PALAEONTOLOGICAL SPECIALIST STUDY

In terms of Section 38(8) of the NHRA

Retrospective Palaeontological Impact Assessment for the Expansion of a Dwelling on Portion 12 Of Farm Ongegunde Vryheid No.746, Cape St Francis Bay, Kouga Local Municipality, Eastern Cape Province.

Prepared by

Dewald Wilken Pr. Sci. Nat.

6 Willet Place, Fern Glen, 6045

083 401 0969

Requested by

Claire de Jongh

Environmental Practitioner

084 607 4743

30 May 2025

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, 2014 (as amended) and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) 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 14 of GN No. R. 326.

Signed

Name

Dewald Wilken Pr. Sci. Nat.

Date
30 May 2025

EXECUTIVE SUMMARY

A retrospective palaeontological impact assessment was requested for the expansion of a dwelling on Farm Ongegunde Vryheid No.746, Cape St Francis Bay, Kouga Local Municipality, Eastern Cape Province. A palaeontological impact assessment 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 area under investigation lays over two formations from two different groups. The inland side of the site is underlain by the Nanaga Formation of the Algoa Group, and the seaward side is underlain by the Peninsula Formation of the Table Mountain Group. to the north the area is partially covered by aeolian (windblown) sediment.

The Nanga Formation and its overlaying aeolian sands are rated as very highly sensitive, while the Peninsula Formation is ranked as highly sensitive. Both these formations have the potential to contain valuable fossil material. However, fossils in both these formations are very sparsely distributed, and it is very unlikely that the expansion of the dwelling has caused loss or damage to the palaeontological heritage of the area. There would be no objection to further development of the property as long as the fossil find procedure at the end of this document is followed in the unlikely event of fossil material being found.

CONTENTS

1. Introduction

1.1 Background Information on Project

A retrospective palaeontological impact assessment was requested for the expansion of a dwelling on Farm Ongegunde Vryheid No.746, Cape St Francis Bay, Kouga Local Municipality, Eastern Cape Province. A palaeontological impact assessment 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).

Figure 1 shows the area under investigation in relation to St Francis bay and Figure 2 shows a closer view of the same area. Figure 3 relates the palaeo-sensitivity to the area of interest.

