

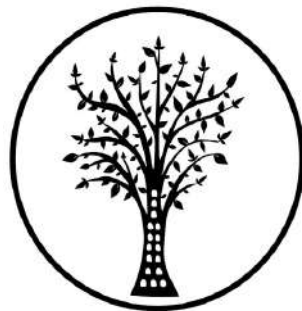
PALAEONTOLOGICAL WALK DOWN REPORT

for the approved Gunstfontein Wind Energy Facility near Sutherland in the Northern
Cape

Prepared by

Dewald Wilken

and



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In Association with

SiVEST

October 2020



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THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I, Dewald Wilken as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

Signed:

Name: Dewald Wilken

Date: 3 Dec 2020

EXECUTIVE SUMMARY

Gunstfontein Wind Farm (Pty) Ltd proposes the development of a wind energy facility with a contracted capacity of up to 200MW and associated infrastructure including Wind turbines, concrete foundations to support the turbines, Cabling between the turbines, laydown areas, internal access roads, an on-site, buildings and dedicated areas for workshops, control systems, maintenance, and storage with parking areas where required, and temporary construction compound and temporary site offices. The proposed site is located ~20km south of Sutherland within the Karoo Hoogland Local Municipality, of the Namakwa District Municipality.

A palaeontological walk through was conducted to comply with 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).

The whole development is underlain by the Abrahamskraal Formation of the Adelaide Subgroup, in the Beauport Group of the Karoo Supergroup. This Formation is rated as highly sensitive.

Although the Abrahamskraal formation is highly sensitive, as it could contain the Tapinocephalus Assemblage Zone, fossils in this area are rare and unpredictably located. The chance of finding a fossil in the area during development is low, but possible. For this reason, a Chance Fossil Find Procedure is added to the end of this report. As far as the palaeontology is concerned the project may proceed.

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1. INTRODUCTION

1.1 Background Information on Project

Gunstfontein Wind Farm (Pty) Ltd proposes the development of a wind energy facility with a contracted capacity of up to 200MW and associated infrastructure including Wind turbines, concrete foundations to support the turbines, Cabling between the turbines, laydown areas, internal access roads, an on-site, buildings and dedicated areas for workshops, control systems, maintenance and storage with parking areas where required, and temporary construction compound and temporary site offices. Project Location: The proposed site is located ~20km south of Sutherland within the Karoo Hoogland Local Municipality, of the Namakwa District Municipality.

The proposed Gunstfontein WEF was given Environmental Authorisation in 2016 (DEA Ref: 14/12/16/3/3/2/826) and has subsequently applied for EA amendments for a proposed OHL grid connection and the development of a BESS within the proposed development footprint. The WEF EA was subsequently amended in 2019 to provide for the following:

- An increase in rotor diameter from 140 m up to 180 m;
- An increase in hub height from 120 m up to 150 m;
- The location, number and details of site access points has been altered;
- Several corrections to conditions;
- Amendment to the site layout with a reduced number of turbines (now 46 turbines);

In their responses to various applications made regarding the proposed development, SAHRA has made the following requirements:

March 2016

- A bufferzone of 60 m must be maintained from all identified heritage and palaeontological resources. Micro adjustment of all relevant proposed infrastructure must occur in order to achieve this;
- The stone cairn/possible grave (Feature 4), should be demarcated and fenced off with a perimeter buffer zone of 60m;
- No turbines may be located within three (3) kilometers from the R354/R356. This is in line with comments issued on surrounding Wind Farm projects (*NB. This requirement was updated in SAHRA's comment from June 2016, see below*);
- A Conservation Management Plan must be developed to ensure the on-going conservation of identified heritage resources during the life of the development. The report must include a map of all identified heritage and palaeontological resources with buffer zones of 60 m in relation to the proposed development. This report must be submitted to SAHRA if the EA has been approved and must form part of the final EMPr; and
- On-site monitoring of excavations deeper than 1 m must be conducted by a qualified palaeontologist during the construction phase of any infrastructure located within the Abrahamskraal formation. Site monitoring reports must be submitted to SAHRA upon completion.

June 2016

- The closest two wind turbines (Turbine 1 and Turbine 2) to the R356 must be removed from the proposed layout in order to maintain a bufferzone of 1.6 km from the historical Verlatenkloof Pass (as proposed by ACED and agreed upon by SAHRA APM Unit through discussion);
- Should the two turbines be relocated to another area, the access route and location of the turbines must be subjected to a walk-down by a qualified archaeologist and palaeontologist to ensure that no heritage resources are impacted by construction activities. A Walk-Down report must be completed and submitted to SAHRA for comment prior to construction. No construction may occur without comments from SAHRA;
- Palaeontological Monitoring of the construction phase can be conducted by a suitable qualified Environmental Control Officer, punctuated by regular site visits by a qualified palaeontologist. Proof of training must be presented to SAHRA and regular monitoring reports must be submitted to SAHRA;
- Previous comments issued on the 18 March 2016 pertaining to the 60m bufferzone from identified heritage and palaeontological resources, feature 4 and the development of a Conservation Management Plan are still valid and must apply to the proposed WEF.

March 2019

The final layout of the development must be physically inspected by a qualified archaeologist and a report must be submitted to SAHRA for comment.

The following additional conditions must be included in the Environmental Management Programme (EMPr) and completed should the Amended EA be granted:

- The Final Amendment Report and EMPr must be uploaded to the SAHRIS application for record purposes;
- If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;
- The decision regarding the Amended EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.

This report is submitted in fulfillment of the requirement for a walkdown of the final alignment by a palaeontologist.



