Impacts Assessment (EIA) – Regulation 23
- Environmental Scoping Report (ESR) – Regulation 21
- Environmental Management Programme (EMPr) – Regulations 19 and 23

National Heritage Resources Act (NHRA) Act 25 of 1999

- Protection of Heritage Resources – Sections 34 to 36
- Heritage Resources Management – Section 38

MPRDA Regulations of 2014

Environmental reports to be compiled for application of mining right – Regulation 48

- Contents of scoping report – Regulation 49
- Contents of environmental impact assessment report – Regulation 50
- Environmental management programme – Regulation 51
- Environmental management plan – Regulation 52

The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) “...*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*”.

In agreement with legislative requirements, EIA rating standards as well as SAHRA policies the following comprehensive and legally compatible PIA report have been compiled.

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.



This Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length.
- the construction of a bridge or similar structure exceeding 50 m in length.
- any development or other activity which will change the character of a site—
- (Exceeding 5 000 m<sup>2</sup> in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent.

or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority

## **4 PROJECT DESCRIPTION**

### **4.1 Project Location**

The proposed 33kV powerline will be approximately 2km in length and will connect the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), which is about 5km north of the proposed MTS site, to the authorised Kentani on-site substation (14/12/16/3/3/2/724) (about 4km north-west of proposed MTS site). A service track under the proposed powerline will also be required. No corridor is being considered for the proposed 33kV powerline.

This proposed powerline project will be located on the following properties / farm portions:

- Remaining Extent of the Farm Walkerville 1031,
- Portion 1 of Walkerville 1031,
- Farm Overschot 31 and
- the Remaining Extent of the Farm Oxford 1030.

Table 4-1: GPS coordinates

|                          |                           |
|--------------------------|---------------------------|
| North-Eastern End        | South-Western End         |
| S28 37'13.5"E 25°44'17.7 | S28°37'54.6"E 25°43'21.8" |

## 4.2 Alternatives

No alternative locations have been identified for the proposed 33 kV powerline project as it is part of the infrastructure for the solar facilities.

## 5 BASELINE DESCRIPTION OF THE RECEIVING ENVIRONMENT

The proposed 33kV powerline connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealsville in the Free State is depicted on the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) (Figure 5-1 and Figure 5-2).

The overall geology of the area is uniform with only the Quaternary sediments, Jurassic dolerite, and the Tierberg Formation of the Eccca Group (Karoo Supergroup) represented. The proposed powerline is primarily underlain by the Tierberg Formation (Eccca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013) (Figure 0-3).

As seen on topographical and Google Earth Images (Figure 1-1 and 1-2) the relief of the proposed powerline is low and thus exposure levels of the Tierberg are low. The area is also extensively mantled by superficial alluvium and calcrete soils. Fossils are found in widespread bedding planes, which are not present in the proposed development footprint.

The Tierberg Formation consists of a recessive-weathering, thick, mudrock-dominated succession. These rocks comprise mostly of dark, often grey to brown, well-laminated, carbonaceous shales with subordinate thin, fine-grained sandstones (Prinsloo 1989, Le Roux 1993, Viljoen 2005, Johnson *et al.*, 2006). The Early to Middle Permian Tierberg shales were deposited in a series of offshore,

quiet water environments below wave base and include basin plain, distal turbidite fan and distal prodelta in ascending order (Viljoen 2005, Almond in Macey et al. 2011). Towards the top of the formation thin coarsening-upwards cycles occur with confined evidence of ripples and common calcareous concretions as well as soft-sediment deformation. Thin volcanic ash layers (water-lain tuffs) are known in these sediments. The Ecca Basin were a restricted, brackish water environment. The Tierberg mudrocks are often baked to a dark grey hornfels with a reddish-brown crust close to the contact with Karoo dolerite intrusions (Prinsloo 1989). The Tierberg formation is known for its rare trace fossils assemblages. Vascular plants (including petrified wood) and palynomorphs of *Glossopteris* flora have been found while crustaceans, shelly marine invertebrates, insects and fish fossils as well as microfossils have been identified.

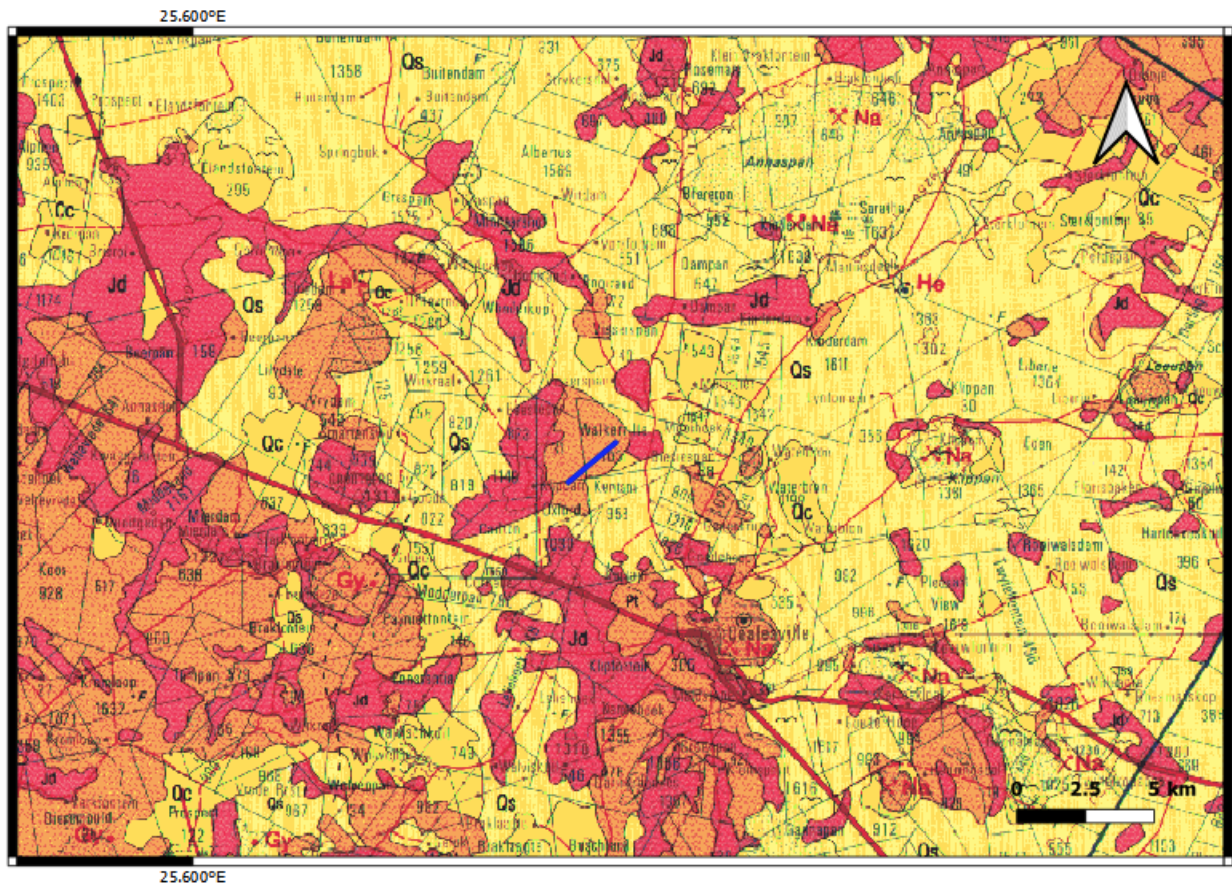


Figure 5-1: Extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating the proposed 33kV powerline (in blue) connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealsville in the Free State.