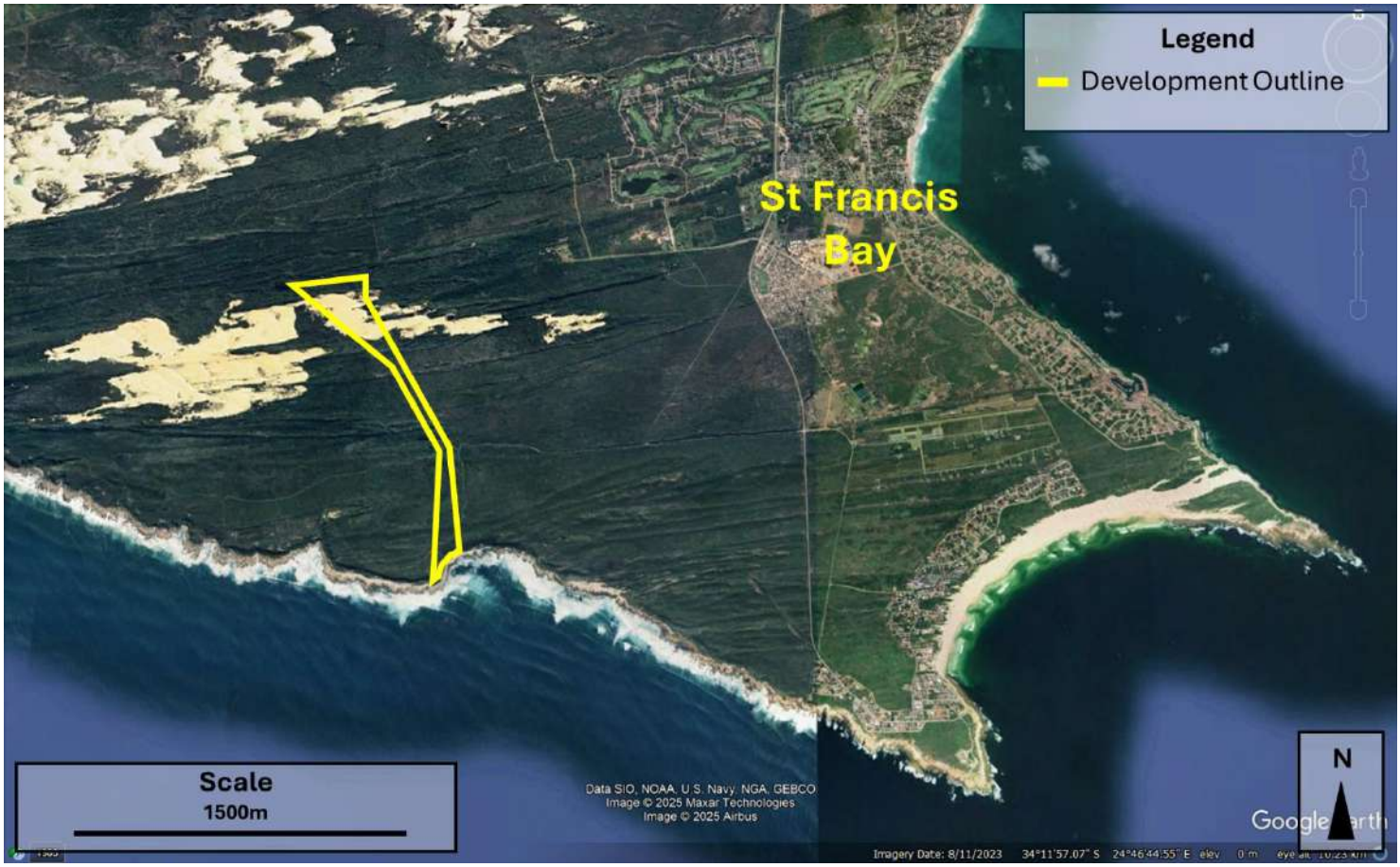

Figure 1. Portion 12 of Farm Ongegunde Vryheid no.746 in relation to St Francis Bay, Eastern Cape South Africa.

Figure 2 a Closer view of the area of interest - Portion 12 of Farm Ongegunde Vryheid no.746.

