Palaeontological Impact Assessment for the proposed Grootfontein 10MW solar energy facility and OHL near Cala Pass, Eastern Cape Province

Desktop Study (Phase 1)

Subcontracted by

Abantu Environmental Consultants

10 October 2026

Prof Marion Bamford
Palaeobotanist
P Bag 652, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za

1. Executive Summary

A Palaeontological Impact Assessment was requested for proposed Grootfontein 10MW solar energy facility and OHPL near Cala Pass to Cala town, Eastern Cape Province.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the potentially very highly sensitive Burgersdorp and Molteno Formations but no fossil localities are known near this site. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling activities for foundations and infrastructure have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very High	Low	Palaeontological Impact Assessment	Section 7.2. SAHRA Requirements

2. **Declaration of independence and summary of expertise**.

a. Declaration

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Abantu Environmental Services, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the Project.

Specialist: Prof Marion Bamford

Signature: 

b. Expertise

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf, PSSA
Experience: 36 years research and lecturing in Palaeontology; over 28 years PIA studies and over 450 projects completed.

c. Specialist declaration of independence and statement of objectivity for the assessment.

Declaration of Independence

I, Marion Bamford, declare that –
General declaration:

- I act as the independent palaeontology practitioner 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 favourable to the applicant,
- I declare that there are no circumstances that may compromise my objectivity in performing such work,
- I have expertise in conducting palaeontological impact assessments, 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 will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application,
- 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,
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties

and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application,
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct,
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.

d. **Summary of the specialist's expertise**

I, Marion Bamford, am a professional Palaeontologist with a PhD in Palaeontology (Wits University, 1990). I have more than 36 years of experience in palaeontological research and have published over 200 papers in peer-reviewed journals and published more than 14 scholarly book chapters. I review manuscripts for international and local journals and also review funding proposals for international funding bodies. Currently I am the Director of the Evolutionary Studies Institute, the only palaeontological institute in Southern Africa.

I have completed more than 500 palaeontological impact assessments (desktop and site visit studies) in the last 29 years for a variety of projects (solar energy projects, wind energy projects, powerlines, roads, infrastructure, housing and retail projects and from all over South Africa. I have been subcontracted by over 30 different companies. From my own projects and training provided by me and other staff in the ESI for Palaeontological Impact Assessments, I am familiar with the legislation.

Table of Contents

1. Executive Summary i
2. Declaration of independence and summary of expertise. 1
3. Project Background 4
4. Methods and Terms of Reference 7
5. Geology and Palaeontology 8

i. Project location and geological context 8
ii. Palaeontological context 9

6. Impact assessment 12
7. Assumptions and uncertainties 13
8. Recommendation 13
9. References 14
10. Chance Find Protocol 15
11. Appendix A – Examples of fossils 16

Figure 1: Google Earth map of the general area to show the relative land marks. 6
Figures 2-3: Google Earth Maps of the proposed development 6-7
Figure 4: Geological map of the area around the project site 8
Figures 5-6: SAHRIS palaeosensitivity maps for the site 10-11

Table 1: NEMA and EIA Regulations 4
Table 2: List of abbreviations for geology map 8
Table 3: Impact Assessment criteria 12

3. Project Background

A Palaeontological Impact Assessment was requested for proposed Grootfontein 10MW solar energy facility and OHPL near Cala Pass to Cala town, Eastern Cape Province (Figures 1-3). The solar facility will be on ploughed fields on a port of Farm Grootfontein and the overhead powerline (OHPL) will follow the road southwards to the town of Cala and an existing substation on the southwest side of the town (Figure 1).

A Palaeontological Impact Assessment was requested for the proposed Grootfontein 10MW solar energy facility and powerline project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein. The minimum requirements for reporting are listed in Table 1.

Table 1: 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). Includes the requirements from GNR Appendix 6 of GN 326 EIA Regulation 2017.