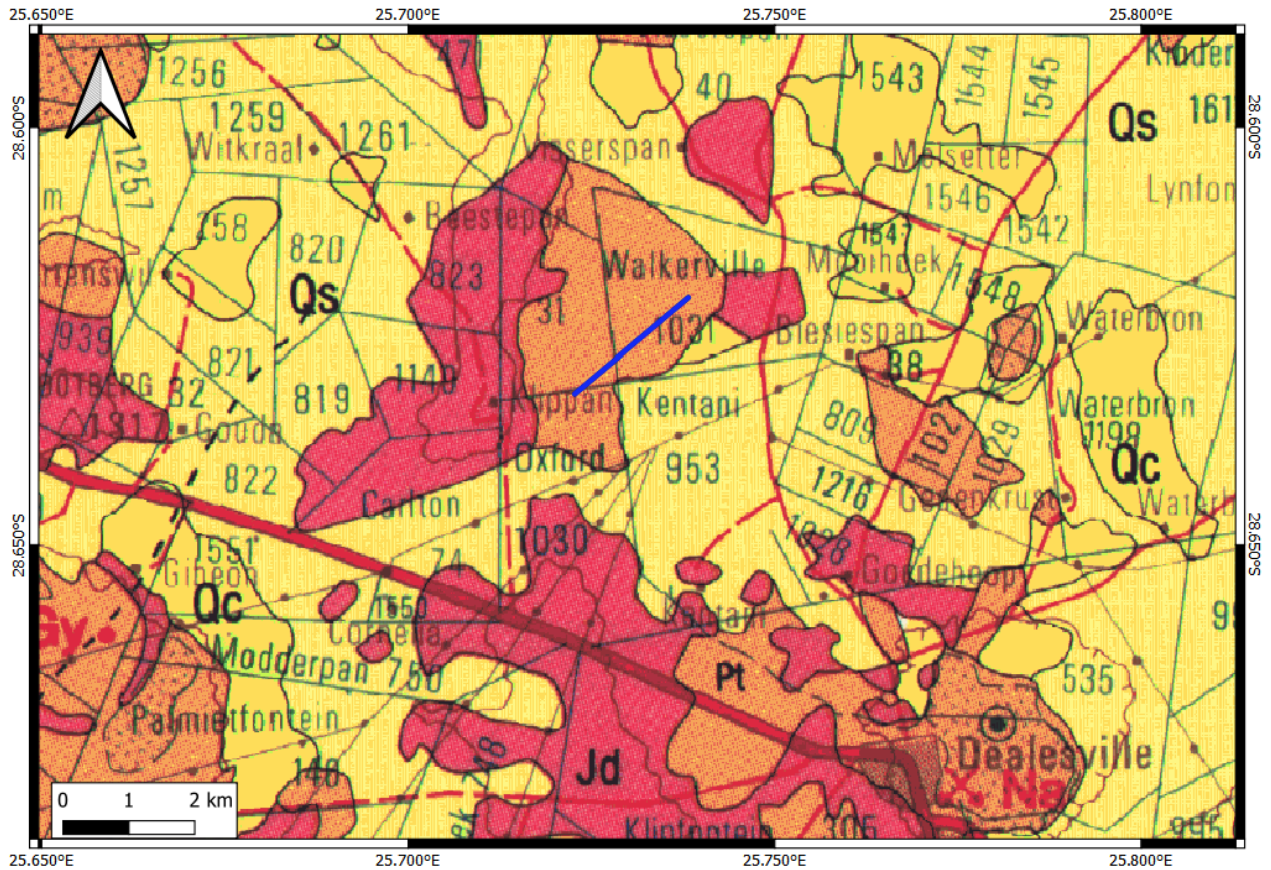


Figure 5-3: Close-up view of the extract of the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria) indicating the proposed 33kV powerline (in blue) connecting the authorised 75MW Sonoblomo PV facility (14/12/16/3/3/2/723), to the authorised Kentani on-site substation (14/12/16/3/3/2/724) MTS site near Dealsville in the Free State.

Legend of 250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria).

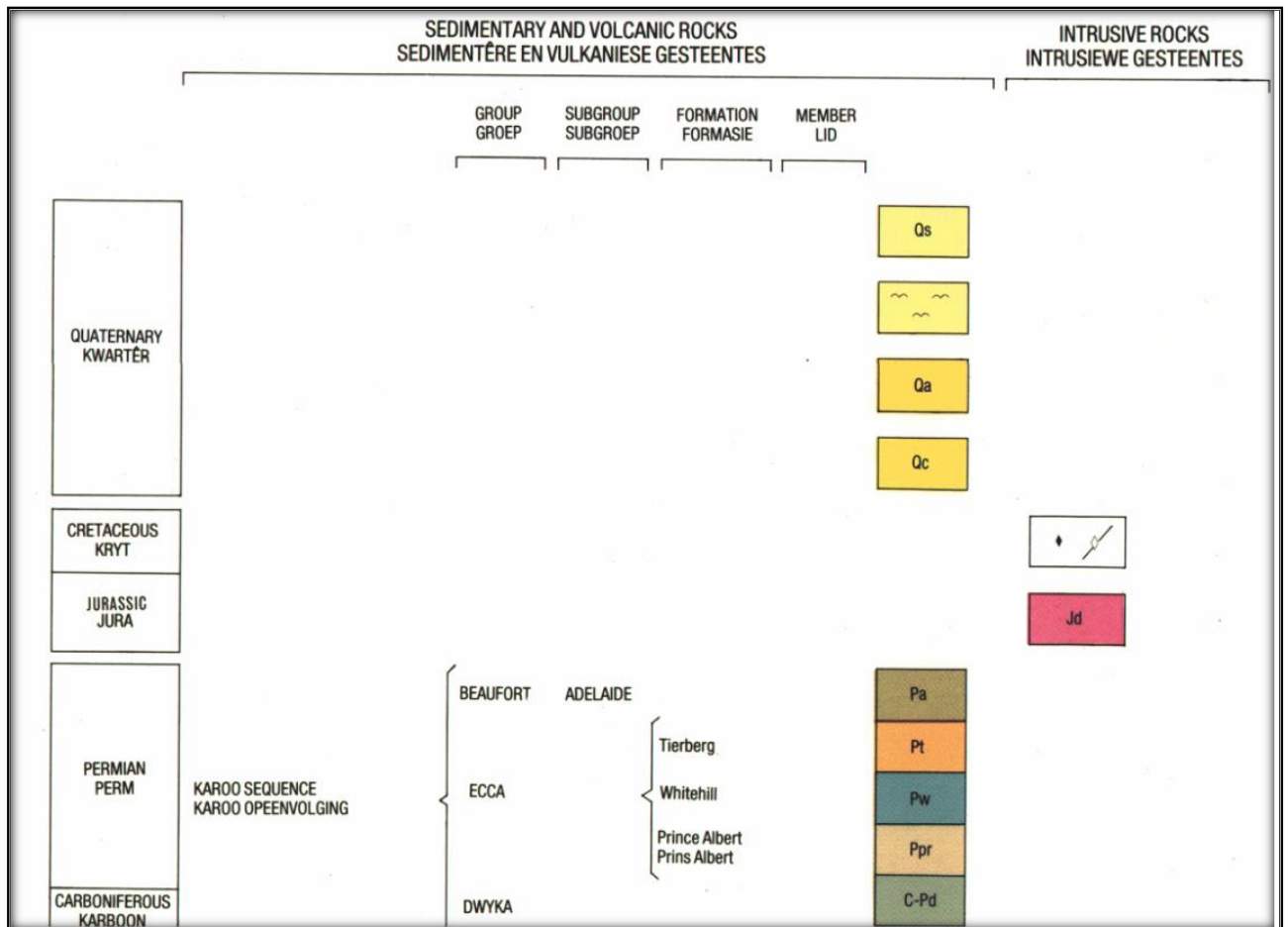


Table 5-2: Legend to Map and short explanation of the development and surrounding sediments (Modified from the 1:250 000 2824 Kimberley Geological Map (1993) (Council of Geoscience, Pretoria). Formations present in the development is indicated in bold)

| Symbol | Stratigraphy | Lithology  |
|--------|--------------|--|
| Qs     | Quaternary   | Sand: Red abundant grey Gravel, Diamondiferous in places |
| Qa     | Quaternary   | Alluvial diamondiferous gravel                           |
| Qc     | Quaternary   | Calcrete, calcified pandune and surface limestone.       |
| Qc     | Quaternary   | Calcrete   |
| Jd     | Jurassic     | Dolerite   |

|           |   |                                       |
|-----------|---|---------------------------------------|
| <b>Pt</b> | <b>Tierberg Formation, Ecca Group, Karoo Supergroup</b> | <b>Sandstone, siltstone, mudstone</b> |
| C-Pd      | Dwyka Group, Karoo Supergroup                           | Tillite, sandstone, shale             |

Quaternary superficial deposits are the youngest geological deposits formed during the most recent period of geological time namely the Quaternary (approximately 2.6 million years ago to present). The rocks and sediments can be found at or near the surface of the Earth. Most of the superficial deposits are unconsolidated sediments and consist of gravel, sand, silt and clay, and they form relatively thin, often discontinuous patches of sediments or larger spreads onshore. These sediments may include stream, channel and floodplain deposits, beach sand, talus gravels and glacial drift sediments.