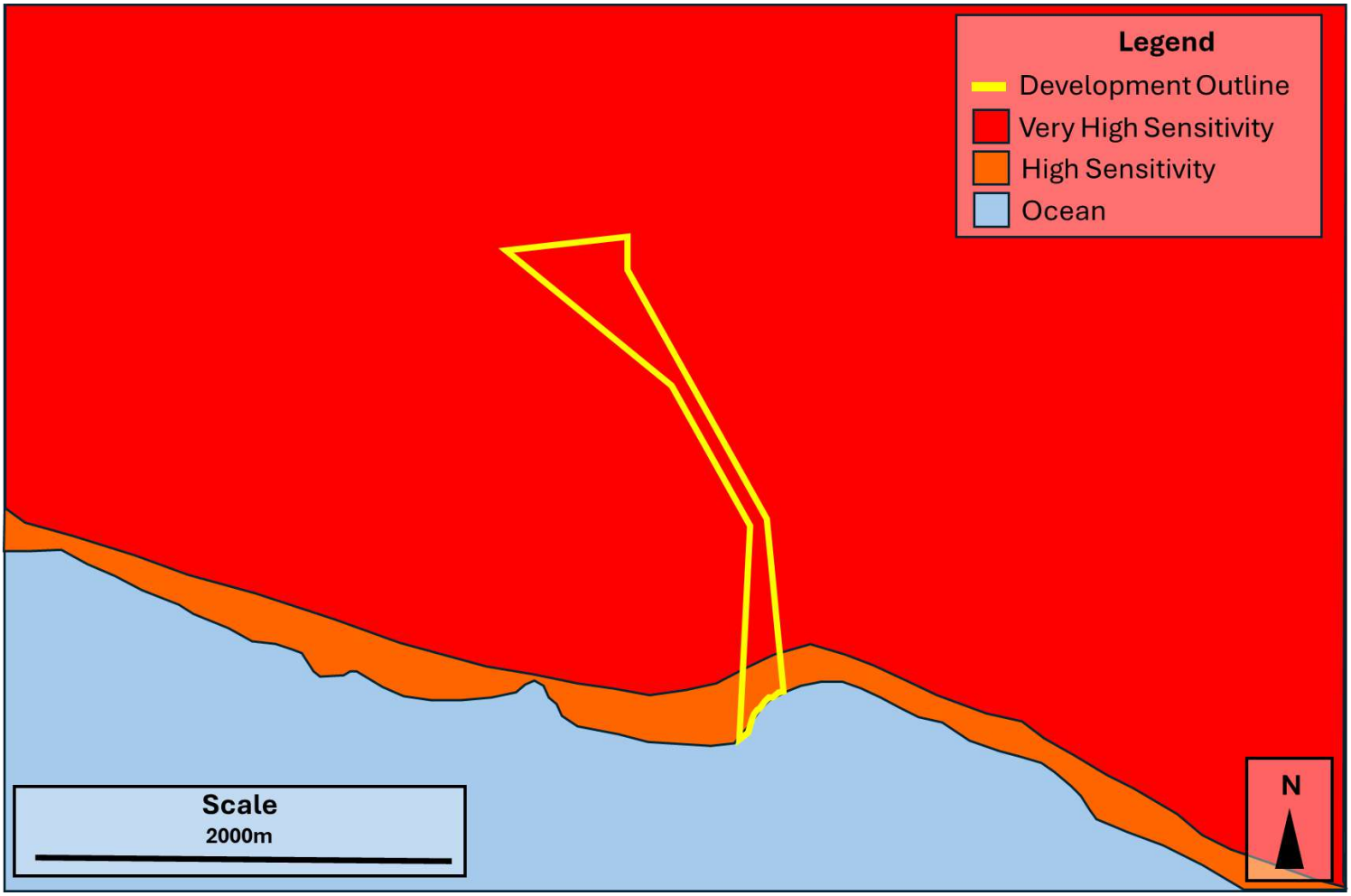

Figure 3 Palaeo-sensitivity Map. Adapted from https://sahris.sahra.org.za/map/palaeo and 3324 Port Elizabeth geologic map. Indicating a range of fossil sensitivity underlying the study area in the Eastern Cape. The Nanaga Formation and overlaying aeolian sediment in red (very high sensitivity), Peninsula Formation marked in orange (high sensitivity).

1.2 Study approach

This PIA report provides a record of the inferred palaeontological heritage resources within the 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 in the broader study region, (2) published geological maps and accompanying sheet explanations (*e.g.,* Toerien, D.K. (1984)).

2. Geological and Paleontological context of the study area

The following section will provide a basic review of the general geology and palaeontology in the study area. The area lays over two formations from two different groups. The inland side of the site is underlain by the Nanaga Formation of the Algoa Group, and the seaward side is underlain by the Peninsula Formation of the Table Mountain group.

2.1. Algoa Group

The Algoa Group consists of aeolian deposits of the Southeast coast of South Africa. The Algoa Group is split into 6 formations based on their lithology and age. These formations are the Schelm Hoek Formation, Nahoon Formation, Salnova Formation, Nanaga Formation, Alexandria Formation, Bathurst Formation. The Algoa Group and its subdivisions can be seen in Figure 4. These Formations are related to transgressive/regressive seas. The area of development is situated on recent aeolian sand that overlays the Nanaga Formation. These aeolian sediments are unnamed, and the red, very high sensitivity ranking (Figure 3) on this sediment is most likely due to the fact that it overlies the Nanaga Formation as can be seen in Figure 5. Only the Nanaga Formation will be further disused.

