SAHRA Case ID: 12894

PALAEONTOLOGICAL ASSESSMENT – LETTER OF EXEMPTION

PROPOSED DEVELOPMENT OF A 25 m HIGH TELECOMMUNICATION MAST ON ERF 542, MAIN ROAD, KLEINZEE, NORTHERN CAPE

BY

John Pether, M.Sc., Pr. Sci. Nat. (Earth Sci.)

Geological and Palaeontological Consultant
P. O. Box 48318, Kommetjie, 7976
Tel./Fax (021) 7833023
Cellphone 083 744 6295
jpether@iafrica.com

FOR

CTS Heritage

CLIENT

EnviroAfrica

18 SEPTEMBER 2018

DECLARATION OF INDEPENDENCE

PALAEONTOLOGICAL ASSESSMENT – LETTER OF EXEMPTION

PROPOSED DEVELOPMENT OF A 25 m HIGH TELECOMMUNICATION MAST ON ERF 542, MAIN ROAD, KLEINZEE, NORTHERN CAPE

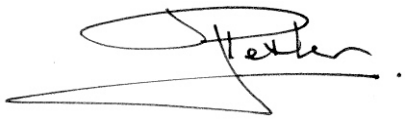
Terms of Reference

This assessment forms part of the Heritage Assessment and it assesses the overall palaeontological (fossil) sensitivities of formations underlying the Project Area.

Declaration

I …**John Pether**……, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in the compilation of the above report;
- 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, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has 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, 2014 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.



Signature of the specialist

Date: 18 SEPTEMBER 2018

CURRICULUM VITAE

John Pether, M.Sc., Pr. Sci. Nat. (Earth Sci.)

Independent Consultant/Researcher recognized as an authority with 35 years' experience in the field of coastal-plain and continental-shelf palaeoenvironments, fossils and stratigraphy, mainly involving the West Coast/Shelf of southern Africa. Has been previously employed in academia (South African Museum) and industry (Trans Hex, De Beers Marine).

At present an important involvement is in Palaeontological Impact Assessments (PIAs) and mitigation projects in terms of the National Heritage Resources Act 25 (1999) (~240 PIA reports to date) and is an accredited member of the Association of Professional Heritage Practitioners (APHP). Continues to be involved as consultant to offshore and onshore marine diamond exploration ventures. Expertise includes:

- Coastal plain and shelf stratigraphy (interpretation of open-pit exposures, on/offshore cores and exploration drilling).
- Sedimentology and palaeoenvironmental interpretation of shallow marine, aeolian and other terrestrial surficial deposits.
- Marine macrofossil taxonomy (molluscs, barnacles, brachiopods) and biostratigraphy.
- Marine macrofossil taphonomy.
- Sedimentological and palaeontological field techniques in open-cast mines (including finding and excavation of vertebrate fossils (bones).

Membership of Professional Bodies

- South African Council of Natural Scientific Professions. Earth Science. Reg. No. 400094/95.
- Geological Society of South Africa.
- Palaeontological Society of Southern Africa.
- Southern African Society for Quaternary Research.
- Accredited member, Association of Professional Heritage Practitioners, Western Cape. Mem. No. 48.

Past Clients Palaeontological Assessments

Agency for Cultural Resource Management (ACRM).	Klomp Group.
AMATHEMBA Environmental.	Megan Anderson, Landscape Architect.
Anél Blignaut Environmental Consultants.	Ninham Shand (Pty) Ltd.
Arcus Gibb (Pty) Ltd.	PD Naidoo & Associates (Pty) Ltd.
Aurecon SA (Pty) Ltd.	Perception Environmental Planning.
BKS (Pty) Ltd. Engineering and Management.	PHS Consulting.
Bridgette O'Donoghue Heritage Consultant.	Resource Management Services.
Cape Archaeology, Dr Mary Patrick.	Robin Ellis, Heritage Impact Assessor.
Cape EAPrac (Cape Environmental Assessment Practitioners).	Savannah Environmental (Pty) Ltd.
CCA Environmental (Pty) Ltd.	Sharples Environmental Services cc
Centre for Heritage & Archaeological Resource Management.	Site Plan Consulting (Pty) Ltd.
Chand Environmental Consultants.	Strategic Environmental Focus (Pty) Ltd.
CK Rumboll & Partners.	SRK Consulting (South Africa) (Pty) Ltd.
CNdV Africa	UCT Archaeology Contracts Office (ACO).
CSIR - Environmental Management Services.	UCT Environmental Evaluation Unit
Digby Wells & Associates (Pty) Ltd.	Urban Dynamics.
Enviro Logic	Van Zyl Environmental Consultants
Environmental Resources Management SA (ERM).	ENVIRO DINAMIK.
Greenmined Environmental	Wethu Investment Group Ltd.
Guillaume Nel Environmental Management Consultants.	Withers Environmental Consultants.