The Quaternary deposits reveal palaeoclimatic changes in the different geological formations (Hunter et al., 2006). The climatic fluctuations in the Cenozoic Era were responsible for the formation of most geomorphologic features in southern Africa (Maud, 2012). Various warming and cooling events occurred in the Cenozoic but climatic changes during the Quaternary, specifically the last 1.8 Ma, were the most drastic climate changes relative to all climate variations in the past Barnosky (2005). Climate in the Quaternary Period were both drier and wetter than the present and resulted in changes in river flow patterns, sedimentation processes and vegetation variation (Tooth et al., 2004).

The fossil assemblages of this Group are generally very low in diversity and occur over a wide range. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn cores as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter.

The Karoo igneous province is one of the world's classic continental basalt (CFB) provinces. This province consists of intrusive and extrusive rocks that occur over a large area (Duncan et al, 2006). Generally, the flood basalts do not contribute to prominent volcanic structures, but instead are

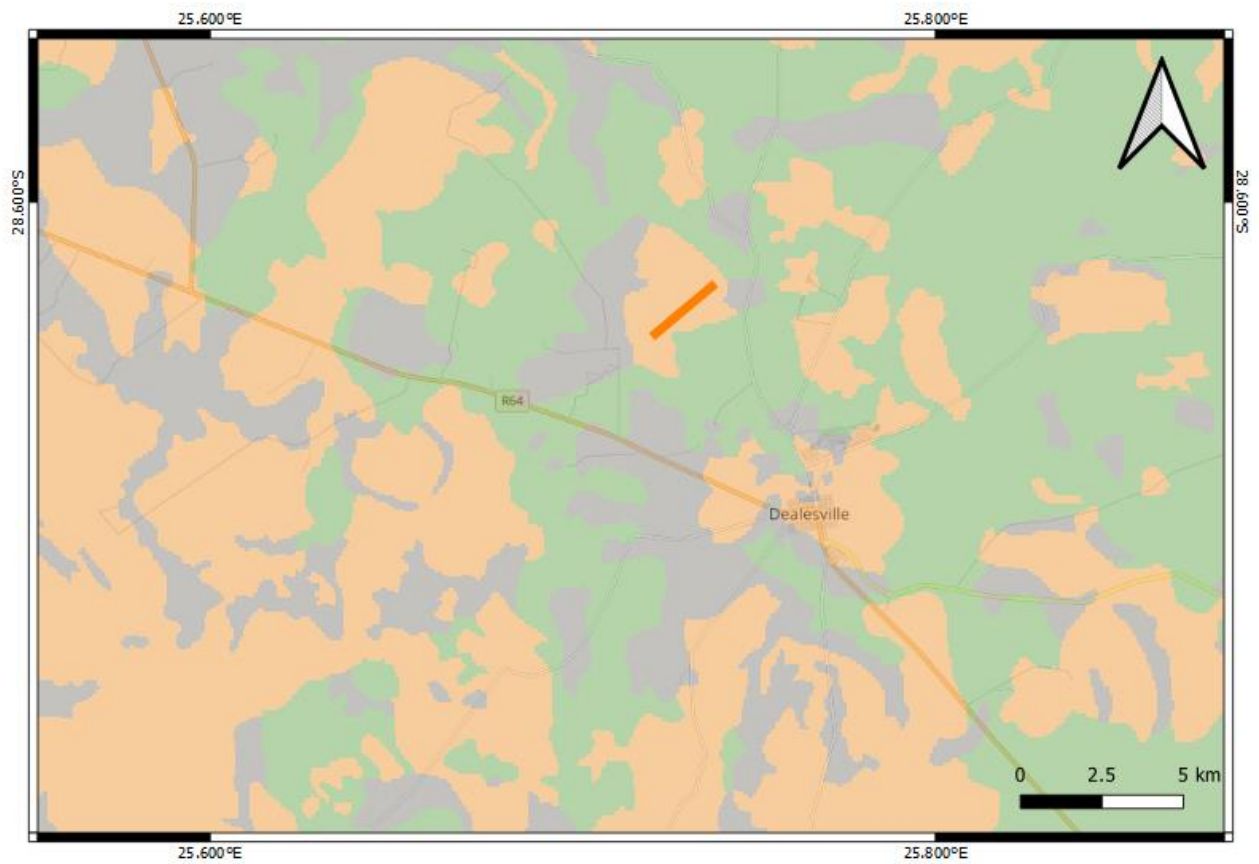
formed by successive eruptions from a set of fissures that form sub-horizontal lava flows (sills and dykes) varying in thickness. This lava caps the landscape on which they erupted. As the Karoo is an old flood basalt province it is today preserved as erosional fragments of a more extensive lava cap that covered much of southern Africa in the geological past. It is estimated that the Karoo lava outcrop currently covered at least 140 000 km<sup>2</sup> while it was larger in the past [~2 000 000 km<sup>2</sup> (Cox 1970, 1972)]

The Karoo Igneous Province contains a large volume of flood basalts as well as silicic volcanic rocks. These units are comprised of rhyodacite and rhyolitic magma and crops out along the Lebombo monocline. Individual units span up to 60 km and sometimes show massive pyroclastic structures and are thus classified as rheoignimbrites. The basal lavas lie conformable on the Clarens Formation but in specific localities sandstone erosion occurred before the volcanic eruptions took place. Lock *et al* (1974) found evidence in the Eastern Cape that in the early stages of volcanism magma interacted with ground water to produce volcanoclastic deposits as well as phreatic and phreatomagmatic diatremes. Eales *et al* (1984) also found evidence of aqueous environments during early volcanism by the existence of pillow lavas and associated hyaloclastite breccias and thin lenses of fluviatile sandstones interbedded with the lowermost magmas.

The Karoo Igneous Province can be divided into the Lebombo Group and the Drakensberg Group.



## 6 SENSITIVITY MAPPING



*Figure 0-4: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences). Proposed powerline is indicated in orange. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a High Sensitivity (orange).*

Corresponding with the National Environmental Screening tool) the sensitivity of the proposed powerline development is high. This is in correspondence with the SAHRIAS Palaeomap.

| <b>Colour</b>        | <b>Sensitivity</b> | <b>Required Action</b>  |
|----------------------|--------------------|---|
| RED                  | VERY HIGH          | field assessment and protocol for finds is required   |
| <b>ORANGE/YELLOW</b> | <b>HIGH</b>        | <b>desktop study is required and based on the outcome of the desktop study; a field assessment is likely</b>                        |
| GREEN                | MODERATE           | desktop study is required   |
| BLUE                 | LOW                | no palaeontological studies are required however a protocol for finds is required   |
| GREY                 | INSIGNIFICANT/ZERO | no palaeontological studies are required  |
| WHITE/CLEAR          | UNKNOWN            | these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map. |

The colors on the PalaeoMap indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero

## **7 SPECIALIST FINDINGS ASSESSMENT OF IMPACTS**

It is important to note that destructive impacts on palaeontological heritage usually only occur during the construction phase. Excavations will change the current topography and destruct or permanently seal-in fossils at or below the ground surface. Fossil Heritage will then no longer be accessible for scientific research.

Impacts on the following phases of the development will thus be zero

- Design / Pre-Construction;
- Operation; and
- Decommissioning.

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 11 September and 27 October 2021. No visible evidence of fossiliferous outcrops was identified.



*Figure 7-5. View from the east over the proposed 33kV powerline locality.*

Grassy vegetation with no evidence of an outcrop.



*Figure 7-6. View from the south over the proposed 33kV powerline locality.*

Grassy vegetation with no evidence of an outcrop.

