

HWC Case No: 21053105AM0608E

**BRIEF PALAEOLOGICAL ASSESSMENT
PROPOSED DEVELOPMENT ON ERF 160695, 80 LIESBEEK WAY, OBSERVATORY
CAPE TOWN, WESTERN CAPE**

By

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20 September 2021

SUMMARY

It is proposed to develop Erf 160695 in Observatory and construct facilities for cultural religious practices (Figure 1). The proposed developments are assumed to entail conventional buildings where subsurface disturbance for construction involves shallow trenches for foundations and services infrastructure.

The site is situated on the right bank of the Liesbeek River. The surface slopes gently up from the river bank, from ~5 to ~9 m asl. (Figure 2). The area is mapped as outcropping bedrock shales of the Tygerberg Formation of the Malmesbury Group (Figure 3). A sandy soil thinly covers the bedrock (Figure 2).

The palaeontological sensitivity of the Malmesbury Group bedrock is classified as LOW (Figure 4). In view of the thin coversands the construction excavations will be mainly into the bedrock shales. Fossils are not expected to occur in these deformed and metamorphosed rocks.

At times of high sea levels the site would have been on the margin of an expanded estuary, but it seems that this sedimentary record has not been preserved and has evidently been eroded away. It is unlikely that shelly-fossiliferous deposits will be encountered in excavations on Erf 160695. Nevertheless, sometimes residuals of fossiliferous deposits occur as cemented veneers in crevices and gullies in the bedrock.

It is therefore improbable that fossils occur on Erf 160695.

Nevertheless, a chance occurrence of fossil material, as well as possible archaeological material, cannot be entirely dismissed. It is advisable that a protocol for fossil finds, the Fossil Finds Procedure (FFP), is included in the Environmental Management Plan (EMP) for the project.

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1 BACKGROUND

It is proposed to develop Erf 160695 in Observatory and construct facilities for cultural religious practices. A Notification of Intent to Develop (NID) has been submitted to Heritage Western Cape (HWC) and a Heritage Impact Assessment (HIA) inclusive of a Palaeontological Desktop Study has been requested. This brief Palaeontological Assessment is to inform about the palaeontological sensitivities of the site and the probability of fossils being uncovered in the subsurface and being disturbed or destroyed during the Construction Phase of the proposed developments.



Figure 1. Location and Site Development Plan for Erf 160695, Observatory.

2 LOCATION

Erf 160695 is located in lower Observatory on the right bank of the Liesbeek River, just upstream from the confluence of the Liesbeek and the Black rivers. It is approached via lower Station Road and Liesbeek Avenue and is 1.53 ha in extent.

1:50 000 Topo-cadastral Sheet 3318CD CAPE TOWN - CD NGI.

Centre co-ordinates: -33.941199°S / 18.479763°E.

3 LOCALITY PLAN

The Site Development Plan is shown in Figure 1.

4 DESCRIPTION OF THE PROPOSED ACTIVITY

The proposed developments are assumed to entail conventional buildings where subsurface disturbance for construction involves shallow trenches for foundations and services infrastructure.

5 ANTICIPATED IMPACT ON PALAEOONTOLOGICAL RESOURCES

The potential palaeontological impact is associated with the **Construction Phase** bulk earth works required for foundations and for services. The intensity or magnitude of impact relates to the palaeontological sensitivities of the affected formations (Appendix 1) and the degree or volume of disturbance.



Figure 2. Aspect of Erf 160695 from Liesbeek Avenue entrance.