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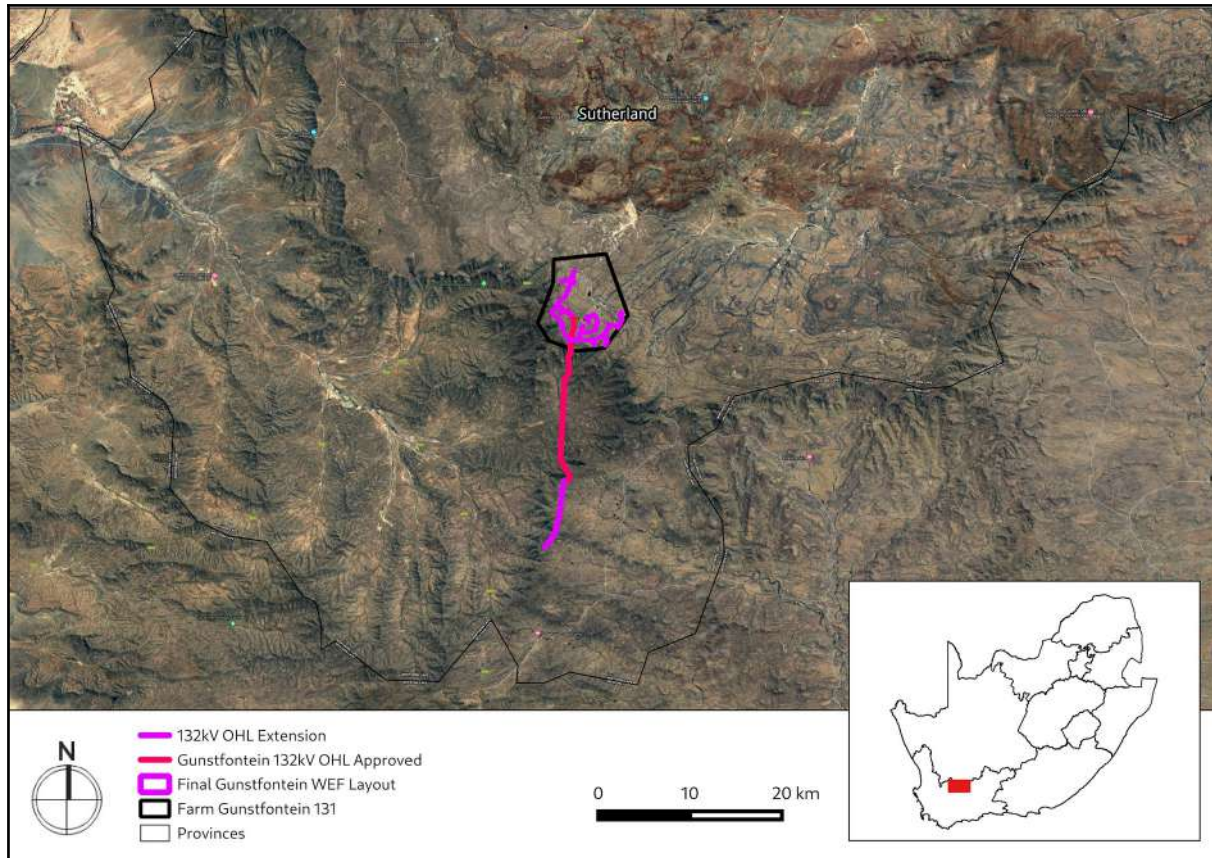


Figure 1 Google Earth© satellite image of the proposed development area

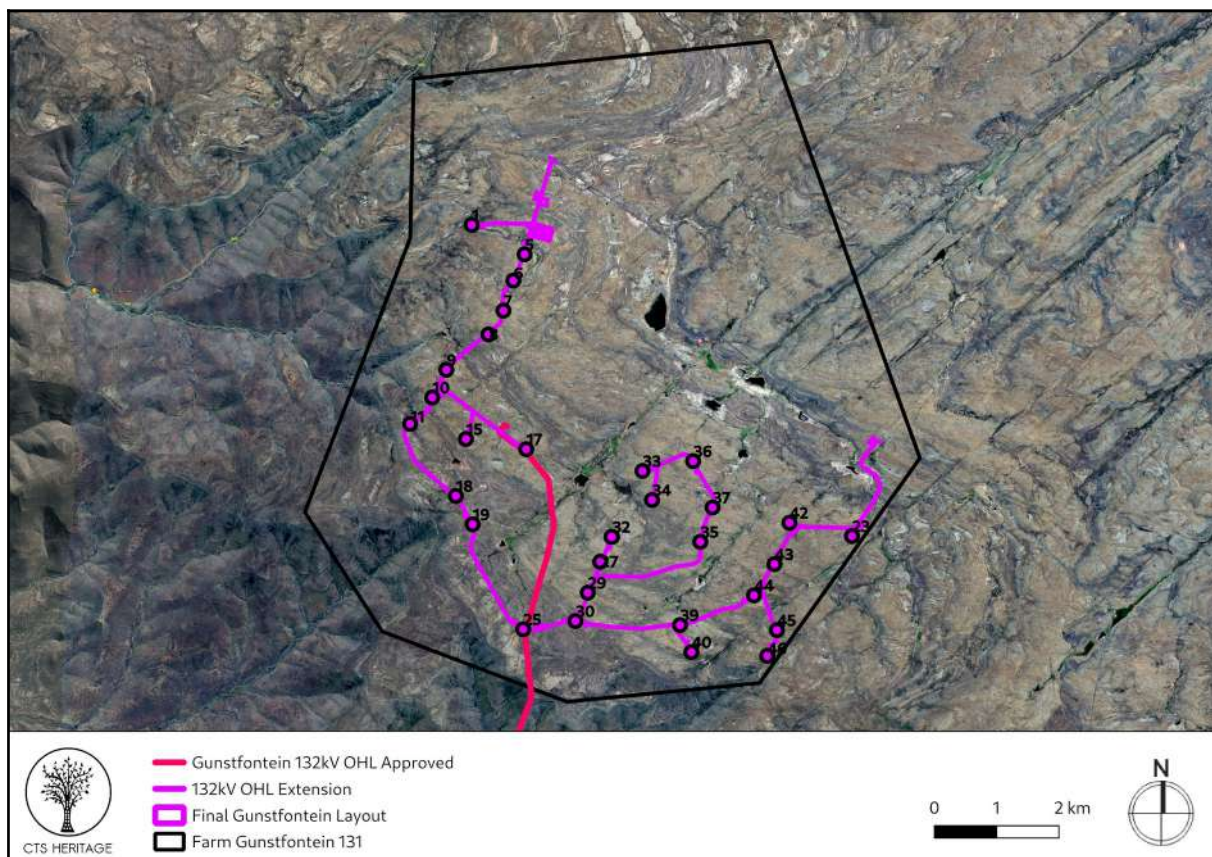


Figure 2 Google Earth© satellite image of the proposed final development layout

2. METHODOLOGY

2.1 Purpose of Palaeontological Study

In their final comment for this application issued on 19 December 2018, SAHRA required that “The walk-down of the final approved layout must be conducted by a qualified palaeontologist and the walk-down report must be submitted to SAHRA prior to the construction phase. No construction may commence without comments from SAHRA in this regard;”. This report is submitted to SAHRA in order to satisfy this requirement.