## **7.1 Impact assessment**

### ***Table 0-3: Rating of impacts template and example***

**33 kV powerline development northwest of Dealesville, Free State: Impact Assessment Ratings**

| Impact 1  |  | Construction Phase     |  |
|---|--|------------------------|--|
| Issue   | Destruction of fossil heritage   |                        |  |
| <b>Description of Impact</b>  |  |                        |  |
| The excavations and site clearance of the powerline will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then no longer be available for research. According to the Geology of the project site there is a Very High possibility of finding fossils during construction. |  |                        |  |
| Type of Impact  | Indirect   |                        |  |
| Nature of Impact  | Negative   |                        |  |
| Phases  | Construction   |                        |  |
| Criteria  | <b>Without Mitigation</b>  | <b>With Mitigation</b> |  |
| Intensity   | High   | Low                    |  |
| Duration  | Permanent  | Permanent              |  |
| Extent  | Site   | Site                   |  |
| Consequence   | High   | Very Low               |  |
| Probability   | Probable   | Unlikely / improbable  |  |
| Significance  | High -   | Low -                  |  |
| Degree to which impact can be reversed  | Irreversible   |                        |  |
| Degree to which impact may cause irreplaceable loss of resources  | Irreplicable loss of fossil heritage   |                        |  |
| Degree to which impact can be mitigated   | Mitigation of the damage and destruction of fossil heritage within the planned footprint would entail the collection and describing of fossils. See Chance find Protocol |                        |  |
| <b>Mitigation actions</b>   |  |                        |  |
| The following measures are recommended:   | Chance Find Procedure  |                        |  |
| <b>Monitoring</b>   |  |                        |  |

|  |                           |                        |
|--|---------------------------|------------------------|
| The following monitoring is recommended: | N/A                       |                        |
| <b>Cumulative impacts</b>                |                           |                        |
| Nature of cumulative impacts             | Loss of Fossil Heritage   |                        |
| Rating of cumulative impacts             | <b>Without Mitigation</b> | <b>With Mitigation</b> |
|  | High -                    | Medium -               |

The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having a high possibility. The significance of the impact occurring will be low as no fossiliferous outcrops have been identified during the field visit

## 7.2 Alternatives

No Alternatives is being considered for the proposed 33kV powerline.

## 7.3 Cumulative Impacts

In relation to an activity, cumulative impact means *“the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities”* (NEMA EIA Reg GN R982 of 2014).

The South African Renewable Energy EIA Application Database (REEA) (namely “REEA\_OR\_2021\_Q2”) and other information available at the time<sup>2</sup> shows that there are no operational renewable energy developments situated within a 30km radius of the proposed project site. There are however several renewable energy projects (solar) authorised or being proposed within close proximity to the town of Dealesville, including the Kentani Cluster which consists of

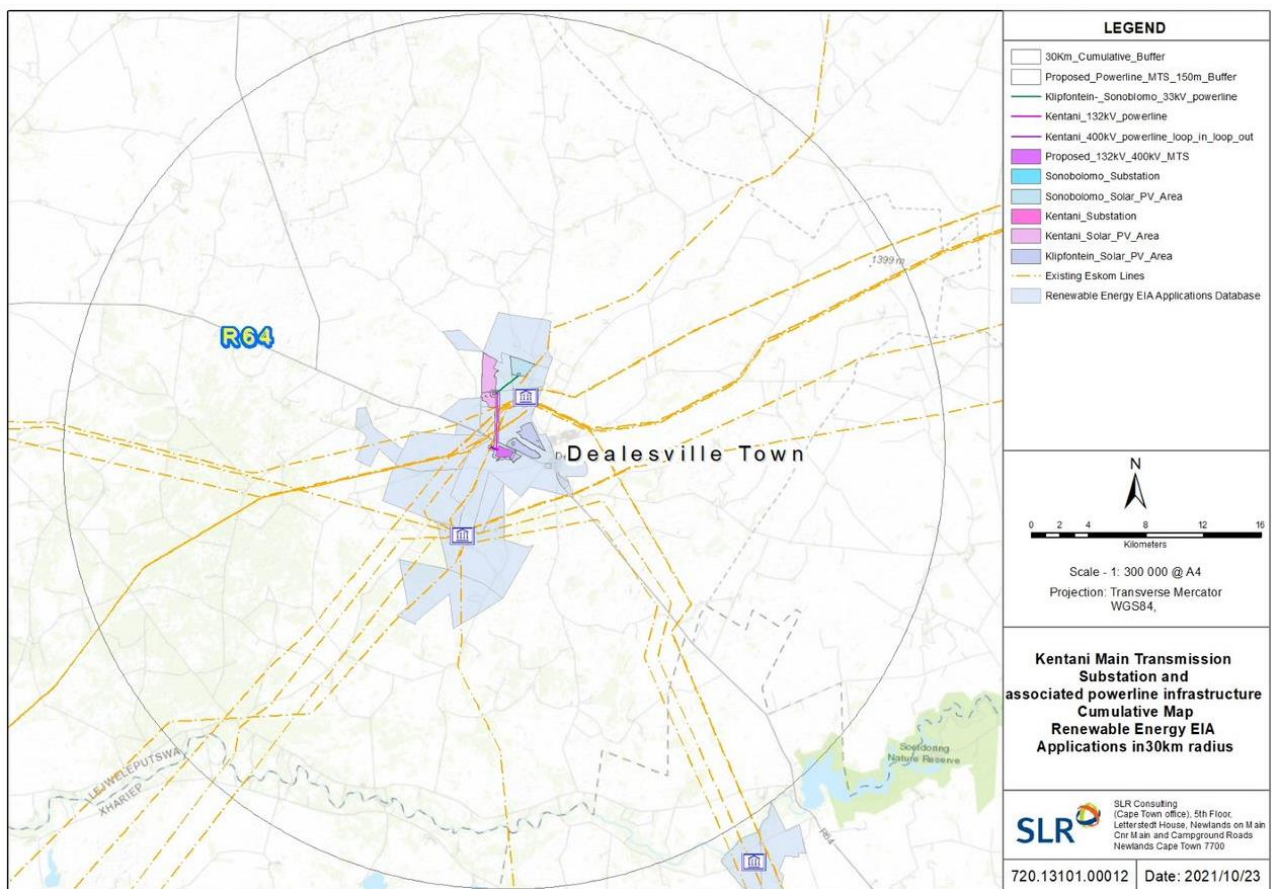
<sup>2</sup> Information has been based on the latest available version of the South African Renewable Energy EIA Application Database (REEA) (“REEA\_OR\_2021\_Q2”), the results of the respective online screening tool reports (<https://screening.environment.gov.za/screeningtool/#/pages/welcome>) and information available on the public domain at the time.

eleven (11) authorised solar PV projects and associated electrical infrastructure. According to the information available at the time<sup>2</sup>, the following renewable energy applications for EA are either approved (i.e., EA issued) or being proposed within a 30km radius of the proposed project site:

- 100 MW Kentani PV - [14/12/16/3/3/2/724](#)
- 100 MW Klipfontein PV - [14/12/16/3/3/2/722](#)
- 100 MW Braklaagte PV - [14/12/16/3/3/2/727](#)
- 100 MW Meeding PV - [14/12/16/3/3/2/719](#)
- 100 MW Irene PV - [14/12/16/3/3/2/718](#)
- 100 MW Leliehoek PV - [14/12/16/3/3/2/728](#)
- 75 MW Sonoblomo PV - [14/12/16/3/3/2/723](#)
- 75 MW Klipfontein PV 2 - [14/12/16/3/3/2/726](#)
- 75 MW Braambosch PV - [14/12/16/3/3/2/725](#)
- 75 MW Boschrand PV 2 - [14/12/16/3/3/2/720](#)
- 75 MW Eksteen PV - [14/12/16/3/3/2/717](#)
- 75 MW solar PV facility which forms part of Kentani Photovoltaic solar Energy Facilities and Supporting Electrical Infrastructure - [14/12/16/3/3/2/721](#)
- Klipbult solar plant - [14/12/16/3/3/2/432](#)
- 75 MW Sebina Letsatsi Solar PV Facility - [14/12/16/3/3/2/755](#)
- 100 MW Edison PV Solar Facility and shared electricity Infrastructure - [14/12/16/3/3/2/851](#)
- 100 MW Maxwell PV Solar Facility and shared electricity Infrastructure - [14/12/16/3/3/2/852](#)
- 100 MW Marconi PV solar projects and associated infrastructure - [14/12/16/3/3/2/853](#)
- 100 MW Watt PV solar projects and associated infrastructure - [14/12/16/3/3/2/854](#)
- 100 MW Faraday PV solar projects and associated infrastructure - [14/12/16/3/3/2/855](#)
- 100 MW Visserpan solar photovoltaic facility project 2 - [14/12/16/3/3/1/2154](#)
- 100 MW Visserpan solar photovoltaic facility project 3 - [14/12/16/3/3/1/2155](#)
- 100 MW Visserpan solar photovoltaic facility project 4 - [14/12/16/3/3/1/2156](#)

In addition, the Jedwater Solar Power Facility ([12/12/20/1972/2](#)) and Letsatsi solar power farm ([12/12/20/1972/1](#)) are situated just outside of the project site's 30km radius, to the south-east of the project site.