Stratigraphic consulting including palaeontology

Afri-Can Marine Minerals Corp	Council for Geoscience
De Beers Marine (SA) Pty Ltd.	De Beers Namaqualand Mines.
Geological Survey Namibia	IZIKO South African Museum.
Namakwa Sands (Pty) Ltd	NAMDEB Diamond Corporation

CONTENTS

1 BACKGROUND

This application is for the proposed erection of a 25 m high telecommunications mast on Erf 542, Main Road, Kleinzee, Northern Cape. A Heritage Screener report has been submitted to the South African Heritages Resources Agency (SAHRA) by CTS Heritage. A palaeontological assessment was requested by SAHRA in order to evaluate the suggestion that palaeontological resources would be minimally impacted by the installation of the radio mast.

The purpose of this brief report is to address this request by providing a summary of the main aspects of the geology and the fossil potential and to provide the Fossil Finds Procedure in case of a chance find in the excavation for the mast footing.

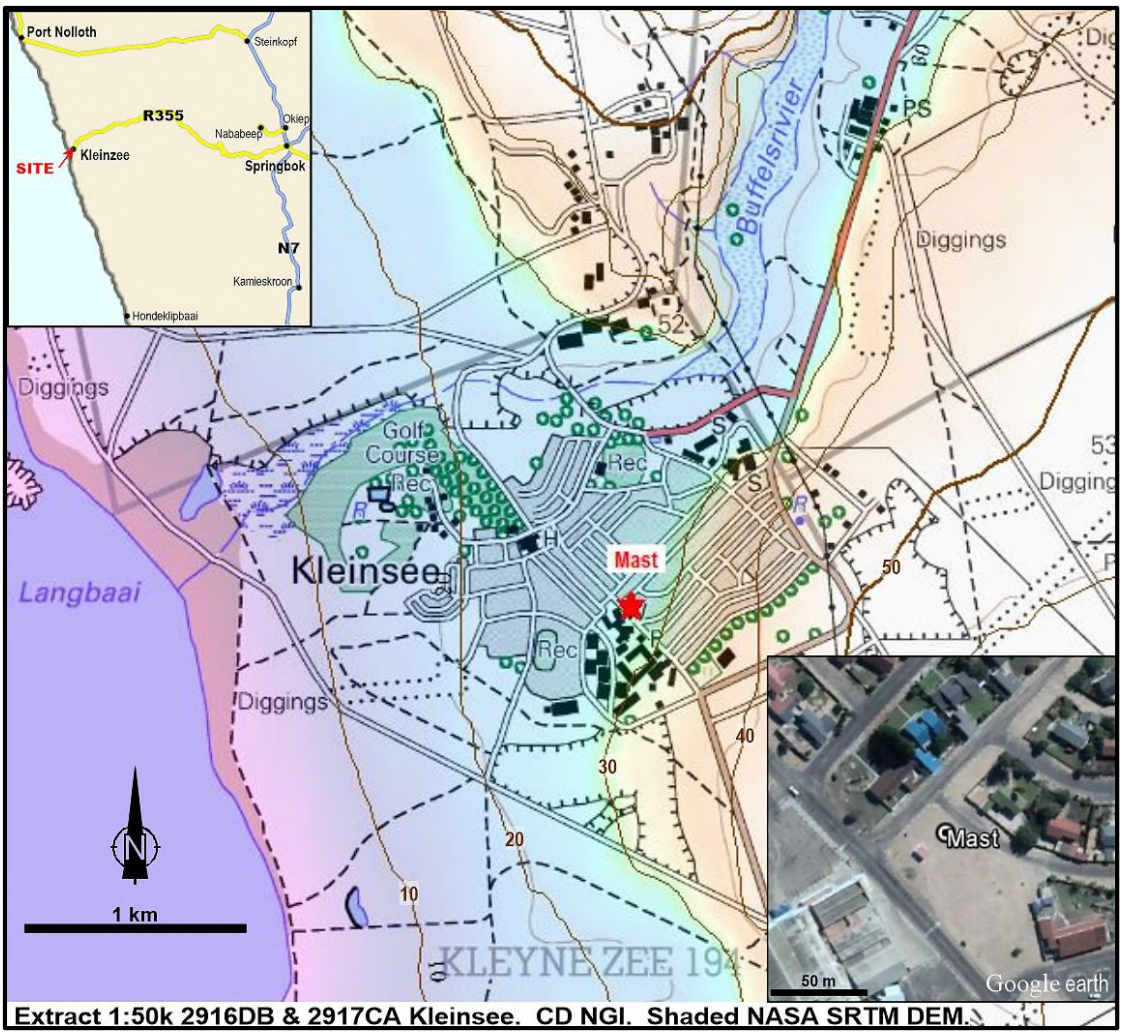


Figure 1. Location of the proposed telecommunications mast.

2 LOCATION

Kleinzee (or Kleinsee) (Figure 1) is the small diamond-mining town that was the headquarters of De Beers Namaqualand Mines. It is situated in the Nama Khoi Local Municipality of the Namakwa District Municipality, in the Namakwaland Magisterial District of the Northern Cape Province. Erf 542 on the Main Road is situated in the commercial centre of the town, opposite the supermarket.

1:50 000 Topo-cadastral Sheet 2916DB & 2917CA KLEINSEE. CD NGI.

1:250 000 Geological Sheet 2916 SPRINGBOK. Council for Geoscience.

Co-ordinates of mast: -29.678895796°S / 17.0697392437°E.

3 LOCALITY PLAN

See Figure 1.

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The mast occupies and area of 56 m^2 and the depth of excavation for the footing is ~2 m.