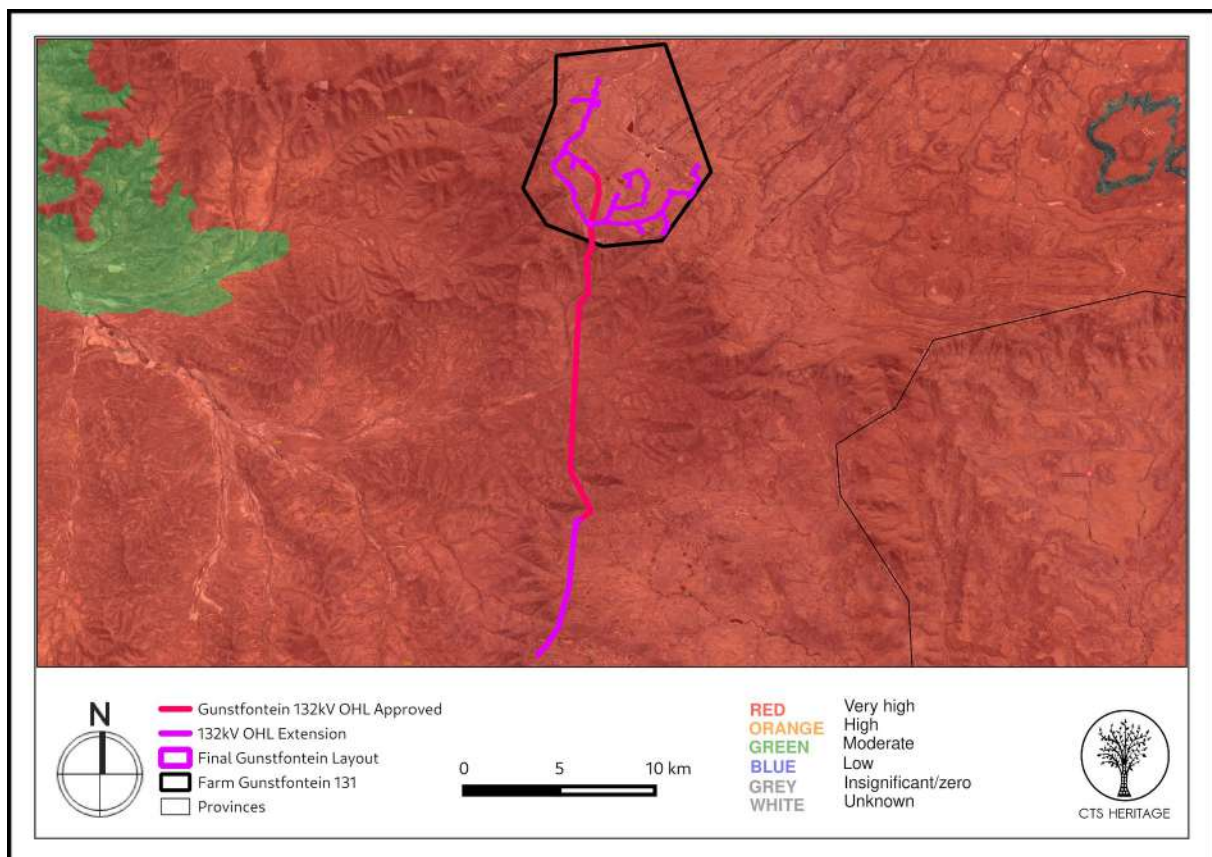


Figure 3 Palaeosensitivity Map. Indicating Moderate to High fossil sensitivity underlying the study area for the Rondawel SEF and associated grid infrastructure

2.2 Study approach

This PIA report provides a record of the observed or inferred palaeontological heritage resources within the broader project study area. The identified resources have been assessed to evaluate their heritage significance in terms of the grading system outlined in Section 3 of the NHRA (Act 25 of 1999). Recommendations for specialist palaeontological mitigation are made where this is considered necessary. The report is based on (1) a review of the relevant scientific literature, including previous palaeontological impact assessments in the broader study region (e.g. Almond 2008; 2012, 2015, 2020) published geological maps, project data, Google Earth satellite imagery and accompanying sheet explanations.

3. GEOLOGICAL CONTEXT OF THE STUDY AREA

According to Almond (2015, SAHRIS NID 357423):

“The main WEF project area on Farm Gunstfontein RE/131 comprises flat-lying to gently-hilly and rocky-ridged terrain on the Roggeveld Plateau that extends along the edge of the Roggeveld Escarpment some 20 km south of Sutherland, Northern Cape. The R356 Verlatekloof Pass tar road between Matjiesfontein and Sutherland runs just to the west while the dust road to the Komsberg Pass traverses the northern portion of the study area. Elevations are highest close to the escarpment edge (c. 1640 - 1600 m amsl) and the ground slopes gradually down to around c. 1560 m amsl in the northeast. The prominent *koppie* Verlatekop (1660 m amsl) lies just outside the western border of the area. The Roggeveld sandstone plateau in this area shows low relief and is transected by several subparallel, SW-NE trending drainage lines related to a set of major bedrock fractures in the region. These form part of the radial and tangential fracture network associated with crustal doming caused by late Cretaceous Salpeterkop igneous activity. The fractures may be intruded at depth by lamprophyre and breccia dykes of the Sutherland Suite (Cole & Vorster 1999, p. 9). The incised drainage lines are associated with intermittent-flowing streams and numerous pans or farm dams. A zone of pans / dams (e.g. the Wilgeboom Dam) also runs along the southwestern side of the Komsberg Pass road.

The adjacent steep, southwest-facing sector of the Roggeveldberg Escarpment on Boschmans Hoek 177 - part of the Great Escarpment of South Africa – spans an elevation of c. 900 m amsl at the base (near Boesmanshoek farmstead) up to 1630 m along the escarpment edge. It is dissected by several dendritic stream gullies, including Boesmanshoek and Brandkloof, which are tributaries of the extensive Tanqua River drainage system. Numerous subhorizontal *kranses* or step-like ridges reflect the successive, prominent-weathering channel sandstone horizons exposed here. Away from the numerous drainage lines and sandstone ridges, bedrock exposure within the study area - notably that of the recessive-weathering mudrock facies - is generally very low. This is due to extensive cover by sandy alluvial and gravelly colluvial deposits as well as karroid *bossieveld* vegetation (Roggeveld Shale Renosterveld and Tanqua Escarpment Shrubland). The WEF development footprint does not extend onto Boschmans Hoek 177.

The geology of the Sutherland region is outlined on the 1: 250 000 scale geology sheet 3220 Sutherland (Theron 1983) (Fig. 4) as well as the updated 1: 250 000 Sutherland metallogenic map that includes important new stratigraphic detail for the Lower Beaufort Group succession (Cole & Vorster 1999) (Fig. 13). The study area is entirely underlain by Middle Permian continental sediments of the **Lower Beaufort Group** (Adelaide Subgroup, Karoo Supergroup), and in particular the **Abrahamskraal Formation** (Pa) at the base of the Lower Beaufort Group succession (Johnson *et al.* 2006 and references cited below). The Beaufort Group sediments here are folded along numerous west-east trending fold axes (Fig. 4). In the Sutherland area to the north of the Roggeveld Escarpment the Lower Beaufort Group sediments have been extensively intruded and thermally metamorphosed (baked) by dolerite sills and dykes of the **Karoo Dolerite Suite** of Early Jurassic age (c. 182 Ma = million years ago; Duncan & Marsh 2006). These igneous rocks were intruded during an interval of crustal uplift and stretching that preceded the break-up of the supercontinent Gondwana. They show up on satellite images as rusty-brown areas. No dolerite or younger (Cretaceous) intrusions are mapped within the present study region along the edge of the Roggeveld Escarpment, however; major dolerite bodies intrude the Lower Beaufort Group over 5 km to the north. The



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Palaeozoic bedrocks in the study area are extensively overlain by Late Caenozoic **superficial deposits** such as scree and other slope deposits (colluvium and hillwash), stream alluvium, down-wasted surface gravels, calcretes and various sandy to gravelly soils. These geologically youthful sediments are generally of low palaeontological sensitivity.”