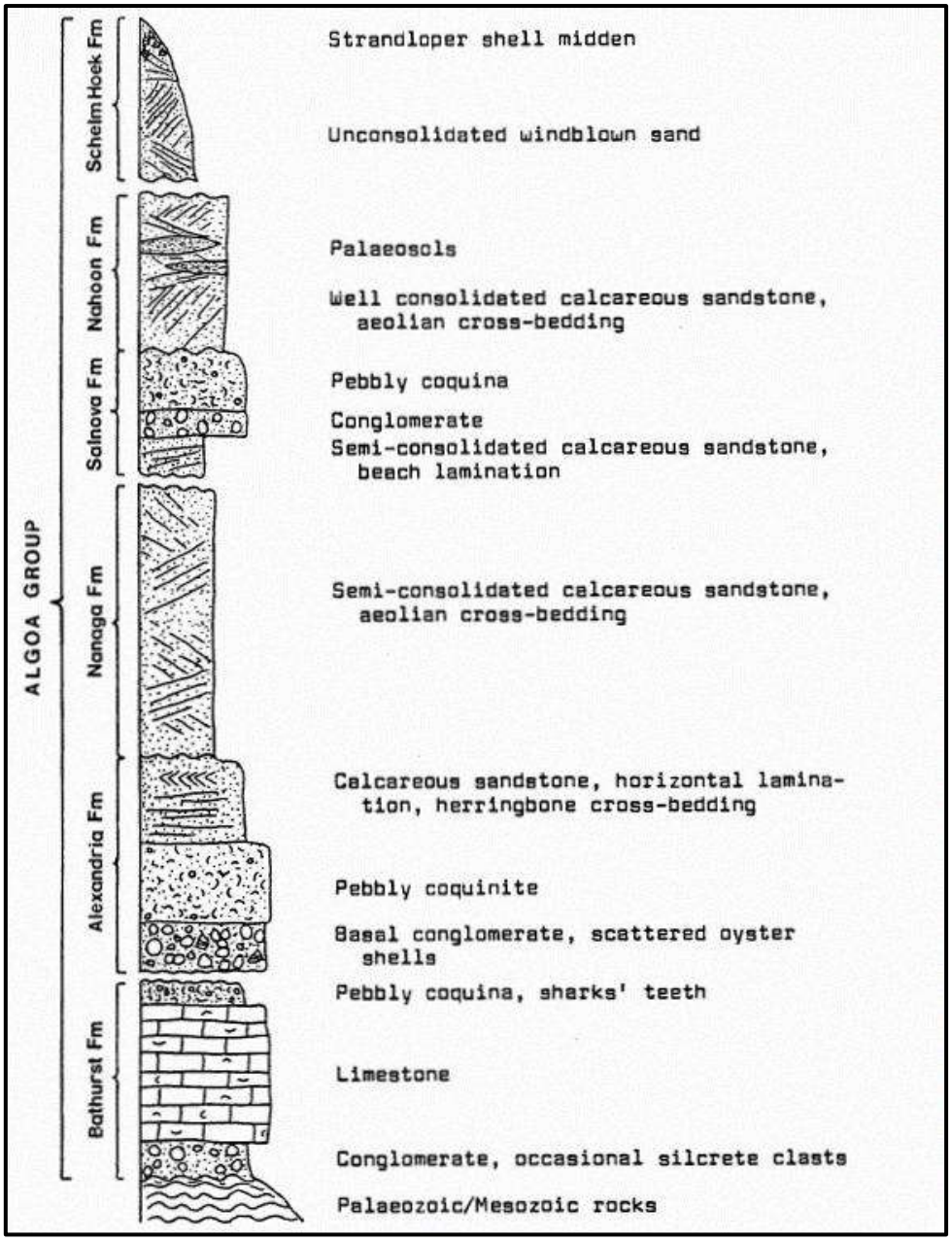

Figure 4 Idealised composite section of Algoa Group showing relative stratigraphic positions and lithology of Formations (not to scale) Le Roux (1989).