5 HERITAGE RESOURCES IDENTIFIED

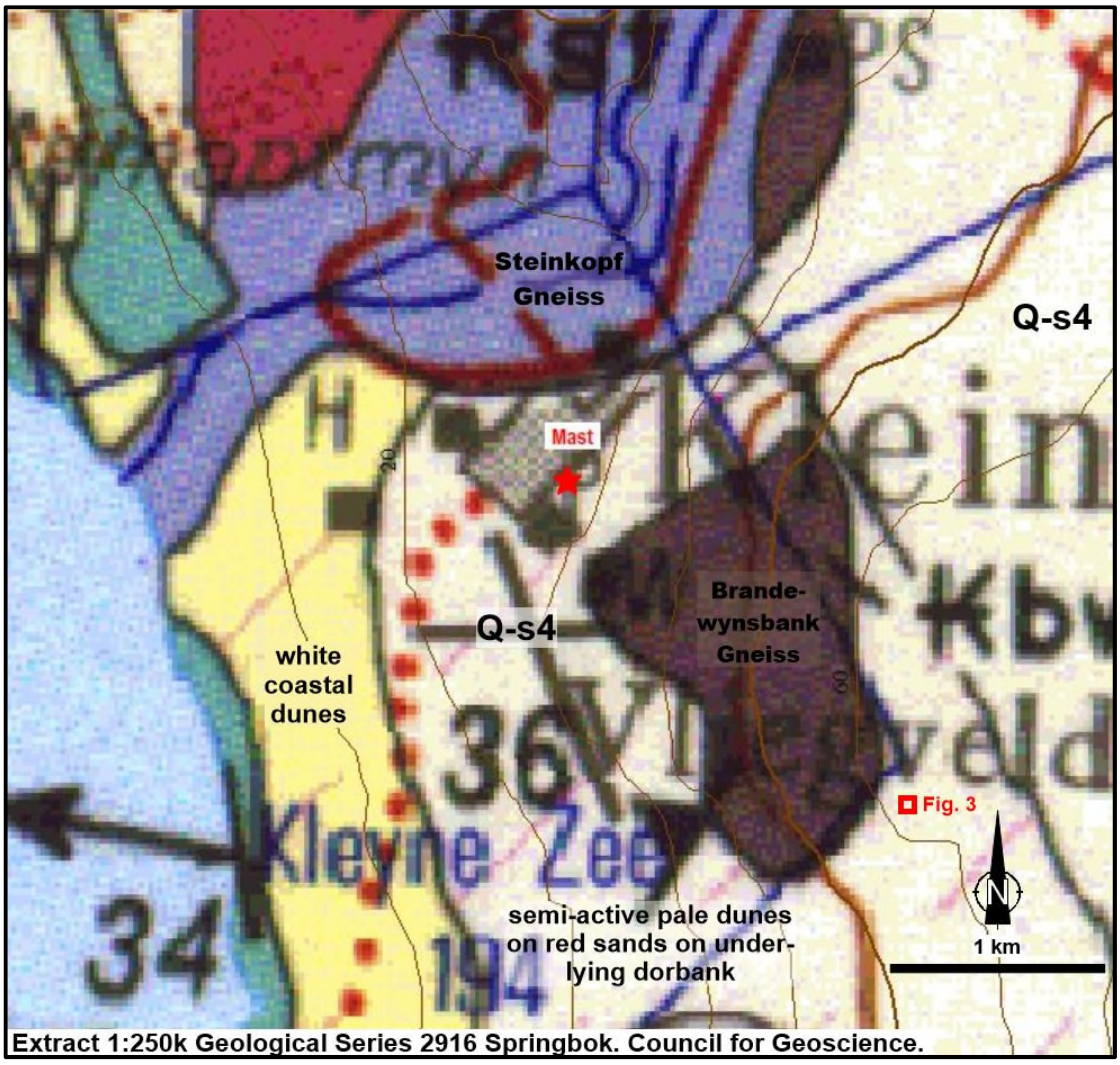


Figure 2. Geology of the Kleinzee town area.

The bedrock of the area is unfossiliferous gneissic basement (Figure 2) and the contact between the Steinkopf Gneiss and the Brandewynsbank Gneiss is in the vicinity of the site beneath the surficial cover.

On the geological map the surficial cover is mapped as red aeolian sand and pediment deposits (Figure 2, Q-s4), a very general category which includes alluvium, deflation residua, red sandy soil and red sand (Marais *et al.*, 2001) and which embraces large areas of the coastal plain.

More specifically, the area was inundated by the sea during the mid-Miocene marine transgression 16 million years ago (Ma) and later again during the early Pliocene ~5 Ma. The associated marine deposits of the Kleinzee and Avontuur formations, resp., are exposed in mine pits nearby, as well as intervening terrestrial deposits.

The site was last occupied by the sea during the late Pliocene ~3 Ma when the sea-level maximum palaeoshoreline was in the vicinity. The older deposits were eroded and the Hondeklipbaai Formation was subsequently deposited. Residual marine gravels of this time could occur, but it is possible that they were flushed off and replaced by river gravel deposits as the shoreline retreated.

Figure 3. Typical section near Kleinzee. The capping calcrete has been stripped off.

The old mine pit just south of Kleinzee, wherein the Brandewynsbank Gneiss is exposed (Figure 2), indicates that the thickness of sediments is only 3-5 m. Overlying the bedrock and residual basal gravels are deposits which are altered by pedogenic processes involving decalcification, the generation of interstitial pedogenic clay forming “dorbank” (Figure 3) and the precipitation of a capping pedocrete. This “dorbank” unit is non-marine and is comprised of colluvium and aeolian sands.