Table 1. a Summary of the underlying geology of the Gunstfontein Farm and the WEF and OHL project.

Symbol	Group	Formation	Lithology	Approximate Age	Palaeontology
Pa	Beaufort, Adelaide Subgroup	Abrahamskraal	Sandstone interlayered with Green to blue- grey mudstones	266 – 250 Ma	Bioturbation, Trance fossils ~Tapinocephalus Assemblage Zone

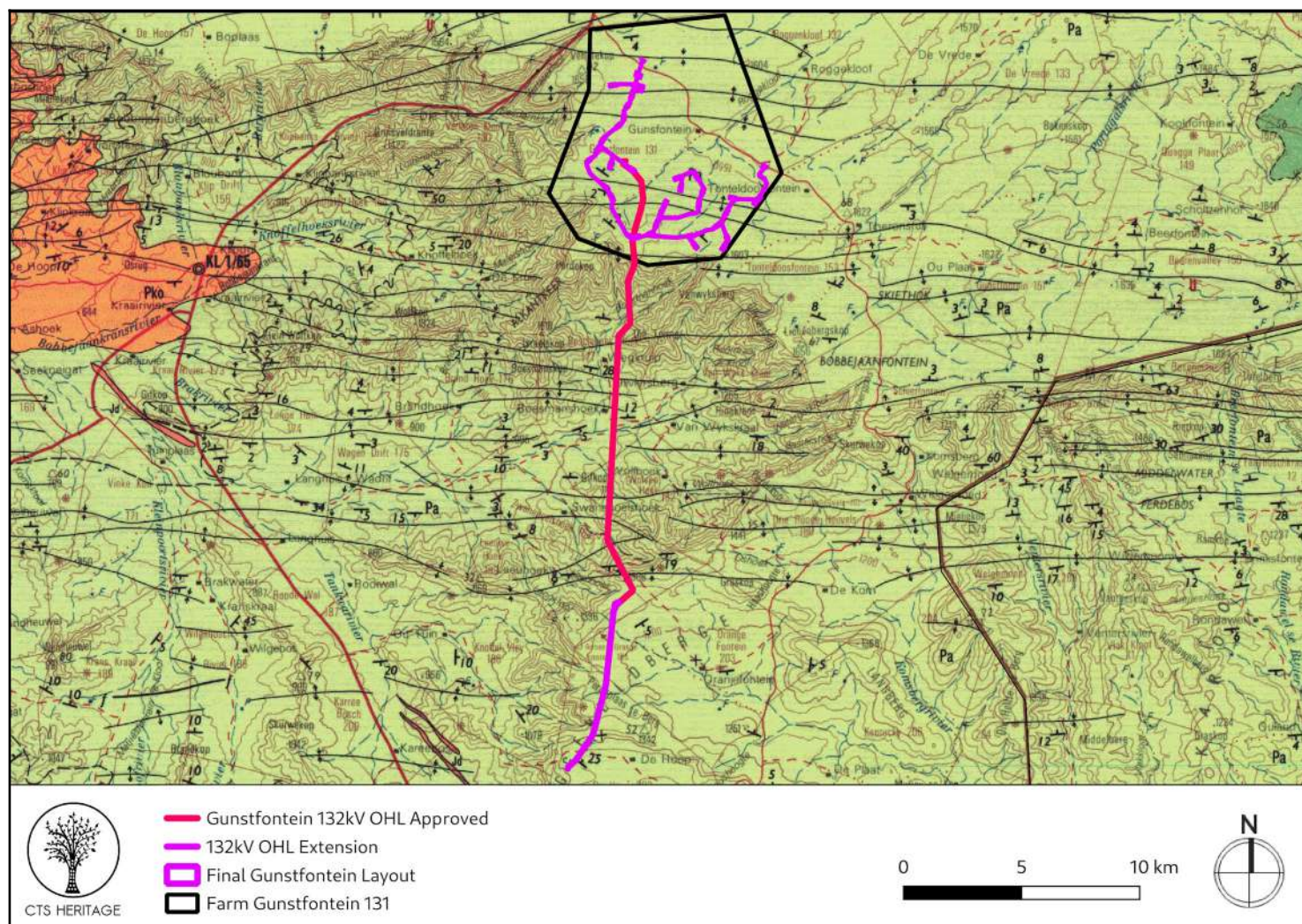


Figure 4 Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the development area for the Rondawel SEF and Grid Connections is underlain by sediments of the Karoo Supergroup including the Adelaide Subgroup, Abrahamskraal Formation (Pa), the Vol

4. PALAEOONTOLOGICAL HERITAGE RESOURCES

4.1. Findings of previous assessment

The area proposed for development of the Gunstfontein WEF is underlain by sediments that have very high palaeontological sensitivity according to the SAHRIS Fossil Sensitivity Map (Figure 3). The geology map of the area (Council of GeoScience Map 3220 Sutherland, Figure 4) indicates that the area is underlain by sediments of the Karoo Supergroup assigned to the Beaufort group, within the Abrahamskraal Formation of the Adelaide Subgroup. This was confirmed by Rossouw (2012, SAHRIS ID 44936) in the Desktop Palaeontological Impact Assessment conducted for the proposed Hidden Valley WEF which includes the area proposed for development.

Subsequently, Almond (2015, SAHRIS ID 353707 and 357423) conducted a palaeontological assessment for the Gunstfontein WEF and the Soetwater WEF which covers the area proposed for the Gunstfontein 132kV OHL. Almond (2015) determined that scientifically important fossil remains (e.g. vertebrate bones and teeth, petrified wood) are very scarce within the development site. This is the same area within which the proposed extension to the Gunstfontein 132kV OHL electrical connection infrastructure is proposed. According to Almonds 2016 assessment of the Soetwater OHL (SAHRIS ID 354172), the impact significance of the construction phase of the proposed electrical connection infrastructure - including switching station complex, 132 kV overhead power line, Soetwater Substation complex and ancillary developments - is assessed as LOW as far as palaeontological heritage is concerned. This conclusion is also applicable to the likely impacts of the proposed extension to the Gunstfontein 132kV OHL which will run parallel to and approximately 15m west of the authorised Soetwater WEF power line routing assessed by Almond (2016). Therefore, based on the information available for the area proposed for development, it is very unlikely that the proposed extension of the Gunstfontein 132kV OHL will negatively impact on significant palaeontological heritage resources.