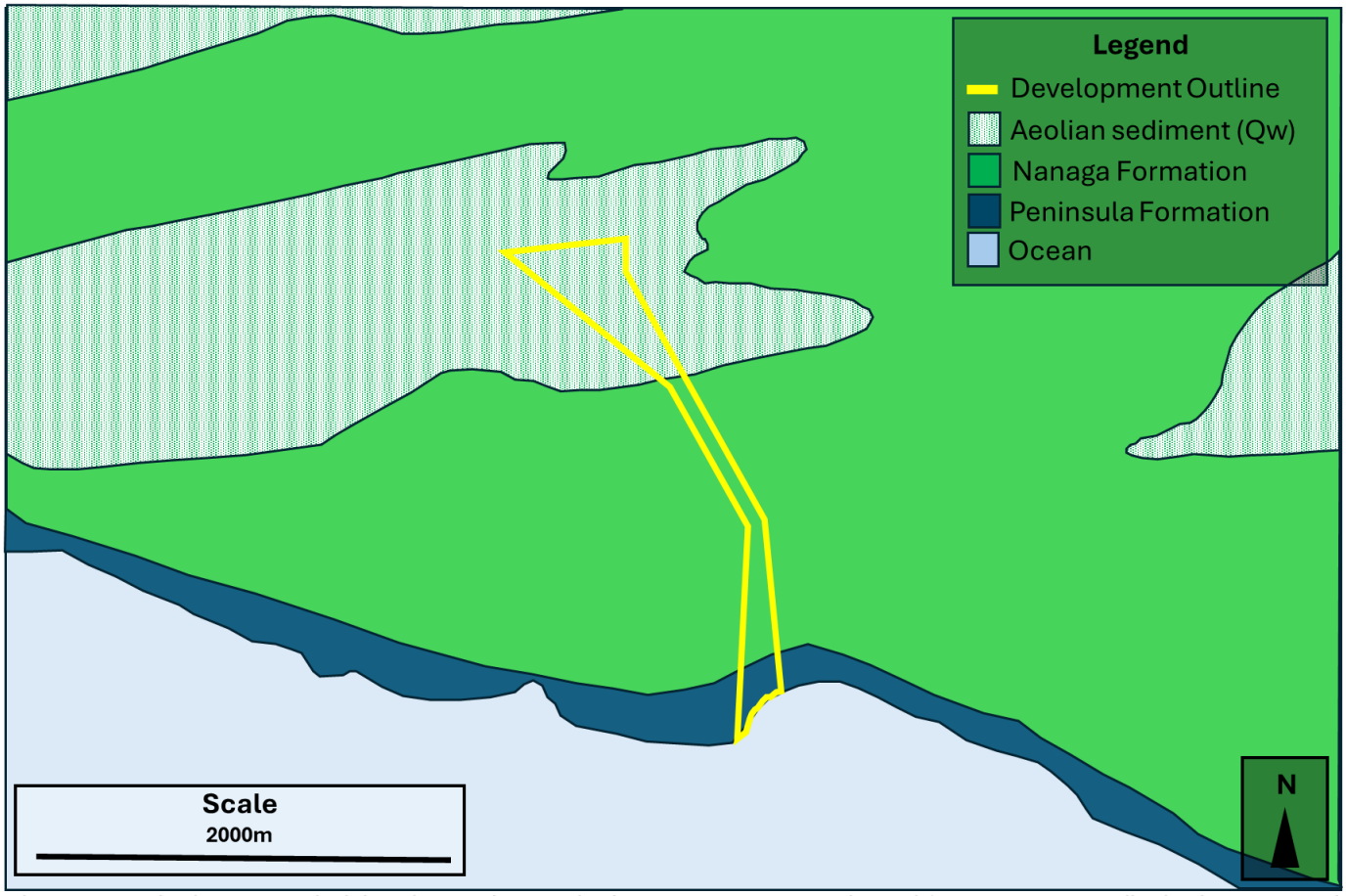

Figure 5 Geologic map underlying the study area in the Eastern Cape. Adapted from 3324 Port Elizabeth. Proposed development area marked yellow.