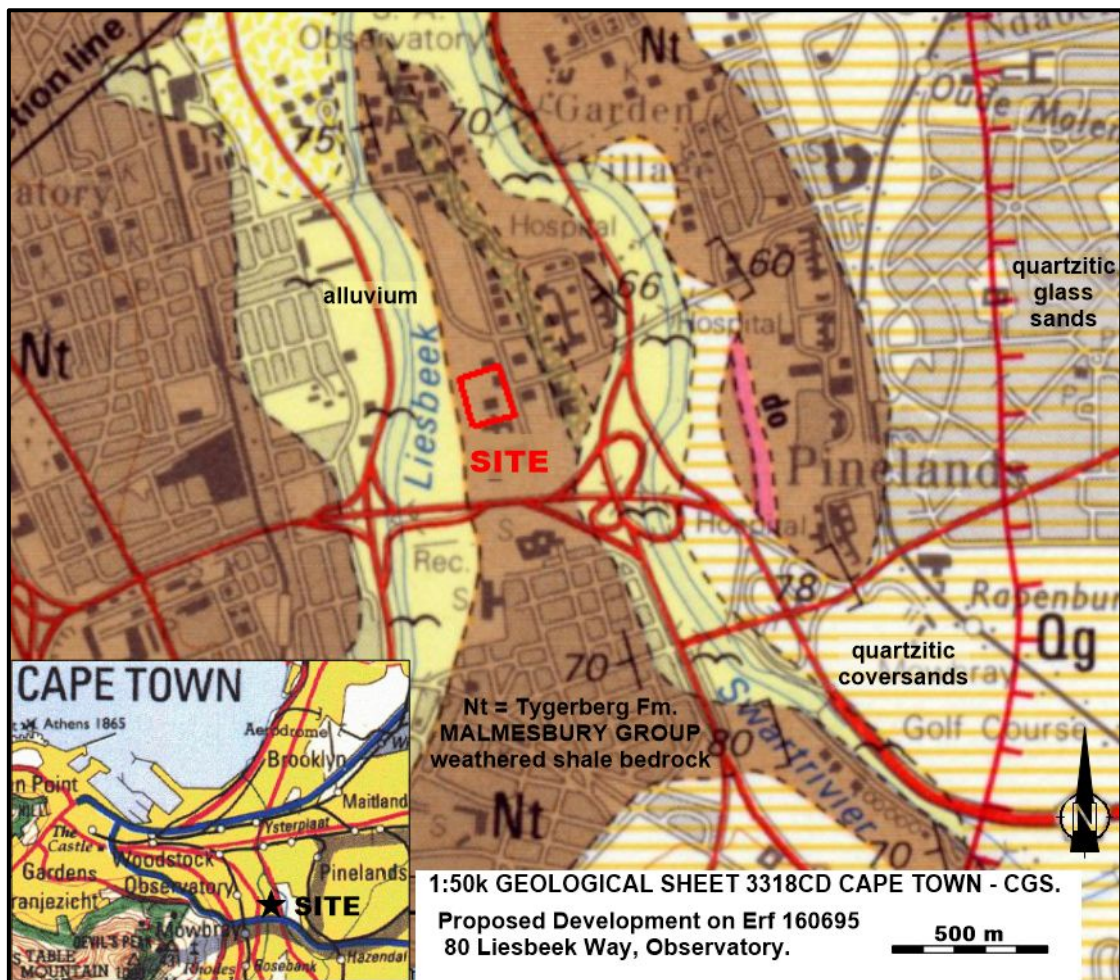


Figure 3. Geological context of Erf 160695.

The site is on the terminal watershed between the Liesbeek and the Black rivers, just upstream from their confluence. The surface slopes gently up from the Liesbeek River bank, from ~5 to ~9 m asl. (Figure 2). The area is mapped as outcropping bedrock shales of the Tygerberg Formation of the Malmesbury Group (Figure 3). A sandy soil thinly covers the bedrock (Figure 2).

Early life forms existed ~560 million years ago in the ancient sea in which the Malmesbury Group sediments were deposited, but fossils have not yet been recorded in these deformed and metamorphosed rocks. The palaeontological sensitivity of the Malmesbury Group bedrock is classified as LOW (Figure 4). In view of the thin coversands the construction excavations will be mainly into the bedrock shales and fossils are not expected to occur.