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
ai	Details of the specialist who prepared the report,	Section 2
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Section 2
b	A declaration that the person is independent in a form as may be specified by the competent authority	Section 2
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 3
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 6
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 4
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 6
g	An identification of any areas to be avoided, including buffers	N/A

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
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;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
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	Section 8
k	Any mitigation measures for inclusion in the EMPr	Section 10, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 8
nii	If the opinion is that the proposed activity 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	Sections 8, 10
o	A description of any consultation process that was undertaken during the course of carrying out the study	EAP
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted 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.	N/A

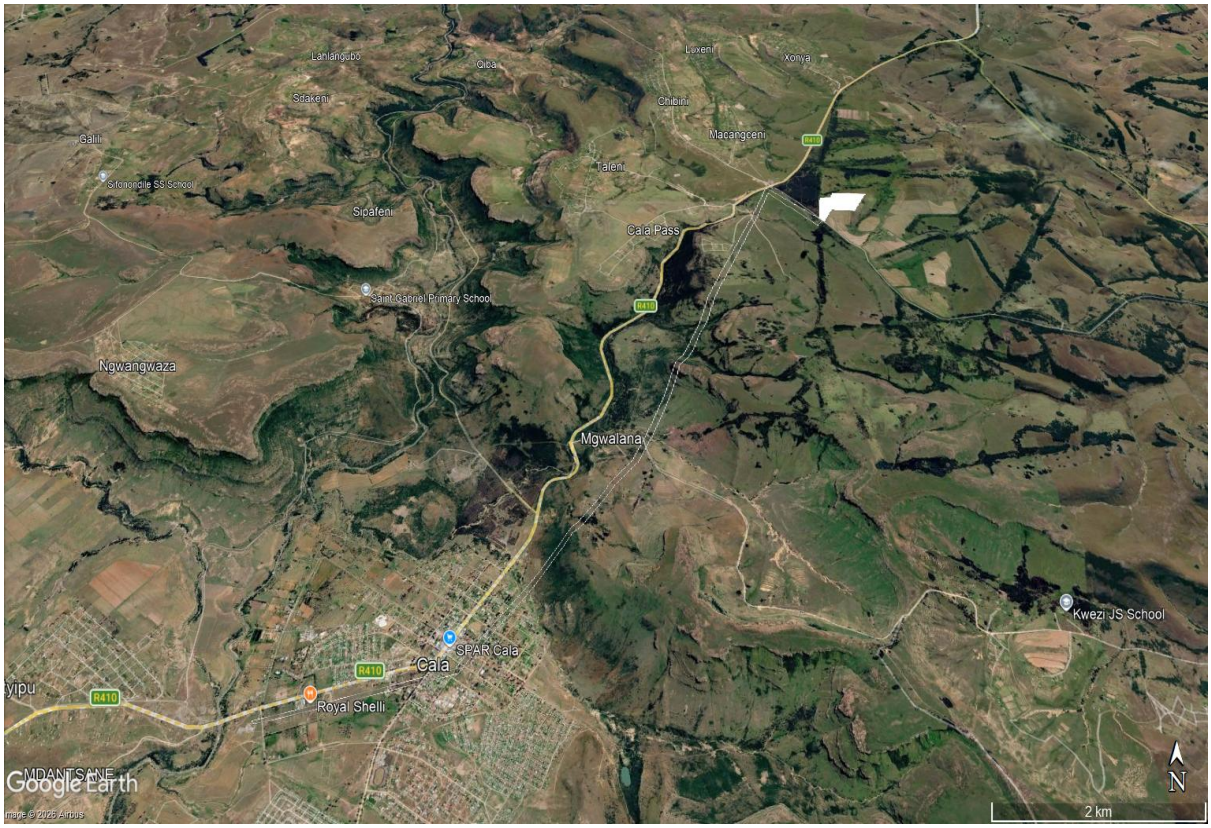


Figure 1: Google Earth map of the general area to show the relative landmarks. The Grootfontein solar facility is shown by the solid white polygon and the powerline by the dotted lines.