Almond (2015, SAHRIS NID 357423) conducted a detailed palaeontological assessment for the proposed Gunstfontein WEF development and concluded that “the Lower Beaufort Group bedrocks within the Gunstfontein WEF study area are generally of low palaeontological sensitivity, and this also applies to the overlying late Caenozoic superficial sediments. Construction of the proposed Gunstfontein WEF is unlikely to entail significant impacts on local heritage resources. Due to the general scarcity of well-preserved fossil remains as well as the extensive superficial sediment cover observed within the study area, the overall impact significance of the construction phase of the proposed Gunstfontein WEF is assessed as LOW.”

Almond (2015) noted that 5 uranium core occurrences had previously been identified on Gunstfontein Farm 131 (SAHRIS Site ID 129326 to 129330) located approximately 2.5km north of the 500m BESS assessment area. Almond (2015) notes that these uranium occurrences may well be associated with fossil plant material. In addition, Almond (2015) identified a site that features concentrations of woody plant fossils and *koffieklip* (SAHRIS Site ID 129325). Almond (2015) recommends that a 30m no-go buffer be implemented around both the uranium sites (SAHRIS Site ID 129326 to 129330) and the plant fossil site (SAHRIS Site ID 129325). SAHRA recommended that this buffer be enlarged to 60m as per their comments dated 10 March 2016 and 20 June 2016.

4.2. Palaeontological resources identified in the walk down

The whole study site is underlain by the Abrahamskraal Formation. The rocks of the Abrahamskraal Formation are generally green-grey to blue-grey mudstones, although grey-red, red-brown, or purple mudstones are also found. Calcareous nodules are present, these nodules tend to weather out brown. Within these mudstone layers fine grained green-grey sandstones are found, usually showing an upward fining trend. These sandstones can range from metres to tens of metres in thickness in some areas. These sandstone layers are important stratigraphic markers for geologists and palaeontologist. (Manson, (2007). These mudstones are also interbedded with siltstone beds. These sedimentary rocks tend to reveal a depositional environment in a retro-arc foreland basin (Karoo Basin), where sediment was deposited in a low energy alluvial plain flowing to the north. As indicated by fluvial and lacustrine sediments. (Johnson et al. 2006)

The lower part of the Formation is seen as deltaic (green-grey, blue-grey mudstones) while the upper part of the Formation is seen as fully terrestrial (often indicated by the red mudstones).

The Abrahamskraal Formation correlates well with the Tapinocephalus Assemblage Zone. Tapinocephalus can be seen in Figure 5 and Figure 6. Therapsids, pareiasaur reptiles and fish fossils have been sparsely reported in this Formation. Plant material (e.g. sphenophyte ferns, fossil wood), freshwater invertebrates (principally smooth-shelled bivalves; and a range of trace fossils including tetrapod trackways (e.g. temnospondyl amphibians, therapsids) have been found.

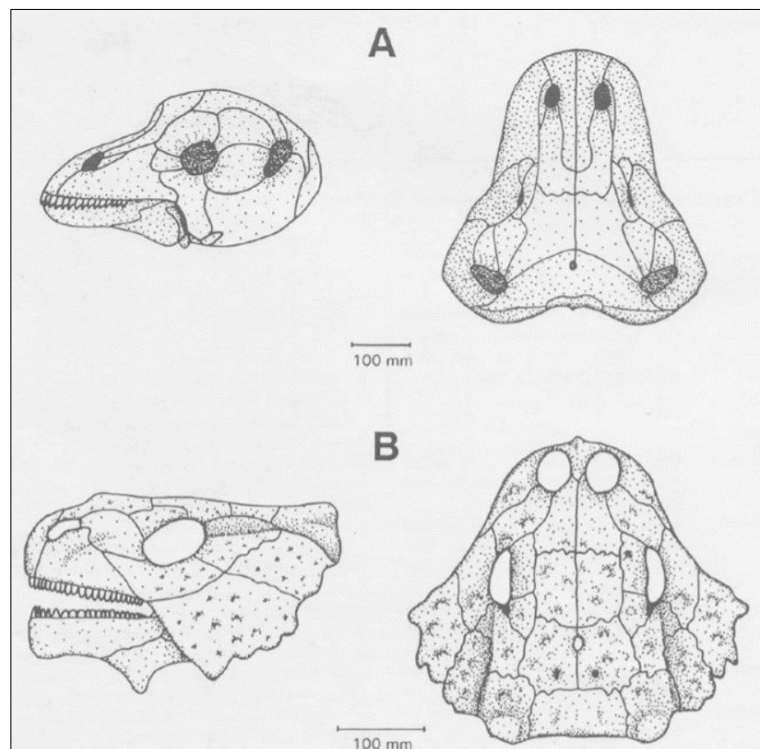


Figure 5 Lateral and dorsal views of biozones-defining fossils of the Tapinocephalus Assemblage Zone. A. Tapinocephalus; B. Bradysaurus modified after Boonstra, 1969 (Rossouw, L. 2019)

