

COEGA TO DEDISA POWERLINE CONSTRUCTION

FOR

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by

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EXECUTIVE SUMMARY

Marine and estuarine shell fossils are likely to be encountered. Although **Significant Palaeontological** material could be found this material is not common. If encountered, fossil material is likely to be broken and fragmented. Should intact shells be encountered these should be archived and a competent Palaeontologist consulted. A “*Chance Find Protocol*” has been inserted.

A small potentially palaeosensitive area is identified. This is covered by alluvial sand and consequently a pre-construction palaeontological visit will serve no purpose. Further this area is heavily disturbed due to the Port of Ngqura construction. I recommend that a paleontological visit should only take place if the “Chance Find Protocol” is triggered.

The Stringing Area is to be developed on reclaimed land and land disturbed due to Ngquru Port construction and is not palaeontologically significant.

1. BACKGROUND AND PROPOSED PROJECT

The proposed power line (Figure 1) is part of an overall Powership project. This project is of National Strategic Importance as it forms part of National Government's intent to address the energy crisis in South Africa. The Coega SEZ and Ngqura Port was identified as a preferred location as it meets the specifications for the proposed powership project and occurs within a designated Strategic Economic Zone (Tripl04, 2020).

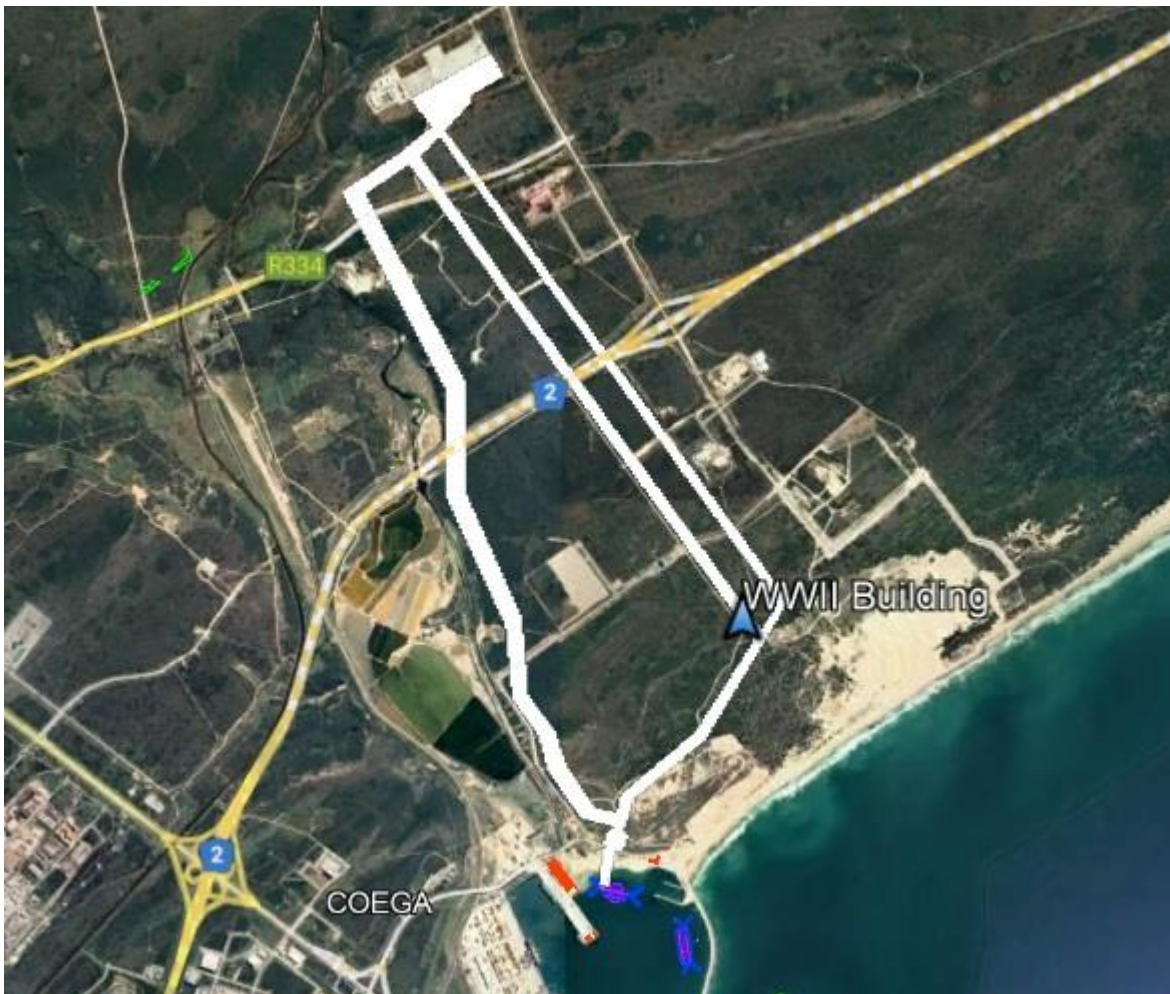


Figure 1: Route of the proposed Powerline. Source map GoogleEarth.

The proposed powerline route is illustrated above (Figure 1). In addition to the powerline will be a “Stringing Yard” (Figure 2). The Stringing Yard will be located on reclaimed land and land which has been significantly disturbed due to port construction.

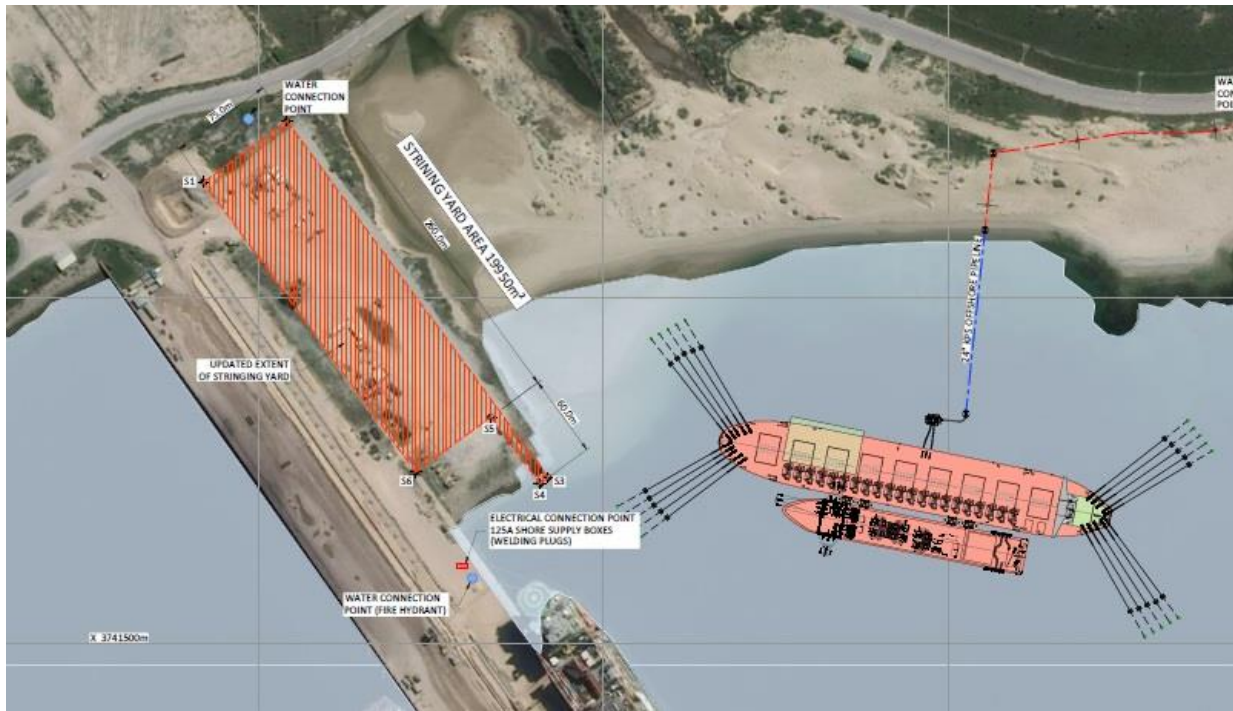


Figure 2: This shows the position of the Stringing Yard and Powership.