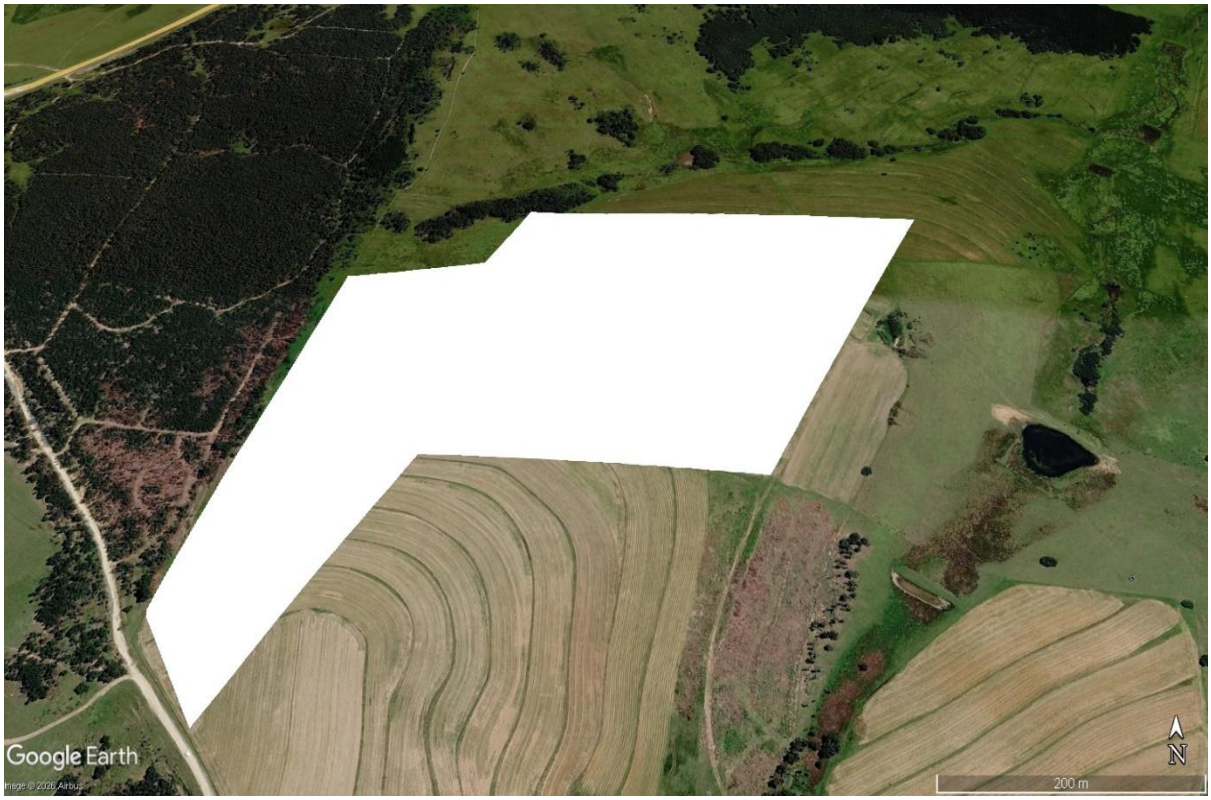


Figure 2: Google Earth Map of the proposed Grootfontein PV shown by the solid white polygon.



Figure 3: Google earth map of proposed site for the Grootfontein SEF without the polygon to show the ploughed fields.

4. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.
The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources include records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases; eg https://sahris.sahra.org.za/map/palaeo
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representativity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