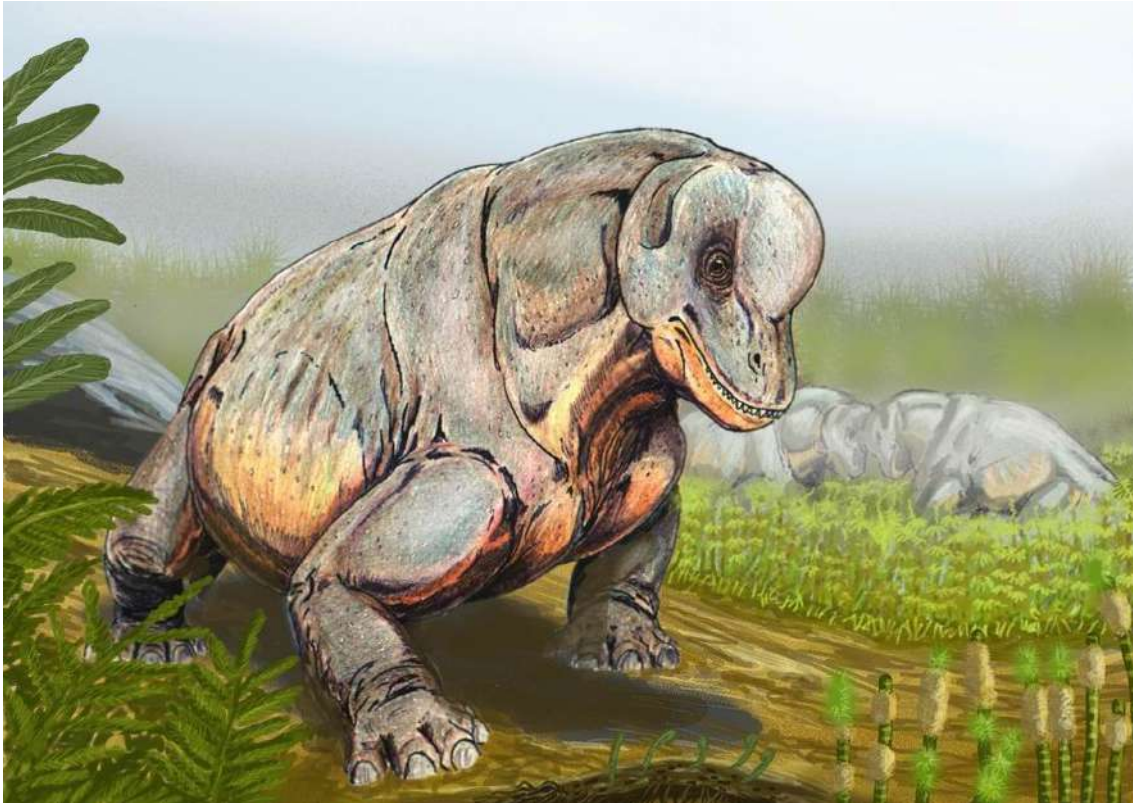


Figure 6 Artist rendition of Tapinocephalus

The maps seen in Figure 7, Figure 8 and Figure 9 show the sites of investigation marked with yellow dots. These mostly indicate outcrops examined to extrapolate data to sites of interest where sediment cover was too thick to investigate. Figure 10 shows the continuous nature of some of these sedimentary layers to indicate their usefulness in extrapolating data.



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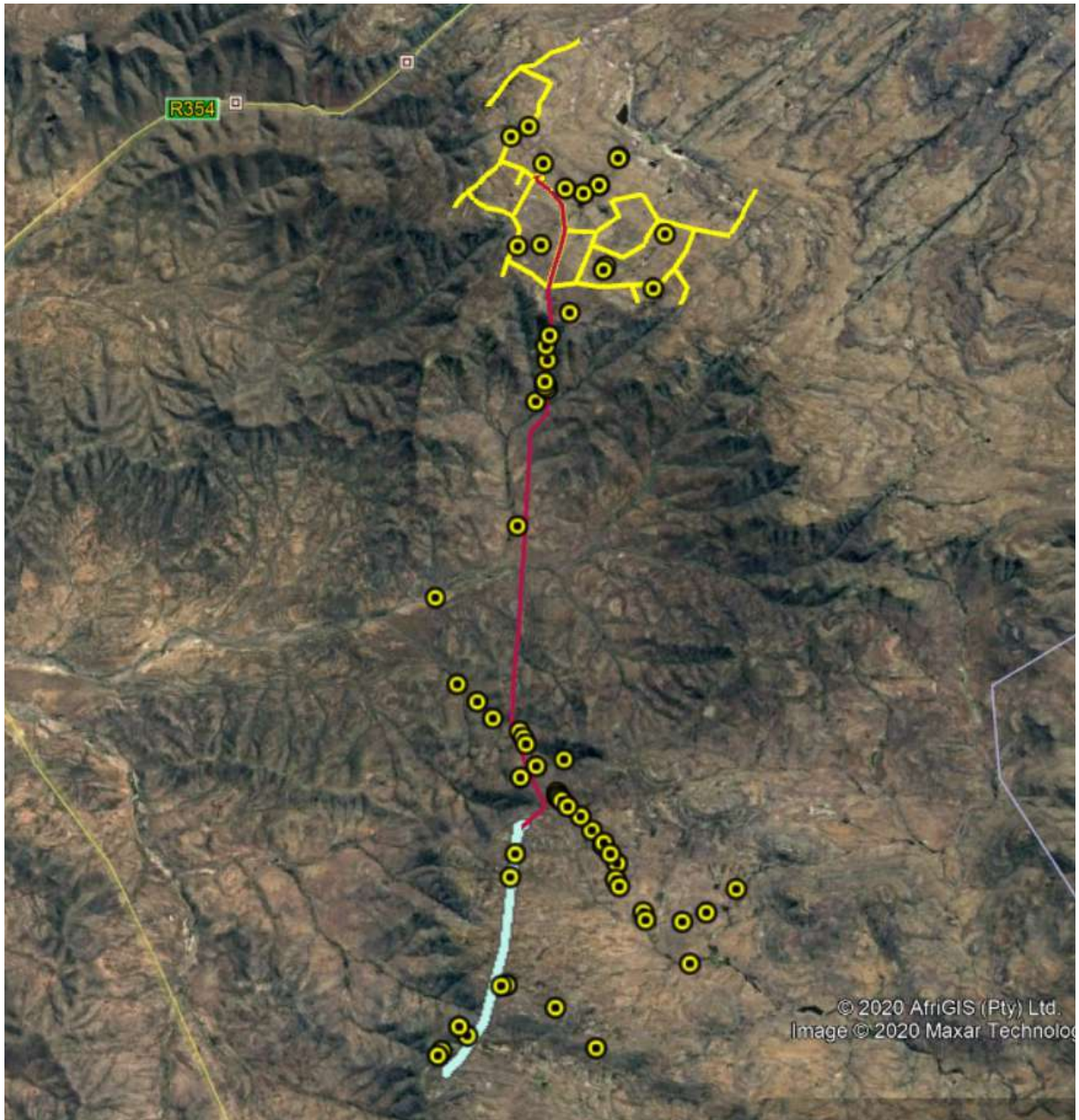


Figure 7 Map of whole area showing sites investigated.