The cumulative Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the 33kV Powerline is underlain by similar geology as the rest of the projects the Impact on these developments will all be similar. The Palaeontological Significance of this current powerline construction is rated as Low and the cumulative Impacts will thus also be Low Negative.



**Figure 0-7: Cumulative Map indicating REFs within the 30km buffer of the proposed MTS and Powerlines (including Powerline Corridors)**

The cumulative Impacts of the area will include approved electrical facilities within a 30 km radius of the project site. As the mentioned MTS and Powerlines and corridors are all underlain by similar geology the Impact on these developments will be similar. The Palaeontological Significance of this current powerline construction is rated as Low and the cumulative Impacts will thus also be Low Negative.



## 8 MITIGATION AND EMPR REQUIREMENTS

The overall geology of the area is uniform with only the Quaternary sediments, Jurassic dolerite, and the Tierberg Formation of the Ecca Group (Karoo Supergroup) represented. The proposed powerline is primarily underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Tierberg Formation is High.

As mitigation a Chance Find Protocol is added to the report.

### 8.1.1 *Chance Find Protocol*

The following procedure will only be followed if fossils are uncovered during excavation.

### 8.1.2 *Legislation*

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act No 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources include “**all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**”.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

### 8.1.3 *Background*

A fossil is the naturally preserved remains (or traces thereof) of plants or animals embedded in rock. These organisms lived millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils, it is possible to determine environmental conditions that existed in a specific geographical area, millions of years ago.

#### 8.1.4 Introduction

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Site Officer (ESO) or site manager of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ESO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

#### 8.1.5 Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- If the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO. Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once the Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

## 9 CONCLUSION AND SUMMARY

### 9.1 Summary of Findings

The proposed 33kV powerline is primarily underlain by the Tierberg Formation (Ecca Group, Karoo Supergroup). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Tierberg Formation is High (Almond and Pether, 2009; Almond *et al.*, 2013)

A site-specific field survey of the proposed 33kV powerline was conducted on foot and by motor vehicle on 11 September 2021 and 27 October 2021. No visible evidence of fossiliferous outcrops was found. For this reason, an overall low palaeontological sensitivity is allocated to the development footprint. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the proposed 33kV powerline will be of a low significance in palaeontological terms. It is therefore considered that the proposed development is feasible and will not lead to detrimental impacts on the palaeontological reserves of the area. The construction of the development may thus be authorised in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources.

If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO or site manager in charge of these developments. Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: [www.sahra.org.za](http://www.sahra.org.za)) so that suitable mitigation (recording and collection) can be carried out.

## 10 CONCLUSION AND IMPACT STATEMENT

The significance of the impact occurring will be High before mitigation and Low after mitigation.

The overall impact of the proposed 33kV powerline, on the paleontological resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Appendix 1: Impact Assessment Methodology

| PART A: DEFINITIONS AND CRITERIA                                      |  |   |
|---|--|---|
| <b>Determination of CONSEQUENCE</b>                                   | <b>Consequence is a function of intensity, spatial extent and duration</b> |   |
| <b>Determination of SIGNIFICANCE</b>                                  | <b>Significance is a function of consequence and probability</b>           |   |
| <b>Criteria for ranking of the INTENSITY of environmental impacts</b> | <b>Very High</b>   | Severe change, disturbance or degradation caused to receptors. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. |
|   | <b>High</b>  | Prominent change, or large degree of modification, disturbance or degradation caused to receptors or which may affect a large proportion of receptors, possibly entire species or community.  |
|   | <b>Medium</b>  | Moderate change, disturbance or discomfort caused to receptors and/or which may affect a moderate proportion of receptors.  |
|   | <b>Low</b>   | Minor (slight) change, disturbance or nuisance caused to receptors which is easily tolerated without intervention, or which may affect a small proportion of receptors.   |
|   | <b>Very Low</b>  | Negligible change, disturbance or nuisance caused to receptors which is barely noticeable or may have minimal effect on receptors or affect a limited proportion of the receptors.  |
| <b>Criteria for ranking the DURATION of impacts</b>                   | <b>Very Short-term</b>   | The duration of the impact will be < 1 year or may be intermittent.   |
|   | <b>Short-term</b>  | The duration of the impact will be between 1 - 5 years.   |
|   | <b>Medium-term</b>   | The duration of the impact will be Medium-term between, 5 to 10 years.  |

|   |                      |  |                 |                 |               |               |
|---|----------------------|--|-----------------|-----------------|---------------|---------------|
|   | <b>Long-term</b>     | The duration of the impact will be Long-term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity). |                 |                 |               |               |
|   | <b>Permanent</b>     | The duration of the impact will be permanent   |                 |                 |               |               |
| <b>Criteria for ranking the EXTENT of impacts</b> | <b>Site</b>          | Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area.                                 |                 |                 |               |               |
|   | <b>Local</b>         | Impact is confined to within the project site / area and its nearby surroundings.  |                 |                 |               |               |
|   | <b>Regional</b>      | Impact is confined to the region, e.g., coast, basin, catchment, municipal region, district, etc.  |                 |                 |               |               |
|   | <b>National</b>      | Impact may extend beyond district or regional boundaries with national implications.   |                 |                 |               |               |
|   | <b>International</b> | Impact extends beyond the national scale or may be transboundary.  |                 |                 |               |               |
| <b>PART B: DETERMINING CONSEQUENCE</b>            |                      |  |                 |                 |               |               |
|   |                      | <b>EXTENT</b>  |                 |                 |               |               |
|   |                      | Site   | Local           | Regional        | National      | International |
| <b>Intensity- Very Low</b>                        |                      |  |                 |                 |               |               |
| <b>DURATION</b>                                   | Permanent            | <b>Low</b>   | <b>Low</b>      | <b>Medium</b>   | <b>Medium</b> | <b>High</b>   |
|   | Long-term            | <b>Low</b>   | <b>Low</b>      | <b>Low</b>      | <b>Medium</b> | <b>Medium</b> |
|   | Medium-term          | <b>Very Low</b>  | <b>Low</b>      | <b>Low</b>      | <b>Low</b>    | <b>Medium</b> |
|   | Short-term           | <b>Very low</b>  | <b>Very Low</b> | <b>Low</b>      | <b>Low</b>    | <b>Low</b>    |
|   | Very Short-term      | <b>Very low</b>  | <b>Very Low</b> | <b>Very Low</b> | <b>Low</b>    | <b>Low</b>    |
| <b>Intensity -Low</b>                             |                      |  |                 |                 |               |               |
| <b>DURATION</b>                                   | Permanent            | <b>Medium</b>  | <b>Medium</b>   | <b>Medium</b>   | <b>High</b>   | <b>High</b>   |
|   | Long-term            | <b>Low</b>   | <b>Medium</b>   | <b>Medium</b>   | <b>Medium</b> | <b>High</b>   |



|                              |                 |               |        |           |           |               |
|------------------------------|-----------------|---------------|--------|-----------|-----------|---------------|
|                              | Medium-term     | Low           | Low    | Medium    | Medium    | Medium        |
|                              | Short-term      | Low           | Low    | Low       | Medium    | Medium        |
|                              | Very Short-term | Very low      | Low    | Low       | Low       | Medium        |
| <b>Intensity- Medium</b>     |                 |               |        |           |           |               |
| <b>DURATION</b>              | Permanent       | Medium        | High   | High      | High      | Very High     |
|                              | Long-term       | Medium        | Medium | Medium    | High      | High          |
|                              | Medium-term     | Medium        | Medium | Medium    | High      | High          |
|                              | Short-term      | Low           | Medium | Medium    | Medium    | High          |
|                              | Very Short-term | Low           | Low    | Low       | Medium    | Medium        |
| <b>Intensity -High</b>       |                 |               |        |           |           |               |
| <b>DURATION</b>              | Permanent       | High          | High   | High      | Very High | Very High     |
|                              | Long-term       | Medium        | High   | High      | High      | Very High     |
|                              | Medium-term     | Medium        | Medium | High      | High      | High          |
|                              | Short-term      | Medium        | Medium | Medium    | High      | High          |
|                              | Very Short-term | Low           | Medium | Medium    | Medium    | High          |
| <b>Intensity - Very High</b> |                 |               |        |           |           |               |
| <b>DURATION</b>              | Permanent       | High          | High   | Very High | Very High | Very High     |
|                              | Long-term       | High          | High   | High      | Very High | Very High     |
|                              | Medium-term     | Medium        | High   | High      | High      | Very High     |
|                              | Short-term      | Medium        | Medium | High      | High      | High          |
|                              | Very Short-term | Low           | Medium | Medium    | High      | High          |
|                              |                 | Site          | Local  | Regional  | National  | International |
|                              |                 | <b>EXTENT</b> |        |           |           |               |