5. Geology and Palaeontology

i. Project location and geological context

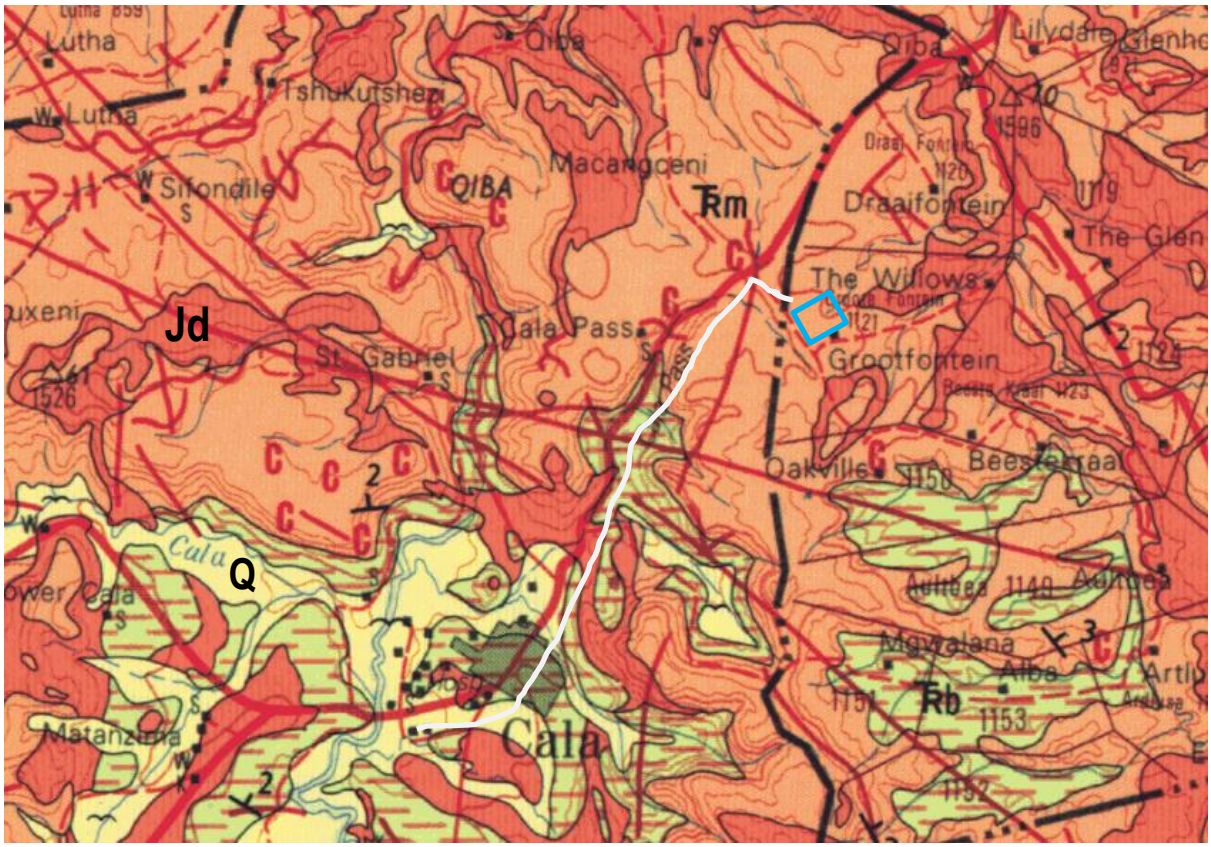


Figure 4: Geological map of the area around the proposed Grootfontein SEF and OHPL project that is indicated within the blue polygon ad white line respectively. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 3126 Queenstown.

Table 2: Explanation of symbols for the geological map and approximate ages (Johnson et al., 2006;). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Quaternary ca 1.0 Ma to Present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, Ca 183 Ma
Trm	Molteno Fm, Stormberg Group, Karoo SG	Gritty sandstone, grey mudstone, shale, coal	Late Triassic, ca 247 – 219 Ma
Trb	Burgersdorp Fm, Tarkastad Subgroup, Karoo SG	Mudstone, sandstone	Middle Triassic, ca 247 – 242 Ma

The project lies in the central part of the Main Karoo Basin where the upper strata are exposed (Figure 4).

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

Overlying the basal Dwyka Group glacigene rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. Overlying the Ecca Group are the rocks of the Beaufort Group that has been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. As with the older Karoo sediments, the formations vary across the Karoo Basin.

In the central and eastern part of the Karoo Basin the Tarkastad Subgroup of the Beaufort Group is composed of two formations, the lower Katberg and upper **Burgersdorp Formations.**

Overlying the Beaufort Group are the three formations of the Stormberg Group. They are absent from the western part of the basin but are more uniform across the eastern part of the basin. Capping the Stormberg Group are the Drakensberg Group basalts and dykes that signalled the end of deposition in the Karoo basin. The Stormberg Group formations are the lower **Molteno Formation** shales, the Elliot Formation that has recently been divided into the lower and upper Elliot Formation, and the upper Clarens Formation.

Large exposures of Jurassic dolerite dykes occur throughout the area. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption.

Sands and alluvium were deposited in the valleys and depression during the Quaternary period.