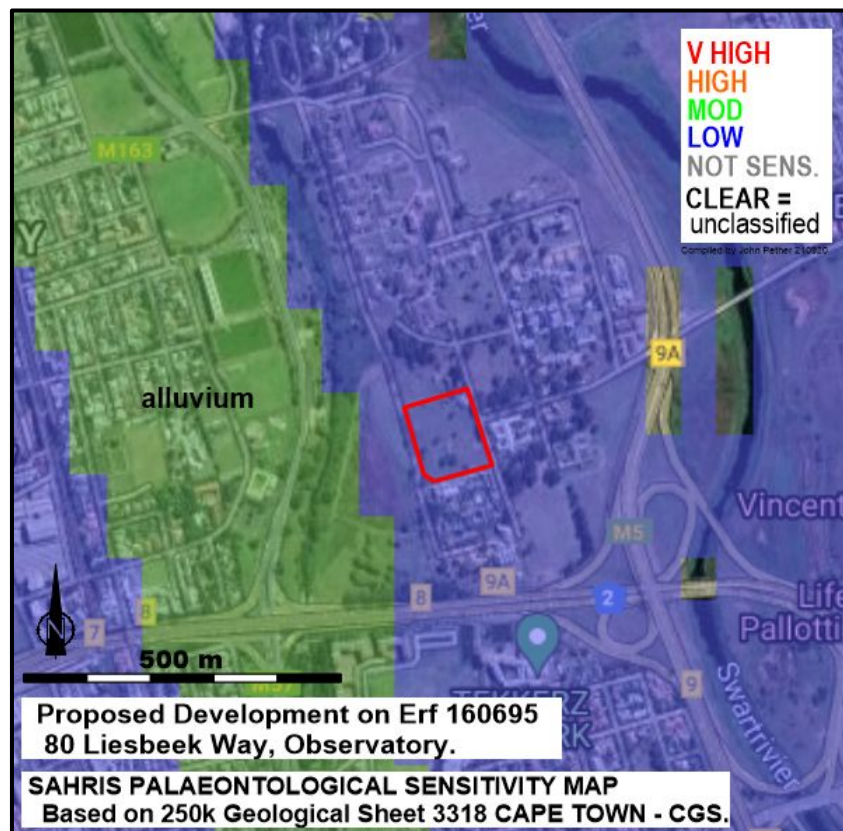


Figure 4. Palaeontological Sensitivities of the Project Area.

During the Last Interglacial around 125 thousand years ago the sea level was 5-6 m higher than present and the site would have been on the shoreline of an expanded estuarine or lagoonal system. During the subsequent Last Ice Age, the site would have been distant from the shoreline due to low sea levels. At the end of the Ice Age sea level rose again and from ~7 to ~5 thousand years ago the sea level was about 3 m higher than present, with the estuarine shoreline lapping the periphery of the site. However, unlike some other estuaries in the Cape, a sedimentary record in the form of flanking terraces does not appear to have been preserved in this area and has evidently been eroded away. It is unlikely that shelly-fossiliferous deposits will be encountered in excavations on Erf 160695. Nevertheless, sometimes residuals of fossiliferous deposits occur as cemented veneers in crevices and gullies in the bedrock.

6 RECOMMENDATIONS

Although the intensity of impact on fossil resources is rated as LOW and fossil finds are improbable, a chance occurrence of fossil material cannot be entirely dismissed.

It is advisable that a protocol for finds of fossil shells or bones, the Fossil Finds Procedure (FFP), is included in the Environmental Management Plan (EMP) for the project, basically "If fossil shells or bones are uncovered during excavations for the services and foundations, stop work and report to Heritage Western Cape. Links to the HWC FFP are below:

https://www.hwc.org.za/sites/default/files/3_11%20Protocol%20Fossil%20Finds%20Final%20June%202016.pdf

https://www.hwc.org.za/sites/default/files/3_12%20Fossil%20Finds%20Poster.pdf

Heritage Western Cape will assess the information and liaise with an archaeological or palaeontological specialist, as appropriate.