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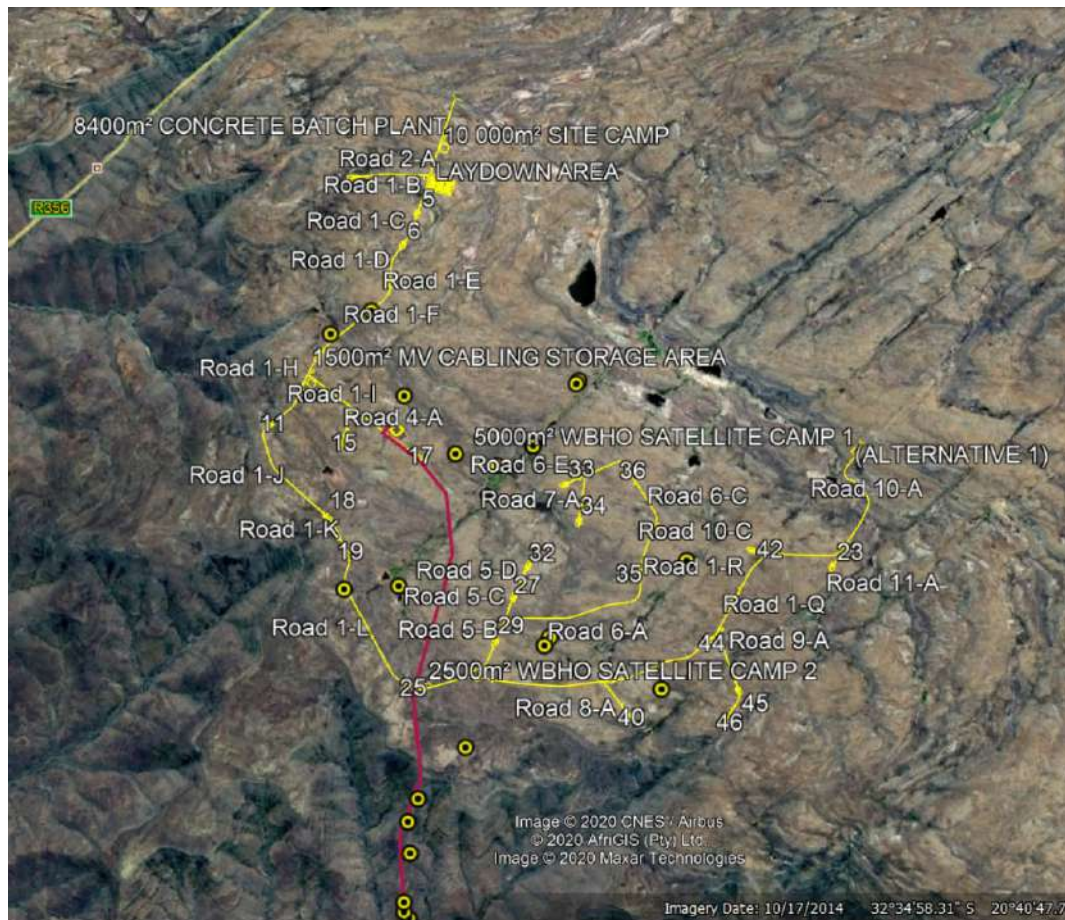


Figure 8 Area on plattue, yellow dots indicates outcrops investigated so information can be extrapolated to areas of interest where sediment cover is too thick of palaeontological analysis.



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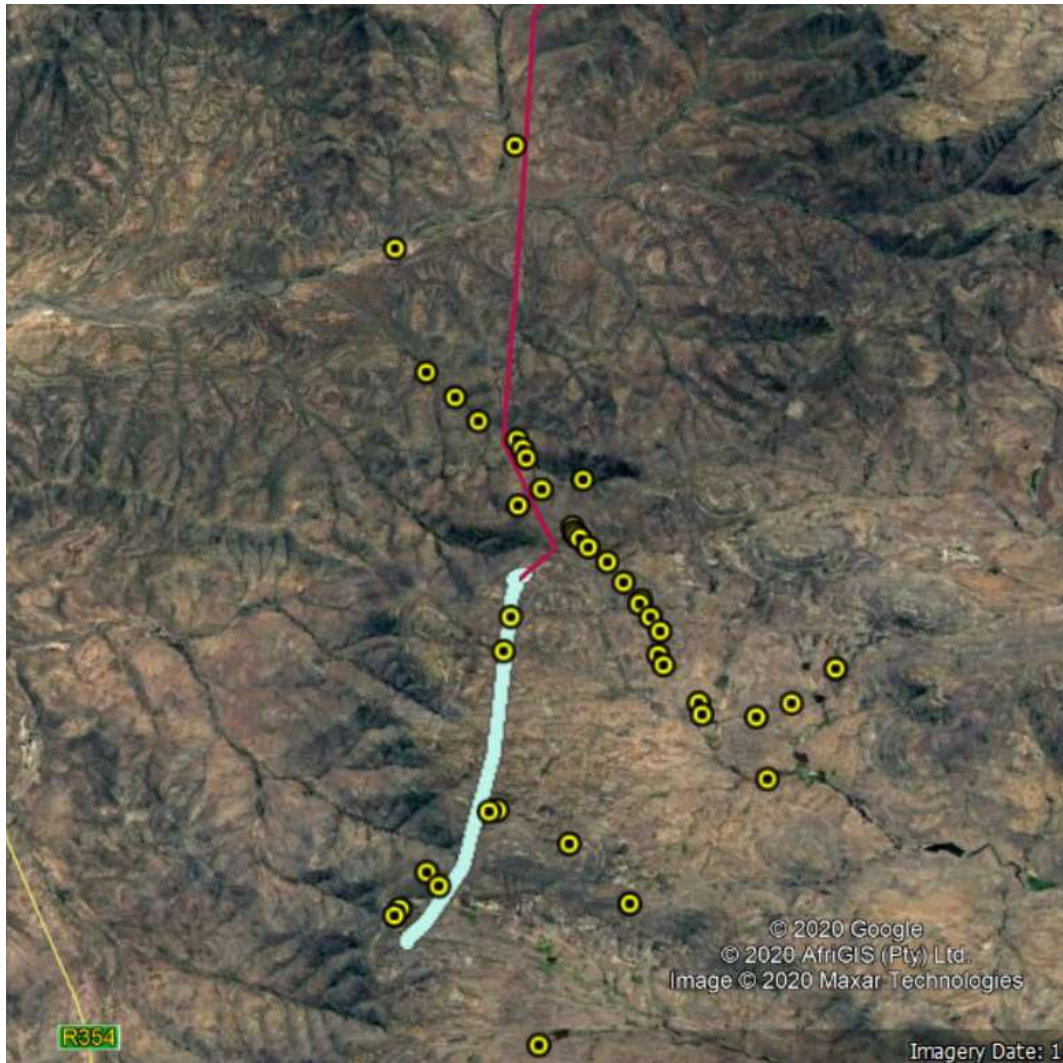


Figure 9 Area down the escarpment, yellow dots indicates outcrops investigated so information can be extrapolated to areas of interest where sediment cover is too thick of palaeontological analysis

None of the outcrops yielded any fossils or trace fossils. The area is known to contain small amounts of black silicified wood, but none was found during this field study.



Figure 10 A - The view from the Rooikrans Pass to the east. B - The same image showing the continuation of the sandstone layer across the area. This is useful for extrapolating data to in accessible areas or areas where sediment cover is too thick.