ii. Palaeontological context

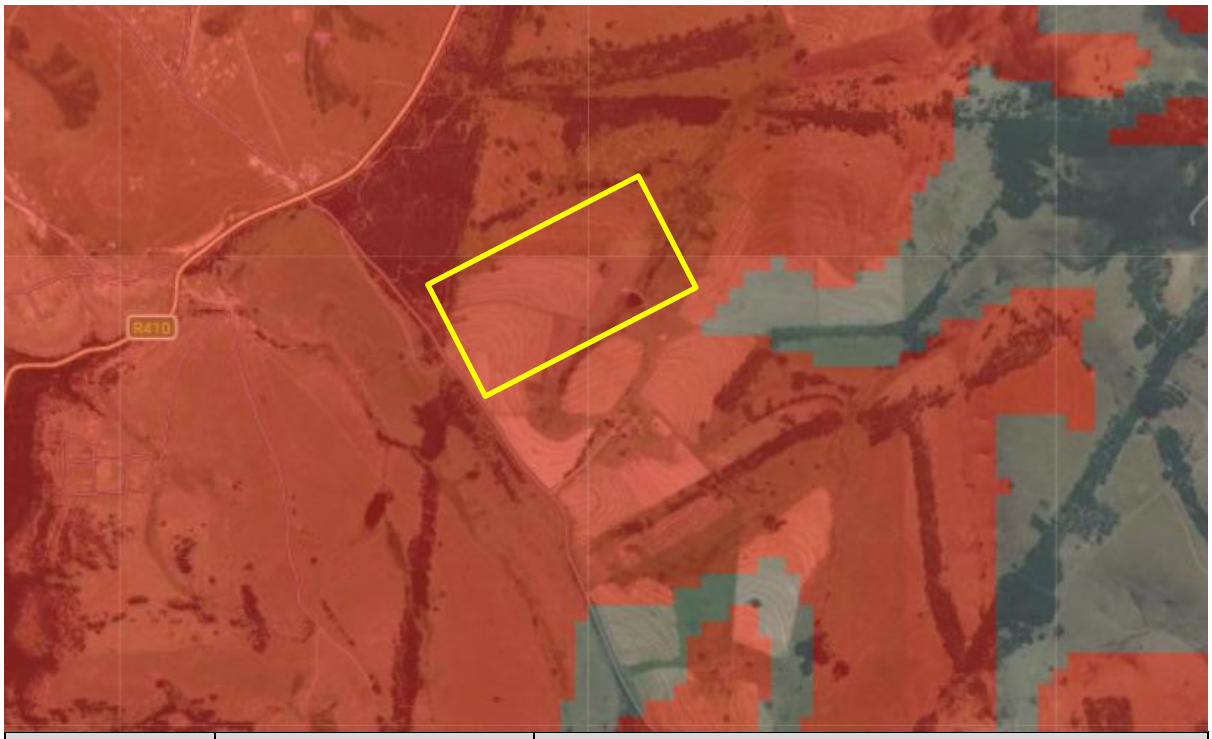
The palaeontological sensitivity of the area under consideration is presented in Figure 5. The site for development is in the potentially very highly sensitive Burgersdorp and Molteno Formations (red), moderately sensitive sands (green) and the non-fossiliferous Jurassic dolerite (grey).

The Early to middle Triassic **Burgersdorp Formation** (Tarkstad Subgroup) is home to the ***Cynognathus* Assemblage Zone**. This post Permo-Triassic extinction event and recovery phase has a lower diversity of fauna and flora. It is typified by the presence of the cynodont genus *Cynognathus* (Kitching, 1995; Hancox et al., 2020), and has been divided into three subzones, namely the lower *Langbergia-Garjainia* Subzone, the *Trirachodon-Kannemeyeria* Subzone and the upper *Cricodon-Ufudocyclops* Subzone (Hancox et al., 2020). Other fauna include, fish, amphibians, parareptiles, eureptiles, therocephalians, cynodontians and trace fossils. Plants of the Burgersdorp Formation no

longer include the glossopterids; there are lycopods (*Gregicaulis*), sphenophytes (*Calamites)*, ferns (*Asterotheca, Cladophlebis*), seed ferns (*Lepidopteris, Dicroidium*), cycads (*Pseudoctenis, Nilssonia*), ginkgos (*Ginkgoites, Sphenobaiera*) and conifers (*Sewardistrobis, Agathoxylon, Podocarpoxylon*) (Plumstead, 1969; Anderson and Anderson, 1985; Bamford, 2004; Barbolini et al., 2018).

The **Molteno Formation**, of upper Triassic age, represents braided streams on a vast braid plain, rare coal deposits with a few filled in abandoned channel tracts and some ponded bodies of water (Catuneanu et al., 1998). It was a part of the ever-shrinking Karoo Basin and only occurs around the margins of the Drakensberg Mountains. There are no vertebrate fossils in this formation but footprints of three-toed vertebrates are common in some parts (Anderson et al., 1998).

In contrast, the flora is extremely rich and diverse in pockets around Little Switzerland, Molteno, Birds River and others (Anderson and Anderson, 1985). The flora includes the lower plants such as bryophytes, ferns, lycopods and sphenophytes, the now extinct seed ferns such as *Dicroidium* (dominant), *Lepidopteris, Yabiella, Taeniopteris, Dejerseya*, cycads such as *Pseudoctenis, Nilssoniopteris*, gymnosperms such as *Ginkgoites, Sphenobaiera, Rissikia, Voltziopsis, Heidiphyllum, Pagiophyllum,* and incertae sedis (Plumstead, 1969; Anderson and Anderson, 1983, 1985, 2002. 2020; Bamford 2004; Anderson et al., 2019a, b, 2020). There is no vertebrate assemblage zone for the Molteno



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/ YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
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.