Nanaga Formation – Very High Palaeo-Sensitivity

The Nanaga Formation overlies Alexandria Formation mostly para-conformably and overlies the Cape Supergroup and the Uitenhage Group unconformably. In some areas it is overlain by the Kinkelbos and Schelm Hoek Formations.
The formation is named after the farm Nanaga (Nanaga 166) where it is well exposed in road cuttings.

This Formation occurs extensively on the northern hinterland of Algoa Bay, and on the coast to the east of Port Elizabeth, this can be seen in Figure 6. It is composed of aeolian sediment from palaeo – dune fields which formed during the regression of the “Alexandria sea”. The Formation is medium – grained, with typical large-scale cross-bedded, calcareous sandstone, sandy limestones and calcretes up to 250m (thick Le Roux (1989)). It can be structureless in some areas. The colour can range from very light grey to greyish yellow to yellowish grey.

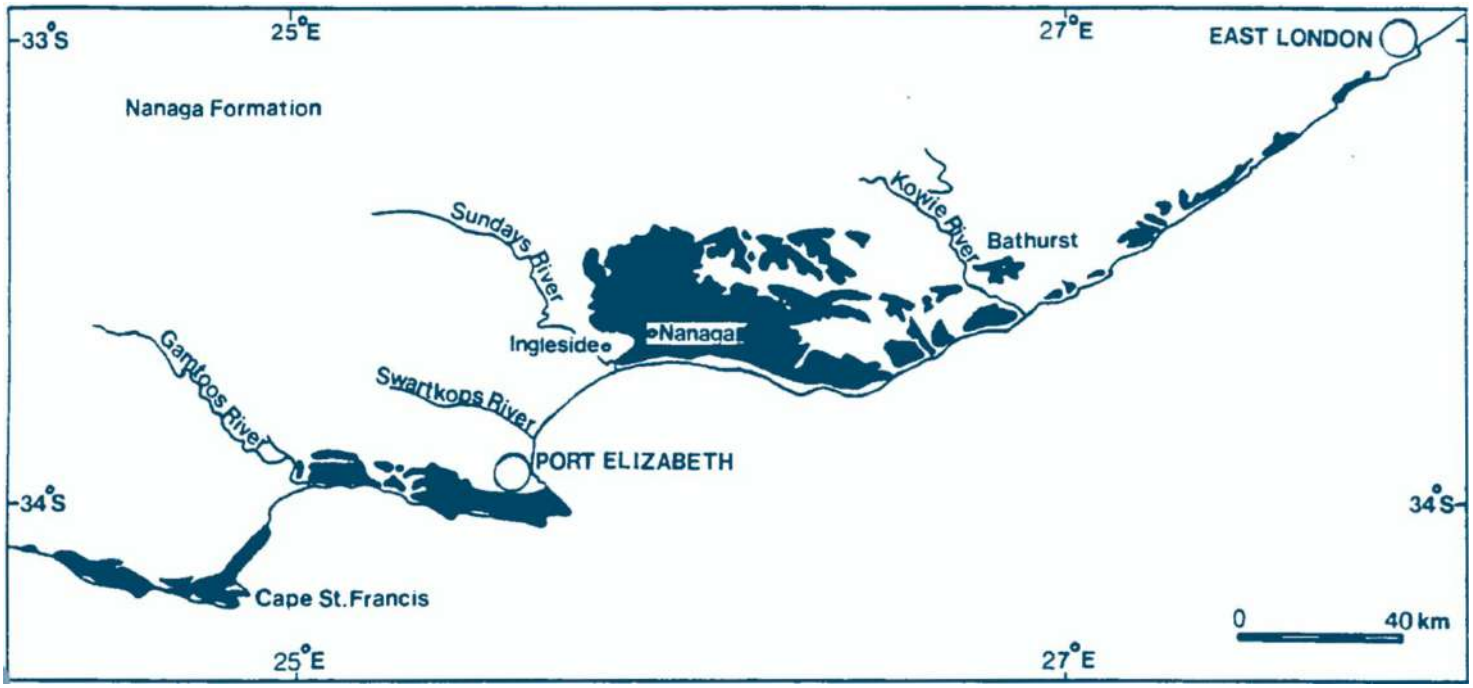

Figure 6. The extent of the Nanaga Formation on the East Coast of South Africa. (Le Roux, 1989)