2. TERMS AND CONDITIONS

Alan Smith Consulting was requested by Jonathan Kaplan of ARCM to provide a Desk-Top Palaeo Impact Assessment for the proposed Coega to Dedisa Powerline development (Figure 1). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) regulations of 2014, Appendix 6.

3. SCOPE AND PURPOSE OF REPORT

A Palaeontological Impact Assessment (PIA) is a means of identifying any significant palaeontological material before development begins, so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile

heritage of South Africa. This Desk-Top investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (DFFE), who will review the Environmental Impact Assessment (EIA) and grant or refuse authorisation. The PIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation, should this be granted.

4. METHODOLOGY

Geological maps, a literature review and personal experience (see Section 10) were used in this research. Although the area is deemed sensitive (Figure 4), the lithologies and sediments have been heavily disturbed due to the Port of Ngqura construction, thus a palaeontological field investigation would be pointless.

5. GEOLOGY

The proposed Powerline project will cross a variety of lithotypes (Figure 3). These are:

- Alexandria Formation (Ta)
- Bluewater Bay Formation (T-Qg)
- Modern Aeolian Sand (Qw)

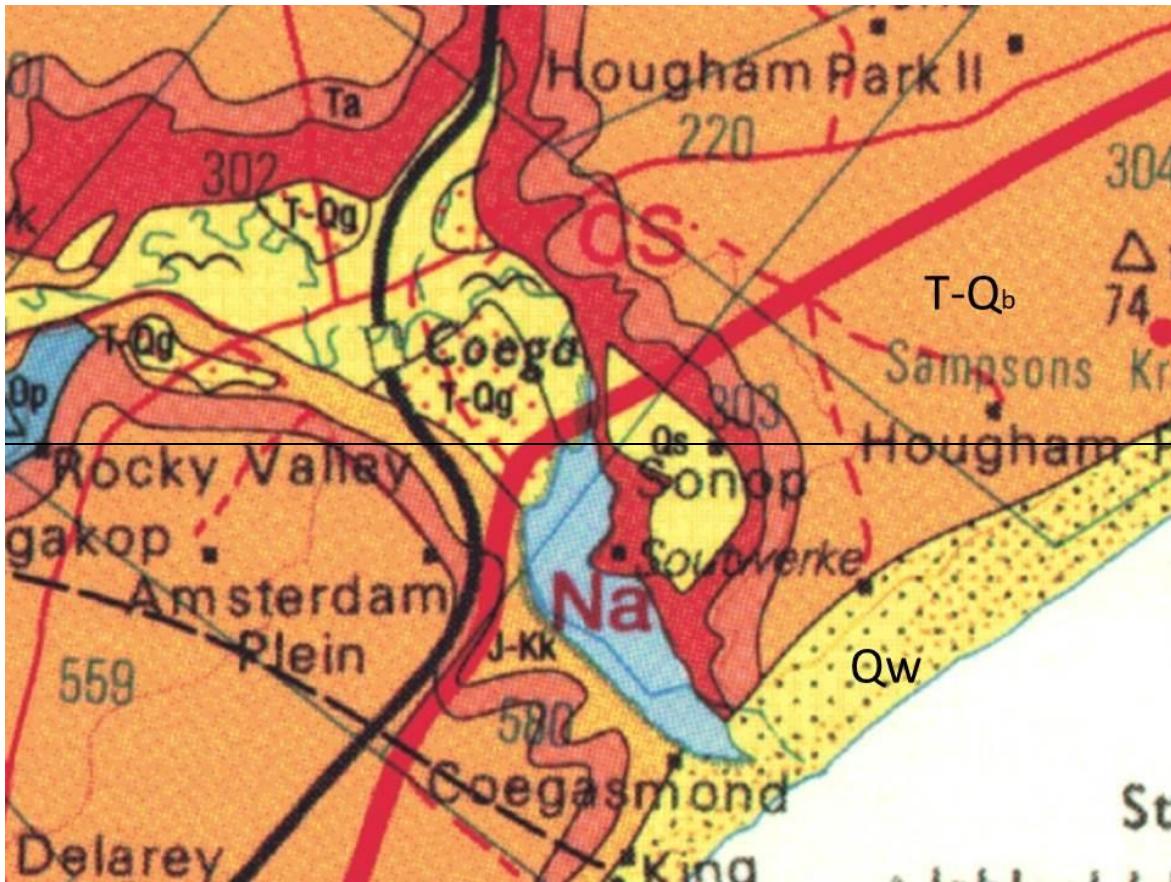


Figure 3: Extract from the Port Elizabeth 3324 1:250 000 Geological Map.