7 SUMMARY FOSSIL FINDS PROCEDURE

Should fossil bones and teeth be encountered in the deposits, work must cease at the site and the works foreman and the ECO for the project must be informed immediately. Scattered, unearthed parts/fragments of the find must be retrieved and returned to the main find site which must be protected from further disturbance.

Heritage Western Cape must be informed and supplied with contextual information:

- A description of the nature of the find.
- Detailed images of the finds (with scale included).
- Position of the find (GPS) and depth.
- Digital images of the context. *i.e.* the excavation (with scales).

HWC and an appropriate specialist palaeontologist will assess the information and liaise with the mine owner, the environmental consultants and the ECO and a suitable response will be established.

In the event of a significant fossil find, a professional palaeontologist must be appointed to undertake the excavation of the fossils and to record their contexts. Said palaeontologist must also undertake the recording of the stratigraphy and sedimentary geometry of the exposures and must undertake the compilation of the detailed report.

A permit from HWC is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist). Should fossils be found that require rapid collecting, application for a palaeontological permit will immediately be made to HWC. The application requires details of the registered owners of the sites, their permission and a site-plan map. All fossil finds must be recorded and the fossils and their contextual information (a report) must be deposited at a SAHRA/HWC-approved institution.

8 REFERENCES

Theron, J.N. 1984. The Geology of Cape Town and Environs. Explanation of 1:50 000 sheets 3318CD & DC, 3418 AB, AD & BA. 77 pp. Council for Geoscience, Pretoria.

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9 APPENDIX 1. PALAEOLOGICAL SENSITIVITY RATING

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

VERY HIGH: Formations/sites known or likely to include vertebrate fossils pertinent to human ancestry and palaeoenvironments and which are of international significance.

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 volcanoclastic or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain contexts at localized outcrops. Volcanoclastic 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.

BRIEF PALAEOLOGICAL ASSESSMENT

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CAPE TOWN, WESTERN CAPE**

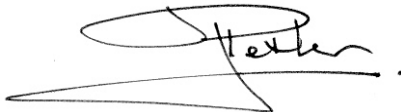
Terms of Reference

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: 20 SEPTEMBER 2021

11 APPENDIX 3. CURRICULUM VITAE

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

Independent Consultant/Researcher recognized as an authority with 38 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) (~300 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.
- Association of Professional Heritage Practitioners (APHP), Western Cape. Accredited Member No. 48.

Past Clients Palaeontological Assessments

AECOM SA (Pty) Ltd.	Guillaume Nel Environmental Management Consultants.
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.
ASHA Consulting (Pty) Ltd.	Perception Environmental Planning.
Aurecon SA (Pty) Ltd.	PHS Consulting.
BKS (Pty) Ltd. Engineering and Management.	Resource Management Services.
Bridgette O'Donoghue Heritage Consultant.	Robin Ellis, Heritage Impact Assessor.
Cape Archaeology, Dr Mary Patrick.	Savannah Environmental (Pty) Ltd.
Cape EAPrac (Cape Environmental Assessment Practitioners).	Sharples Environmental Services cc
CCA Environmental (Pty) Ltd.	Site Plan Consulting (Pty) Ltd.
Centre for Heritage & Archaeological Resource Management (CHARM).	SRK Consulting (South Africa) (Pty) Ltd.
Chand Environmental Consultants.	Strategic Environmental Focus (Pty) Ltd.
CK Rumboll & Partners.	UCT Archaeology Contracts Office (ACO).
CNdV Africa	UCT Environmental Evaluation Unit
CSIR - Environmental Management Services.	Urban Dynamics.
Digby Wells & Associates (Pty) Ltd.	Van Zyl Environmental Consultants
Enviro Logic	Western Cape Environmental Consultants (Pty) Ltd, t/a ENVIRO DINAMIK.
Environmental Resources Management SA (ERM).	Wethu Investment Group Ltd.
Greenmined Environmental	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