Figure 5: SAHRIS palaeosensitivity map for the site for the proposed Grootfontein SEF shown within the yellow rectangle.



Figure 6: SAHRIS palaeosensitivity map for the OHPL for Grootfontein to Cala town shown by the while line. Colour coding as for Figure 5.

From the SAHRIS maps above the PV area and parts of the OHPL route are is indicated as very highly sensitive (red) so a site visit could be requested. However, the PV site has been cleared and ploughed for cultivation (Figure 3) so there are no rocky outcrops and, therefore, no fossils on the soil covered land surface. The powerline route is also along minor roads and cultivated fields so is disturbed. In addition, the Burgersdorp Formation and the Molteno Formation have been extensively mapped by Heidi and John Anderson since the 1970s. The nearest fossil site is at Askeaton that is more than 20km to the southwest (Anderson and Anderson, 2003; p. 8-9). The vertebrate fossils are known mainly form sites along the main road between Queenstown and Lady Frere, to the west of this powerline route.

A fossil chance find protocol is considered to be adequate to protect any possible fossils that might occur in the project footprint because fossils will not be present in the ploughed fields and road servitudes, and would only be exposed once excavations for pole foundation have commenced (Section 10).

6. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 3:

Table 3a: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	**H**	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	**H**	-
	M	-
	L	Soils do not preserve fossils; so far there are no records from the Molteno Fm of plant or animal fossils in this site so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
DURATION	**L**	-

PART B: Assessment		
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	**L**	Since the only possible fossils within the area would be fossil plants in the shales, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	**H**	**-**
	M	**-**
	L	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the strata immediately below the soil cover. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct type and age to contain fossils. However, the material to be excavated is soil in a cultivated field and this does not preserve fossils. Since there is a small chance that fossils from the Molteno Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

7. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolerites, sandstones, shales and sands are typical for the country and only some might contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils.

8. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. There is a very small chance that fossils may below the soils of the cleared and cultivated fields in the shales of the Burgersdorp and Molteno Formations so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations for foundations and infrastructure have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very High	Low	Palaeontological Impact Assessment desktop study	Section 7.2. SAHRA Requirements

9. References

Anderson, J.M., Anderson, H.M., 1985. Palaeoflora of Southern Africa: Prodromus of South African megafloras, Devonian to Lower Cretaceous. A.A. Balkema, Rotterdam. 423 pp.

Anderson, J.M., Anderson, H.M., 2003. Heyday of the gymnosperms: systematics and biodiversity of the Late Triassic Molteno fructifications. Strelitzia 15. National Botanical Institute, Pretoria. 398pp.

Bamford, M.K. 2004. Diversity of woody vegetation of Gondwanan southern Africa. Gondwana Research 7, 153-164.

Barbolini, N., Rubidge, B.S., Bamford, M.K. 2018. A new approach to biostratigraphy in the Karoo retroarc foreland system: utilising restricted-range palynomorphs and their first appearance datums for correlation. Journal of African Earth Sciences 140, 114-133.

Catuneanu, O., Hancox, P.J., Rubidge, B.S., 1998. Reciprocal flexural behaviour and contrasting stratigraphies: a new basin development model for the Karoo retroarc foreland system. Basin Research 10, 417-439.

Hancox, P.J., Neveling, J., Rubidge, B.S., 2020. . Biostratigraphy of the *Cynognathus* Assemblage Zone (Beaufort Group, Karoo Supergroup). South African Journal of Geology 123, 217-238.

Kitching, J.W., Raath, M. A., 1984. Fossils from the Elliot and Clarens Formations (Karoo Sequence) of the northeastern Cape, Orange Free State and Lesotho, and a suggested biozonation based on tetrapods. Palaeontologia africana 25, 111-125.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.

Taverner-Smith, R., Mason, T.R., Christie, A.D.M., Smith, A.M., van der Spuy, M., 1988. Sedimentary models for coal formation in the Vryheid Formation, northern Natal. Bulletin of the Geological Survey of South Africa, 94. 46pp.