| PART C: DETERMINING SIGNIFICANCE               |                         |   |               |          |        |           |
|--|-------------------------|---|---------------|----------|--------|-----------|
| PROBABILITY<br><br>(of exposure to<br>impacts) | Definite/<br>Continuous | Very Low  | Low           | Medium   | High   | Very High |
|  | Probable                | Very Low  | Low           | Medium   | High   | Very High |
|  | Possible/<br>frequent   | Very Low  | Very Low      | Low      | Medium | High      |
|  | Conceivable             | Insignificant   | Very Low      | Low      | Medium | High      |
|  | Unlikely/<br>improbable | Insignificant   | Insignificant | Very Low | Low    | Medium    |
|  |                         | Very Low  | Low           | Medium   | High   | Very High |
|  |                         | <b>CONSEQUENCE</b>  |               |          |        |           |
| PART D: INTERPRETATION OF SIGNIFICANCE         |                         |   |               |          |        |           |
| Very High -                                    | Very High +             | Represents a key factor in decision-making. In the case of adverse effects, the impact would be considered a fatal flaw unless mitigated to lower significance.   |               |          |        |           |
| High -   | High +                  | These beneficial or adverse effects are considered to be very important considerations and are likely to be material for the decision-making process. In the case of negative impacts, substantial mitigation will be required.   |               |          |        |           |
| Medium -                                       | Medium +                | These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor. In the case of negative impacts, mitigation will be required. |               |          |        |           |
| Low -  | Low +                   | These beneficial or adverse effects may be raised as localised issues. They are unlikely to be critical in the decision-making process but could be important in the subsequent design of the project. In the case of negative impacts, some mitigation is likely to be required.   |               |          |        |           |

|               |               |  |
|---------------|---------------|--|
| Very Low -    | Very Low<br>+ | These beneficial or adverse effects will not have an influence on the decision, neither will they need to be taken into account in the design of the project. In the case of negative impacts, mitigation is not necessarily required. |
| Insignificant |               | Any effects are beneath the levels of perception and inconsequential, therefore not requiring any consideration.   |

**CURRICULUM VITAE**

**ELIZE BUTLER**

**PROFESSION:** Palaeontologist

**YEARS' EXPERIENCE:** 28 years in Palaeontology

**EDUCATION:** B.Sc Botany and Zoology, 1988

University of the Orange Free State

B.Sc (Hons) Zoology, 1991

University of the Orange Free State

Management Course, 1991

University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009

University of the Free State

**Dissertation title:** The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

**MEMBERSHIP**

Palaeontological Society of South Africa (PSSA) 2006-currently

## EMPLOYMENT HISTORY

|  |  |
|--|--|
| Part time Laboratory assistant                         | Department of Zoology & Entomology<br>University of the Free State Zoology 1989-1992 |
| Part time laboratory assistant                         | Department of Virology<br><br>University of the Free State Zoology 1992              |
| Research Assistant                                     | National Museum, Bloemfontein 1993 – 1997  |
| Principal Research Assistant<br>and Collection Manager | National Museum, Bloemfontein<br><br>1998–currently                                  |

## TECHNICAL REPORTS

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**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed Mashishing township establishment in Mashishing (Lydenburg), Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the Proposed Mlonzi Estate Development near Lusikisiki, Ngquza Hill Local Municipality, Eastern Cape. Bloemfontein.

**Butler, E. 2018.** Palaeontological Phase 1 Assessment of the proposed Swaziland-Mozambique border patrol road and Mozambique barrier structure. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed electricity expansion project and Sekgame Switching Station at the Sishen Mine, Northern Cape Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological field assessment of the proposed construction of the Zonnebloem Switching Station (132/22kV) and two loop-in loop-out power lines (132kV) in the Mpumalanga Province. Bloemfontein.

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**Butler, E. 2018.** Palaeontological Desktop Assessment for the proposed Thornhill Housing Project, Ndlambe Municipality, Port Alfred, Eastern Cape Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological desktop assessment of the proposed housing development on portion 237 of farm Hartebeestpoort 328. Bloemfontein.

**Butler, E. 2018.** Palaeontological desktop assessment of the proposed New Age Chicken layer facility located on holding 75 Endicott near Springs in Gauteng. Bloemfontein.

**Butler, E. 2018** Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological field assessment of the proposed development of the Wildealskloof mixed use development near Bloemfontein, Free State Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Field Assessment of the proposed Megamor Extension, East London. Bloemfontein

**Butler, E. 2018.** Palaeontological Impact Assessment of the proposed diamonds Alluvial & Diamonds General Prospecting Right Application near Christiana on the Remaining Extent of Portion 1 of the Farm Kaffraria 314, Registration Division HO, North West Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Impact Assessment of the proposed construction of a new 11kV (1.3km) Power Line to supply electricity to a cell tower on farm 215 near Delportshoop in the Northern Cape. Bloemfontein.

**Butler, E. 2018.** Palaeontological Field Assessment of the proposed construction of a new 22 kV single wood pole structure power line to the proposed MTN tower, near Britstown, Northern Cape Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Exemption Letter for the proposed reclamation and reprocessing of the City Deep Dumps in Johannesburg, Gauteng Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Exemption letter for the proposed reclamation and reprocessing of the City Deep Dumps and Rooikraal Tailings Facility in Johannesburg, Gauteng Province. Bloemfontein.

**Butler, E. 2018.** Proposed Kalabasfontein Mine Extension project, near Bethal, Govan Mbeki District Municipality, Mpumalanga. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment for the development of the proposed Leslie 1 Mining Project near Leandra, Mpumalanga Province. Bloemfontein.

**Butler, E. 2018.** Palaeontological Desktop Assessment of the proposed Mookodi – Mahikeng 400kV Line, North West Province. Bloemfontein.

**Butler, E. 2018.** Environmental Impact Assessment (EIA) for the Proposed 325mw Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in the Northern Cape Province.



**Butler, E.** 2018. Palaeontological Impact Assessment of the proposed construction of the Tooverberg Wind Energy Facility, and associated grid connection near Touws River in the Western Cape Province. Bloemfontein.

**Butler, E.** 2018. Palaeontological impact assessment of the proposed Kalabasfontein Mining Right Application, near Bethal, Mpumalanga.

**Butler, E.,** 2019. Palaeontological Desktop Assessment of the proposed Westrand Strengthening Project Phase II.

**Butler, E.,** 2019. Palaeontological Field Assessment for the proposed Sirius 3 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province

**Butler, E.,** 2019. Palaeontological Field Assessment for the proposed Sirius 4 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province

**Butler, E.,** 2019. Palaeontological Field Assessment for Heuningspruit PV 1 Solar Energy Facility near Koppies, Ngwathe Local Municipality, Free State Province.

**Butler, E.,** 2019. Palaeontological Field Assessment for the Moeding Solar Grid Connection, North West Province.

**Butler, E.,** 2019. Recommended Exemption from further Palaeontological studies for the Proposed Agricultural Development on Farms 1763, 2372 And 2363, Kakamas South Settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2019.** Recommended Exemption from further Palaeontological studies: of Proposed Agricultural Development, Plot 1178, Kakamas South Settlement, Kai! Garib Municipality

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Proposed Waste Rock Dump Project at Tshipi Borwa Mine, near Hotazel, Northern Cape Province:

**Butler, E., 2019.** Palaeontological Exemption Letter for the proposed DMS Upgrade Project at the Sishen Mine, Gamagara Local Municipality, Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed Integrated Environmental Authorisation process for the proposed Der Brochen Amendment project, near Groblershoop, Limpopo

Butler, E., **2019.** Palaeontological Desktop Assessment of the proposed updated Environmental Management Programme (EMPr) for the Assmang (Pty) Ltd Black Rock Mining Operations, Hotazel, Northern Cape

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed Kriel Power Station Lime Plant Upgrade, Mpumalanga Province

**Butler, E., 2019.** Palaeontological Impact Assessment for the proposed Kangala Extension Project Near Delmas, Mpumalanga Province.