Alexandria Formation (Ta): This limestone-rich unit has an average thickness of 7-10m. It is of Tertiary age and composed of carbonaceous sandstone, shelly limestone and conglomerate. Sandstones are found in the upper section. These are horizontal-, planar-, or trough-crossbedded. This unit was deposited in shoreface, foreshore or estuarine environments (Almond, 2010).

Bluewater Bay Formation (T-Qb): This is an alluvial sheet composed of gravel and sand.

Alluvium (Qw): This is a contemporary river sand deposit.

6. PALAEOLOGY

Some of the lithotypes are rated high in palaeosensitivity (Figure 4).

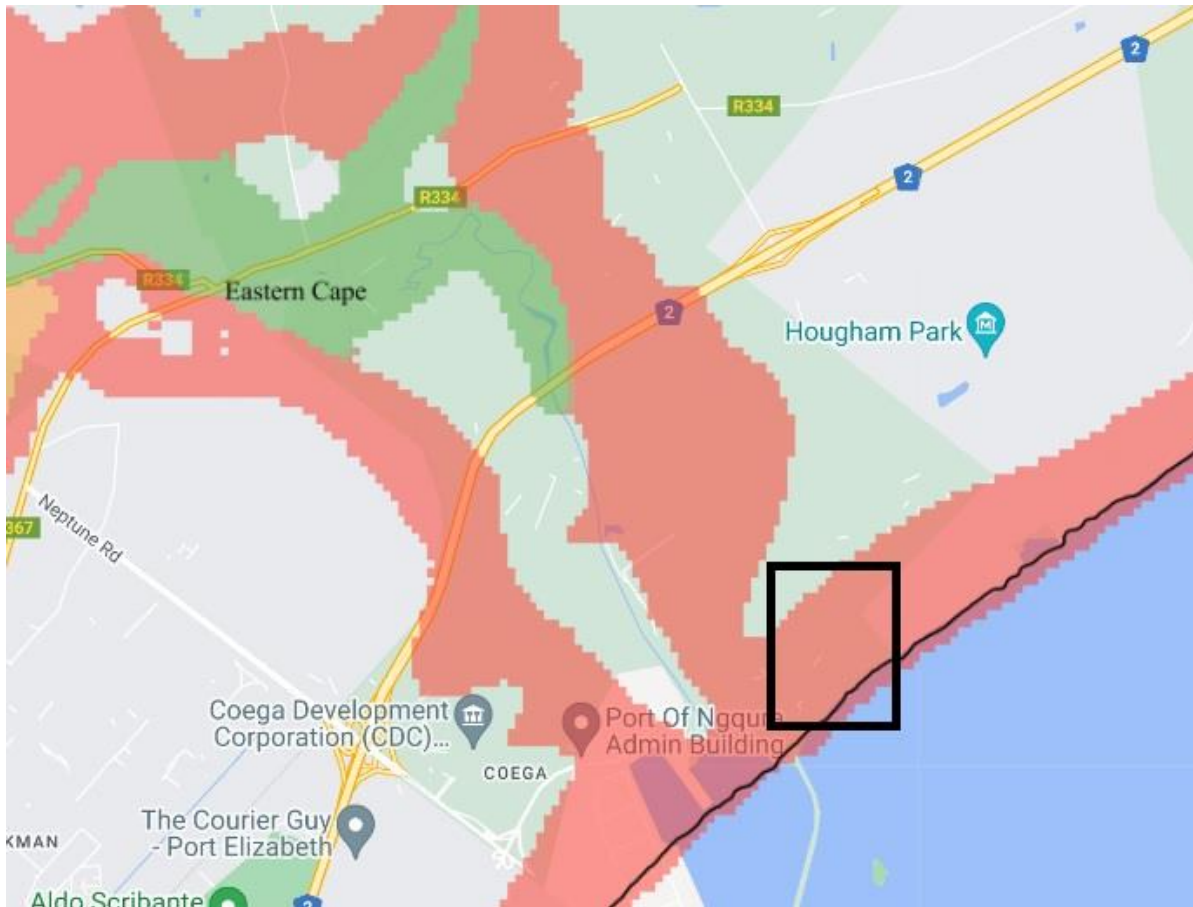


Figure 4: Palaeosensitivity of rocks in the proposed Residue Storage Extension area. The approximate palaeosensitive area (Alexandria Formation) to be traversed by the proposed power line is boxed. Most of the area is not palaeosensitive.