4.3. Photographic Record

The following table contains selected photos as a summary of outcrops studied. Rock Hammer for scale is 30cm long. No fossils or trace fossils were found during this field study.



Long-32.804575000, Lat 20.622282000
Sandstone flat



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Long -32.805675000, Lat 20.621203000

Sandstone flats, not the extreme weathering of the mudstones in between layers, leaving only a fine gravel.



Long -32.787695000, Lat 20.642095000

Darker sandstone flat, showing weathering and very slight lamination.



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Long -32.803695000, Lat 20.669611000

Highly fractures shales interlayered between sandstones.



Long -32.573460000, Lat 20.674624000

Extensive sandstone flat with no features.



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Long -32.619008000, Lat 20.653291000

Sandstone outcrop overlaying fractured shales. No clear sedimentary features.



Long -32.719711000, Lat 20.636206000

Sandstone outcrop with no sedimentary features.



Long -32.760973000, Lat 20.674987000
Extensive sandstone flat.

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

The proposed development is underlain by potentially fossiliferous sediment of the Karoo Supergroup, specifically the Abrahamskraal Formation of the Adelaide Subgroup of the Beaufort Group. This formation contains the Tapinocephalus Assemblage Zone. Scientifically valuable, well-preserved fossils are exceedingly rare in this area, with an unpredictable distribution. For this reason, it is unlikely that the development will have a significant effect on the area, provided that the chance fossil find procedure is followed in the possible case of a fossil being found.

Table 2 Impact Assessment Criteria

Criteria	Category	Explanation
Overall Nature	<i>Low</i>	Possible fossils in the construction footprint could be destroyed Impact will remain negligible if the Chance Fossil Find Procedure is followed
Type	<i>Direct</i>	The development will directly impact these resources
Extent	<i>Site</i>	Impact is limited to the OHL and WEF area
Duration	<i>Permanent</i>	Likely impacts will affect the heritage resources identified permanently
Severity	<i>Low</i>	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Reversibility	<i>Irreversible</i>	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures.
Irreplaceable Loss	<i>Resource may be partly destroyed</i>	Partial loss or destruction of the resource might occur but can be mitigated if the Chance Fossil Find Procedure is followed.



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Probability	<i>low</i>	The site is partly located on very sensitive palaeontological strata but fossils in this Formation is rare. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Mitigation Potential	<i>High</i>	If the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Impact Significance	<i>Negligible</i>	Impact significance will remain negligible if the Chance Fossil Find Procedure is followed

6. CONCLUSION AND RECOMMENDATIONS

The proposed Gunstfontein development may proceed. It is unlikely that this construction will have a great effect on the national palaeontological heritage.

Although the area has a rich occurrence of multiple fossil assemblages, fossil finds are often isolated as individuals. It is recommended that the responsible ECO monitor the material extracted during excavation.

Should important new fossil remains - such as insects, vertebrate bones and teeth, petrified wood, plant-rich fossil lenses or dense fossil burrow assemblages - be exposed during construction, the responsible Environmental Control Officer should alert ECPHRA (i.e. The Eastern Cape Provincial Heritage Resources Authority. Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.za) as soon as possible. This is so that appropriate action can be taken in good time by a professional palaeontologist at the developer's expense. Palaeontological mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as of associated geological data (e.g. stratigraphy, sedimentology, taphonomy). The palaeontologist concerned with mitigation work will need a valid fossil collection permit from ECPHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies recently developed by SAHRA (2013). These recommendations are summarized in tabular form in Appendix 1 (Chance Fossil Finds Procedure) and should be incorporated into the Environmental Management Programme (EMPr) for the proposed development.

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APPENDIX 1: Fossil Finds Procedure

Chance Fossil Finds Procedure

(Adopted from the HWC Chance Fossils Finds Procedure: June 2016)

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO. It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

- The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found;



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- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates;
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
 - The date
 - A description of the discovery
 - A description of the fossil and its context (e.g. position and depth of find)
 - Where and how the find has been stored
 - Photographs to accompany the preliminary report (the more the better):
 - A scale must be used
 - Photos of location from several angles
 - Photos of vertical section should be provided
 - Digital images of hole showing vertical section (side);
 - Digital images of fossil or fossils.

Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

- Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sandbags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- If the find cannot be stabilised, the fossil may be collected with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove all the fossil material and any breakage of fossil material must be avoided at all costs.



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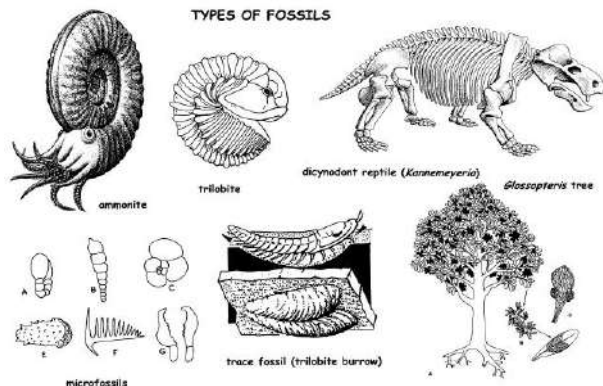
No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Wider context of the find. Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil Name:		
Contact:		
Recorder Name:		
Contact:		
Photographer Name:		
Contact:		

Palaeontology: what is a fossil?

Fossils are the traces of ancient life (animal, plant or microbial) preserved within rocks and come in two forms:

- Body fossils preserve parts, casts or impressions of the original tissues of an organism (e.g. bones, teeth, wood, pollen grains); and
- Trace fossils such as trackways and burrows record ancient animal behaviour.



How to report chance fossil finds: What should I do if I find a fossil during construction/mining?

If you think you have identified a fossil:

Immediately inform the ECO or Site Agent.
He/she will then contact HWC and write a report
and if necessary operations will stop in that
specific area until the fossil is recovered

Heritage Western Cape
ceoheritage@westerncape.gov.za

021 483 5959

www.hwc.org.za



Types of palaeontological finding - What does a fossil look like?

Fossils vary in size, from fossilised tree trunks and dinosaur bones down to very small animals or plants.
Finds can be **individual fossils** (one isolated wood log or bone) or **clusters and beds** (several bones, teeth, animal or plant remains, trace fossils in close proximity or bones resembling part of a skeleton). A bed of fossils is a layer with many fossil remains.

Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.

Image	Description	Image	Description
	Leaves		Snail shells and other shells
	Fossil wood		Bones of larger animals
	The remains of fish and marine life (e.g. teeth, scales, starfish)		Large burrows made by moles and other animals
	Stromatolites		Traces made by burrowing insects (ants, wasps, dung-beetles etc.).
	Animal footprints		

Images provided by Dr John Almond

Text by HWC's Archaeology, Palaeontology & Meteorites Committee June 2016