**Butler, E., 2019.** Palaeontological Desktop Assessment for the proposed construction of an iron/steel smelter at the Botshabelo Industrial area within the Mangaung Metropolitan Municipality, Free State Province.

**Butler, E., 2019.** Recommended Exemption from further Palaeontological studies for the proposed agricultural development on farms 1763, 2372 and 2363, Kakamas South settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2019.** Recommended Exemption from further Palaeontological Studies for Proposed formalisation of Gamakor and Noodkamp low cost Housing Development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2019.** Recommended Exemption from further Palaeontological Studies for proposed formalisation of Blaauwskop Low Cost Housing Development, Kenhardt Road, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed mining permit application for the removal of diamonds alluvial and diamonds kimberlite near Windsorton on a certain portion of Farm Zoelen's Laagte 158, Registration Division: Barkly Wes, Northern Cape Province.

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed Vedanta Housing Development, Pella Mission 39, Khâi-Ma Local Municipality, Namakwa District Municipality, Northern Cape.

**Butler, E., 2019.** Palaeontological Desktop Assessment for The Proposed 920 KWP Groenheuwel Solar Plant Near Augrabies, Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment for the establishment of a Super Fines Storage Facility at Amandelbult Mine, Near Thabazimbi, Limpopo Province

**Butler, E., 2019.** Palaeontological Impact Assessment for the proposed Sace Lifex Project, Near Emalahleni, Mpumalanga Province

**Butler, E., 2019.** Palaeontological Desktop Assessment for the proposed Rehau Fort Jackson Warehouse Extension, East London

**Butler, E., 2019.** Palaeontological Desktop Assessment for the proposed Environmental Authorisation Amendment for moving 3 Km of the Merensky-Kameni 132KV Powerline

**Butler, E., 2019.** Palaeontological Impact Assessment for the proposed Umsobomvu Solar PV Energy Facilities, Northern and Eastern Cape

**Butler, E., 2019.** Palaeontological Desktop Assessment for six proposed Black Mountain Mining Prospecting Right Applications, without Bulk Sampling, in the Northern Cape.

**Butler, E., 2019.** Palaeontological field Assessment of the Filling Station (Rietvlei Extension 6) on the Remaining Portion of Portion 1 of the Farm Witkoppies 393JR east of the Rietvleidam Nature Reserve, City of Tshwane, Gauteng

**Butler, E., 2019.** Palaeontological Desktop Assessment of The Proposed Upgrade Of The Vaal Gamagara Regional Water Supply Scheme: Phase 2 And Groundwater Abstraction

**Butler, E., 2019.** Palaeontological Desktop Assessment of The Expansion of The Jan Kempdorp Cemetery on Portion 43 Of Farm Guldenskat 36-Hn, Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment of the Proposed Residential Development On Portion 42 Of Farm Geldunskat No 36 In Jan Kempdorp, Phokwane Local Municipality, Northern Cape Province

**Butler, E., 2019.** Palaeontological Impact Assessment of the proposed new Township Development, Lethabo Park, on Remainder of Farm Roodepan No 70, Erf 17725 And Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape

**Butler, E., 2019.** Palaeontological Protocol for Finds for the proposed 16m WH Battery Storage System in Steinkopf, Northern Cape Province

**Butler, E., 2019.** Palaeontological Exemption Letter of the proposed 4.5WH Battery Storage System near Midway-Pofadder, Northern Cape Province

**Butler, E., 2019.** Palaeontological Exemption Letter of the proposed 2.5ml Process Water Reservoir at Gloria Mine, Black Rock, Hotazel, Northern Cape

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Establishment of a Super Fines Storage Facility at Gloria Mine, Black Rock Mine Operations, Hotazel, Northern Cape:

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Proposed New Railway Bridge, and Rail Line Between Hotazel and the Gloria Mine, Northern Cape Province

**Butler, E., 2019.** Palaeontological Exemption Letter Of The Proposed Mixed Use Commercial Development On Portion 17 of Farm Boegoeberg Settlement Number 48, !Kheis Local Municipality In The Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment of the Proposed Diamond Mining Permit Application Near Kimberley, Sol Plaatjies Municipality, Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment of the Proposed Diamonds (Alluvial, General & In Kimberlite) Prospecting Right Application near Postmasburg, Registration Division; Hay, Northern Cape Province

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed diamonds (alluvial, general & in kimberlite) prospecting right application near Kimberley, Northern Cape Province.

**Butler, E., 2019.** Palaeontological Phase 1 Impact Assessment of the proposed upgrade of the Vaal Gamagara regional water supply scheme: Phase 2 and groundwater abstraction

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed seepage interception drains at Duvha Power Station, Emalahleni Municipality, Mpumalanga Province

**Butler, E., 2019.** Palaeontological Desktop Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

**Butler, E., 2019.** Palaeontological Phase 1 Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

**Butler, E., 2019.** Palaeontological field Assessment for the Proposed Upgrade of the Kolomela Mining Operations, Tsantsabane Local Municipality, Siyanda District Municipality, Northern Cape Province, Northern Cape

**Butler, E., 2019.** Palaeontological Desktop Assessment of the proposed feldspar prospecting rights and mining application on portion 4 and 5 of the farm Rozynen 104, Kakamas South, Kai! Garib Municipality, Zf Mgcawu District Municipality, Northern Cape

**Butler, E., 2019.** Palaeontological Phase 1 Field Assessment of the proposed Summerpride Residential Development and Associated Infrastructure on Erf 107, Buffalo City Municipality, East London.

**Butler, E., 2019.** Palaeontological Desktop Impact Assessment for the proposed re-commission of the Old Balgay Colliery near Dundee, KwaZulu Natal.

**Butler, E., 2019.** Palaeontological Phase 1 Impact Assessment for the Proposed Re-Commission of the Old Balgay Colliery near Dundee, KwaZulu Natal

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery.

**Butler, E., 2019.** Palaeontological Impact Assessment and Protocol for Finds of a Proposed New Quarry on Portion 9 (of 6) of the farm Mimosa Glen 885, Bloemfontein, Free State Province

**Butler, E., 2019.** Palaeontological Impact Assessment and Protocol for Finds of a proposed development on Portion 9 and 10 of the Farm Mimosa Glen 885, Bloemfontein, Free State Province

**Butler, E., 2019.** Palaeontological Exemption Letter for the proposed residential development on the Remainder of Portion 1 of the Farm Strathearn 2154 in the Magisterial District of Bloemfontein, Free State

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**Butler, E., 2019.** Palaeontological Desktop Assessment for five Proposed Black Mountain Mining Prospecting Right Applications, Without Bulk Sampling, in the Northern Cape.

**Butler, E. 2019.** Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and an Integrated Water Use Licence Application for the Reclamation of the Marievale Tailings Storage Facilities, Ekurhuleni Metropolitan Municipality - Gauteng Province.

**Butler, E., 2019.** Palaeontological Impact Assessment for the Proposed Sace Lifex Project, near Emalahleni, Mpumalanga Province.

**Butler, E., 2019.** Palaeontological Desktop Assessment for the proposed Golfview Colliery near Ermelo, Msukaligwa Local Municipality, Mpumalanga Province

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Proposed Kangra Maquasa Block C Mining development near Piet Retief, in the Mkhondo Local Municipality within the Gert Sibande District Municipality

**Butler, E., 2019.** Palaeontological Desktop Assessment for the Proposed Amendment of the Kusipongo Underground and Opencast Coal Mine in Support of an Environmental Authorization and Waste Management License Application.