6 ANTICIPATED IMPACTS ON PALAEONTOLOGICAL HERITAGE RESOURCES

Observations in the surrounding area indicate that fossil marine shells are not preserved in the basal, residual marine unit. A survey of mine pits around Kleinzee reveals that fossil bones are very sparse in the overlying terrestrial deposits, but occasional bone fragments and isolated teeth of antelopes occur (pers. obs.).

Notwithstanding the scarcity of fossil bone material indicated by a brief survey, the context of the site, adjacent to the mouth of a major river and its palaeo-estuary, renders it probable that the fossil bones of terrestrial and river-dwelling animals are present in the deposits in greater abundance than is generally the case. Indeed, the first major fossil bone find on the Namaqualand coast was discovered in this area. Stromer (1931) described a small vertebrate assemblage from river deposits overlying the early Pliocene marine beds at ~35 m asl. on the immediate north bank of the Buffelsrivier, approximately opposite the proposed mast site. The extinct species included an hyaena, a giant otter and a mongoose, fossils of which were later also found in the early Pliocene deposits at Langebaanweg. Only the illustrations of the Kleinzee fossils remain as the material was taken to Germany and was lost during WW II (Hendey, 1984; Pickford & Senut, 1997).

In conclusion, the overall abundance of fossil bone material in the affected deposits is sparse and generally poorly preserved. Given the overall low palaeontological sensitivity and the small excavation footprint it is improbable that a concentration of fossil bones will be encountered. The anticipated palaeontological impact of the mast installation is therefore LOW.