Alexandria Formation: This has a basal conglomerate comprising an oyster shell *hash*. Marine invertebrate fossils and trace fossils are common throughout this Formation (King, 1972). Locally it can contain a rich diversity (including over two hundred taxa) of Miocene / Pliocene marine fauna. These are mainly bivalves and gastropods, but there is also a wide range of rarer groups such as flat sea urchins (*pansy shells*), corals, brachiopods (*lamp shells*), barnacles, crabs and sharks' teeth (Almond, 2010) Despite its unusually rich fossil record, in practice the **Palaeontological Sensitivity** of the Alexandria Formation is very variable, ranging from locally high to generally low (Almond, 2010).

Bluewater Bay Formation: This is unlikely to be fossiliferous.

Modern Aeolian Sand: This could contain reworked fossils, but these are likely to be damaged.

STRINGING YARD

The Stringing Yard is to be built on reclaimed and heavily disturbed land due to the construction of the Port of Ngqura. Consequently, any palaeontological material is likely to have already been found on this site or destroyed during port construction earthworks. The “Chance Find Protocol” (see section 8 of this report) will be sufficient for any chance find on this site.

7. RECOMMENDATIONS

A palaeosensitive area has been recognized but it is relatively small (Figure 5). This area comprises the Alexandria Formation. It is covered by aeolian sand which is itself disturbed and not exposed. These lithologies have already been disturbed and palaeontological material destroyed by the Port of Ngqura construction. Further there is little to no rock exposure.



Figure 4: This illustrates the area which has been red flagged in the Sahris Palaeosensitivity Map. This area is disturbed and consequently any fossils will also be disturbed.

Marine shell debris, due to contemporaneous wave-action, are likely to be encountered on this site, but these are unlikely to be significant. **Significant Palaeontological** material could be found within the highlighted area (see Figure 4 and 5) but this is likely to be broken and highly fragmented due to the Port of Ngqura construction. Should intact shells of other fossils be found these should be archived and a competent Palaeontologist consulted.

Due to the Ngqura Port construction and the disturbance that this has caused no purpose can be served by a pre-construction visit. Should the “Chance Find Protocol” (see section 8) be triggered, the need for a Palaeontology Field Visit may have to be re-evaluated.

8. CHANCE FIND PROTOCOL

As this site includes areas flagged red on the SAHRIS PalaeoSensitivity Map (Figure 3), a *“Chance Find Protocol”* is **Recommended**.

In the case of any unusual finds, a Palaeontologist must be notified immediately by the ECO and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material:

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.
4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.

5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.
7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.
8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

9. REFERENCES

Almond, J (2010). Natura Viva cc. Accessed 01 October, 2020.

sahris.sahra.org.za/sites/default/files/heritagereports/Coega%20IDZ%20Fossil%20Heritage%20PIA%20Part1.pdf

Port Elizabeth 3324 1: 250 000 Geological Map. Council for Geosciences, Pretoria.

King, L. (1972). "[Pliocene marine fossils from the Alexandria Formation in the Paterson District, Eastern Cape Province, and their geomorphic significance](#)". South African Journal of Geology. *75* (2). *ISSN 1012-0750*.

Palaeosensitivity Map <https://sahris.sahra.org.za/map/palaeo>

Triplo4: Sustainable Solutions (2020: September 21). ID for the Powership at Port of Ngqura within Coega SEZ at Nelson Mandela Bay Municipality, Eastern Cape.

10. DETAILS OF SPECIALIST

Dr Alan Smith

Private Consultant: Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091

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Honorary Research Fellow: Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg.

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published more than 50 journal articles with 590 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.