**Butler, E., 2019.** Palaeontological Exemption Letter of the Proposed Mamatwan Mine Section 24g Rectification Application, near Hotazel, Northern Cape Province

**Butler, E., 2020.** Palaeontological Field Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Extension of the South African Nuclear Energy Corporation (Necsa) Pipe Storage Facility, Madibeng Local Municipality, North West Province

**Butler, E., 2020.** Palaeontological Field Assessment for the Proposed Piggery on Portion 46 of the Farm Brakkefontien 416, Within the Nelson Mandela Bay Municipality, Eastern Cape

**Butler, E., 2020.** Palaeontological field Assessment for the proposed Rietfontein Housing Project as part of the Rapid Land Release Programme, Gauteng Province Department of Human Settlements, City of Johannesburg Metropolitan Municipality

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Choje Wind Farm between Grahamstown and Somerset East, Eastern Cape

**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial, General & In Kimberlite), Combined with A Waste License Application, Registration Division: Gordonia And Kenhardt, Northern Cape Province

**Butler, E., 2020.** Palaeontological Impact Assessment for the Proposed Clayville Truck Yard, Ablution Blocks and Wash Bay to be Situated on Portion 55 And 56 Of Erf 1015, Clayville X11, Ekurhuleni Metropolitan Municipality, Gauteng Province

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Hartebeesthoek Residential Development

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Mooiplaats Educational Facility, Gauteng Province

**Butler, E., 2020.** Palaeontological Impact Assessment for the Proposed Monument Park Student Housing Establishment

**Butler, E., 2020.** Palaeontological Field Assessment for the Proposed Standerton X10 Residential and Mixed-Use Developments, Lekwa Local Municipality Standerton, Mpumalanga Province

**Butler, E., 2020.** Palaeontological Field Assessment for the Rezoning and Subdivision of Portion 6 Of Farm 743, East London

**Butler, E., 2020.** Palaeontological Field Assessment for the Proposed Matla Power Station Reverse Osmosis Plant, Mpumalanga Province

**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Prospecting Right Application Without Bulk Sampling for the Prospecting of Diamonds Alluvial near Bloemhof on Portion 3 (Portion 1) of the Farm Boschpan 339, the Remaining Extent of Portion 8 (Portion 1), Portion 9 (Portion 1) and Portion 10 (Portion 1) and Portion 17 (Portion 1) of the Farm Panfontein 270, Registration Division: Ho, North West Province

**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Prospecting Right Application Combined with a Waste Licence Application for the Prospecting of Diamonds Alluvial, Diamonds General and Diamonds near Wolmaransstad on the Remaining Extent, Portion 7 and Portion 8 Of Farm Rooibult 152, Registration Division: HO, North West Province.

**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Prospecting Right Application With Bulk Sampling combined with a Waste Licence Application for the Prospecting of Diamonds Alluvial (Da), Diamonds General (D), Diamonds (Dia) and Diamonds In Kimberlite (Dk) near Prieska On Portion 7, a certain Portion of the Remaining Extent of Portion 9 (Wouter), Portion 11 (De Hoek), Portion 14 (Stofdraai) (Portion of Portion 4), the Remaining Extent of Portion 16 (Portion Of Portion 9) (Wouter) and the Remaining Extent of Portion 18 (Portion of Portion 10) of the Farm Lanyon Vale 376, Registration Division: Hay, Northern Cape



**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Prospecting Right Area and Mining Permit Area near Ritchie on the Remaining Extent of Portion 3 (Anna's Hoop) of the Farm Zandheuvel 144, Registration Division: Kimberley, Northern Cape Province

**Butler, E., 2020.** Palaeontological Desktop Assessment of the Proposed Okapi Diamonds (Pty) Ltd Mining Right of Diamonds Alluvial (Da) & Diamonds General (D) Combined with a Waste Licence Application on the Remaining Extent of Portion 9 (Wouter) of the Farm Lanyon Vale 376; Registration Division: Hay; Northern Cape Province.

**Butler, E., 2020.** Palaeontological Field Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial & General) between Douglas and Prieska on Portion 12, Remaining Extent of Portion 29 (Portion Of Portion 13) and Portion 31 (Portion Of Portion 29) on the Farm Reads Drift 74, Registration Division; Herbert, Northern Cape Province

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Mining Permit Application Combined with a Waste License Application for the Mining of Diamonds (Alluvial) Near Schweitzer-Reneke on a certain Portion of Portion 12 (Ptn of Ptn 7) of the Farm Doornhoek 165, Registration Division: HO, North West Province

**Butler, E., 2020.** Palaeontological Desktop Assessment for Black Mountain Koa South Prospecting Right Application, Without Bulk Sampling, in the Northern Cape.

**Butler, E., 2020.** Palaeontological Impact Assessment of the Proposed AA Bakery Expansion, Sedibeng District Municipality, Gauteng.

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Boegoeberg Township Expansion, !Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Gariep Township Expansion, !Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Groblershoop Township Expansion, !Kheis Local Municipality, Zf Mgcawu District Municipality, Northern Cape Province.

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Grootdrink Township Expansion, !Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province

**Butler, E., 2020.** Palaeontological Exemption Letter for the Proposed Opwag Township Expansion, !Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province

**Butler, E., 2020.** Palaeontological Exemption Letter for the Proposed Topline Township Expansion, !Kheis Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province

**Butler, E., 2020.** Palaeontological Desktop Assessment for the Proposed Wegdraai Township Expansion, !Kheis Local Municipality, Zf Mgcawu District Municipality, Northern Cape Province

**Butler, E., 2020.** Palaeontological field Assessment for the Proposed Establishment of an Emulsion Plant on Erf 1559, Hardustria, Harrismith, Free State.

**Butler, 2020.** Part 2 Environmental Authorisation (EA) Amendment Process for the Kudusberg Wind Energy Facility (WEF) near Sutherland, Western and Northern Cape Provinces- Palaeontological Impact Assessment

**Butler, E., 2020.** Proposed Construction and Operation of the Battery Energy Storage System (BESS) and Associated Infrastructure and inclusion of Additional Listed Activities for the Authorised Droogfontein 3 Solar Photovoltaic (PV) Energy Facility Located near Kimberley in the Sol Plaatje Local Municipality, Francis Baard District Municipality, in the Northern Cape Province of South Africa.

**Butler, E., 2020.** Palaeontological Impact Assessment for the Proposed Development of a Cluster of Renewable Energy Facilities between Somerset East and Grahamstown in the Eastern Cape

**Butler, E., 2021.** Palaeontological Desktop Assessment for the Proposed Amaoti Secondary School, Pinetown, Ethekewini Metropolitan Municipality Kwazulu Natal

**Butler, E., 2021.** Palaeontological Impact Assessment for the Proposed an Inland Diesel Depot, Transportation Pipeline and Associated Infrastructure on Portion 5 of the Farm Franshoek No. 1861, Swinburne, Free State Province

**Butler, E., 2021.** Palaeontological Impact Assessment for the proposed erosion control gabion installation at Alpine Heath Resort on the farm Akkerman No 5679 in the Bergville district Kwazulu-Natal.

**Butler, E., 2021.** Palaeontological Impact Assessment for the proposed Doornkloof Residential development on portion 712 of the farm Doornkloof 391 Jr, City of Tshwane Metropolitan Municipality in Gauteng, South Africa.

**Butler, E., 2021.** Palaeontological Desktop Assessment for The Proposed Expansion of the Square *Kilometre* Array (SKA) Meerkat Project, on the Farms Mey's Dam RE/68, Brak Puts RE /66, Swartfontein RE /496 & Swartfontein 2/496, in the Kareeberg Local Municipality, Pixley Ka Seme District Municipality, and the Farms Los Berg 1/73 & Groot Paardekloof RE /74, in the Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province

**Butler, E., 2021.** Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling on Portion 6 of Scholtzfontein 165 and Farm Arnotsdale 175, Herbert District in the Northern Cape.

**Butler, E., 2021.** Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling on the Remaining Extent of Biessie Laagte 96, and Portion 2 and 6 of Aasvogel Pan 141, Near Hopetown in the Northern Cape.

**Butler, E., 2021.** Palaeontological Desktop Assessment for De Beers Consolidated Mines: Proposed Drilling in the North West Province: on Portions 7 (RE) (Of Portion 3), 11, 12 (of Portion 3), 34 (of Portion 30), 35 (of Portion 7) of the Farm Holfontein 147 IO and Portions 1, 2 and the RE) of the Farm Kareeboschbult 76 Ip and Portions 1, 2, 4, 5, 6, (of Portion 3), 7 (of Portion 3), 13, 14, and the Re of the farm Oppaslaagte 100i P and portions 25 (of Portion 24) and 30 of the farm Slypsteen 102 IP.