7 RECOMMENDATIONS

In view of the above, no additional palaeontological study is required prior to installation of the mast.

Nevertheless, the Stromer assemblage serves to illustrate that local concentrations of fossil bones do occur in the surrounding area. The small excavation footprint renders such a find improbable, but it may be pointed out that such chance discoveries can occur, such as fossil bone finds encountered during the manual excavation of wells in the past (Areb, Kangnas).

It is recommended that a requirement to be alert for a possible chance fossil bone find (and buried archaeological material) be included in the Environmental Management Programme (EMPr) for the installation of the proposed telecommunications mast.

8 FOSSIL FINDS PROCEDURE

Contractor personnel for the installation of the mast must be instructed to be alert for the occurrence of fossil bones, archaeological material and of unrecorded burials.

In the event of a possible find of bones or a buried archaeological material in the mast footing excavation, work must cease at the site and the works foreman and the Environmental Control Officer (ECO) for the project must be informed immediately. Unearthed parts/fragments of the find on the spoil heap must be retrieved and returned to the main find site which must be protected from further disturbance.

The ECO or representative must then inform SAHRA immediately and provide:

- A description of the nature of the find.
- Position of the excavation (GPS) and depth.
- Detailed images of the finds (with scale included).
- Digital images of excavation showing vertical sections (sides) (with scales).

SAHRA and an appropriate specialist palaeontologist will assess the information and liaise with the developer, the environmental consultants and the ECO and a suitable response will be established. Only a professional palaeontologist may excavate uncovered fossils with a valid mitigation permit from SAHRA.

9 REFERENCES

Hendey, Q.B. 1984. Southern African late Tertiary vertebrates. In: Klein, R.G. (ed.), Southern African Prehistory and Paleoenvironments: 81 106. Rotterdam, A.A. Balkema.

Marais, JAH., Agenbacht, ALD., Prinsloo, M. & Basson, WA. 2001. The Geology of the Springbok Area. Explanation to 1:250000 Geology Sheet 2916 Springbok. Council for Geoscience, Pretoria. 103 pp.

Pickford, M. & Senut, B. 1997. Cainozoic mammals from coastal Namaqualand, South Africa. Palaeontologia Africana., 34, 199-217.

Stromer, E. 1931. Reste süsswasser-und land-bewohnender Wirbeltiere aus den Diamantfeldern Klein-Namaqualandes (Südwes-Afrika). Sitzungsberichte Bayerische Akademie der Wissenschaften 1931: 17 47.

10 APPENDIX 1. PALAEONTOLOGICAL SENSITIVITY RATING

Palaeontological Sensitivity refers to the likelihood of finding significant fossils within a geologic unit.

HIGH: Assigned to geological formations known to contain palaeontological resources that include rare, well-preserved fossil materials important to on-going palaeoclimatic, palaeobiological and/or evolutionary studies. Fossils of land-dwelling vertebrates are typically considered significant. Such formations have the potential to produce, or have produced, vertebrate remains that are the particular research focus of palaeontologists and can represent important educational resources as well.

MODERATE: Formations known to contain palaeontological localities and that have yielded fossils that are common elsewhere, and/or that are stratigraphically long-ranging, would be assigned a moderate rating. This evaluation can also be applied to strata that have an unproven, but strong potential to yield fossil remains based on its stratigraphy and/or geomorphologic setting.

LOW: Formations that are relatively recent or that represent a high-energy subaerial depositional environment where fossils are unlikely to be preserved, or are judged unlikely to produce unique fossil remains. A low abundance of invertebrate fossil remains can occur, but the palaeontological sensitivity would remain low due to their being relatively common and their lack of potential to serve as significant scientific resources. However, when fossils are found in these formations, they are often very significant additions to our geologic understanding of the area. Other examples include decalcified marine deposits that preserve casts of shells and marine trace fossils, and fossil soils with terrestrial trace fossils and plant remains (burrows and root fossils)

MARGINAL: Formations that are composed either of volcaniclastic or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain contexts at localized outcrops. Volcaniclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by the heat and pressure of deep burial are called metasedimentary. If the meta sedimentary rocks had fossils within them, they may have survived the metamorphism and still be identifiable. However, since the probability of this occurring is limited, these formations are considered marginally sensitive.

NO POTENTIAL: Assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no palaeontological resource potential.

Adapted from Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources - Standard Guidelines. News Bulletin, Vol. 163, p. 22-27.