10. Fossil Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or trace fossils) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 7-8). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site an ECPHRA permit must be obtained. Annual reports must be submitted to ECPHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to ECPHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

11. **Appendix A** – Examples of fossils from the Burgersdorp and Molteno Formations

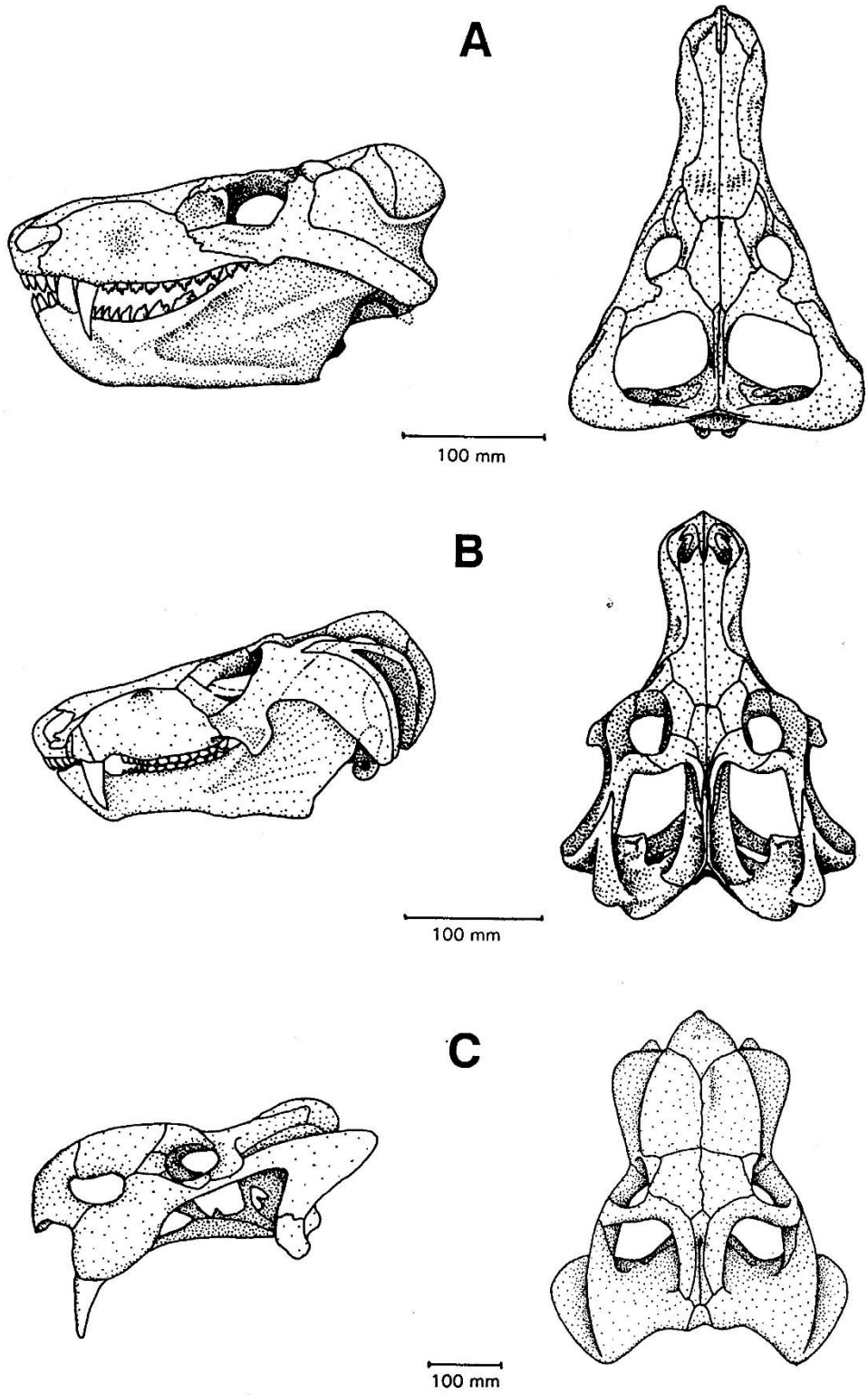


Figure 7: Reconstructions of *Cynognathus, Diademadon* and *Kannemayeria* skulls from the Burgersdorp Formation (from Rubidge et al., 1995).



Figure 8: Photographs of fossil plants that could be found in the Molteno Formation shales, to assist the on-site responsible person.