This Formation is probably Pliocene to Early Pleistocene in age (Le Roux (1990a), Bamford (2018) SACS, (1980)).“It is distinguished from the underlying Cape Supergroup and Uitenhage Group by its calcareous nature and poorer consolidation, and from the Alexandria Formation by its aeolian cross-bedding and lack of pebbles and/or coarse fragments of marine shells exceeding about 0,5 cm in diameter. Regarding the Kinkelbos Formation it is distinguished from the (locally) overlying Formation by its aeolian cross-bedding, coarser-grained lithologies, lack of clasts and whitish colour (as opposed to the reddish-brown colour of the Kinkelbos Formation)” Le Roux (1989). Geomorphologically, the Formation occurs as smooth rounded hills within undulating ridges, trending sub-parallel to the present shoreline.

The Formation is mostly devoid of significant fossils, however minute fragments of marine macro-organisms (mainly shells), foraminifera (sometimes constituting up to 80 per cent of the rock), and occasional extant land gastropods such as *Achatina* spp., *Tropidophora* spp.*, Trigonephris* spp. and *Natalina* spp. are present (Figure 7).

Figure 7 Natalina sp.top left, Achatina zebra top right, Tropidophora spp. bottom pseudo fossils (Wilken (2017))

2.2. Table Mountain Group

The Cape Supergroup rocks, divided into the Table Mountain, Bokkeveld and Witteberg Groups, were deposited on a passive continental margin (Tankard et al., 1982) in a wide range of subaerial and subaqueous depositional environments (Johnson, 1991). This took place during the Late Cambrian to early Carboniferous time (520-340 million years). The deformation of the Cape Supergroup rocks took place during the Permian and Triassic time as a single phase, multiple event orogeny (278-215 million years) (Hälbich et al., 1983). This deformation is characterised by numerous folds (often verging to the North) and numerous thrust and reverse faults, the most significant one being the Baviaanskloof Thrust (Theron, 1969). Therefore, the Table Mountain group rocks in the area have been deformed significantly by faulting and folding which often makes the stratigraphic interpretation of these rocks rather difficult (Booth & Shone, 2002).

The site is underlain by the Table Mountain Group and the Bokkeveld Group. The formations within these groups can be seen in Table 1 and Figure 8.

Table 1 Explanation of symbols and summary of geology (thickness in m) and palaeontology in Figure 5, relevant formation marked in blue.

Age	Group		Formation	Lithology	Palaeoenvironment
	Bokkeveld Group	Ceres subgroup	(Gd) Gydo Formation	Mudrock, siltstone	Offshore shelf, prodelta slope
Dev.	Table Mountain Group	Nardouw Subgroup	S-Db Baviaanskloof (200)	Sandstone (+ shale in the East)	Shallow Marine (+ offshore shelf in the East)
Silurian			(Ss) Skurweberg (400)	Sandstone (thick bedded)	Fluvial braid-plain, shallow marine
			(Sg) Goudini (300)	Sandstone (red - brown)	Shallow marine, fluvial braid-plain
Ordovician			(Oc) Cedarberg (50)	Shale, Siltstone	Offshore shelf
			(Op) Peninsula (2700)	Sandstone	Fluvial braid-plain, shallow marine
			(Os) Sardinia Bay (900?)	Sandstone, Siltstone, Shale	Distal fluvial, tidal flat, shallow marine
				Sandstone, Conglomorate	Fluvial braid-plain

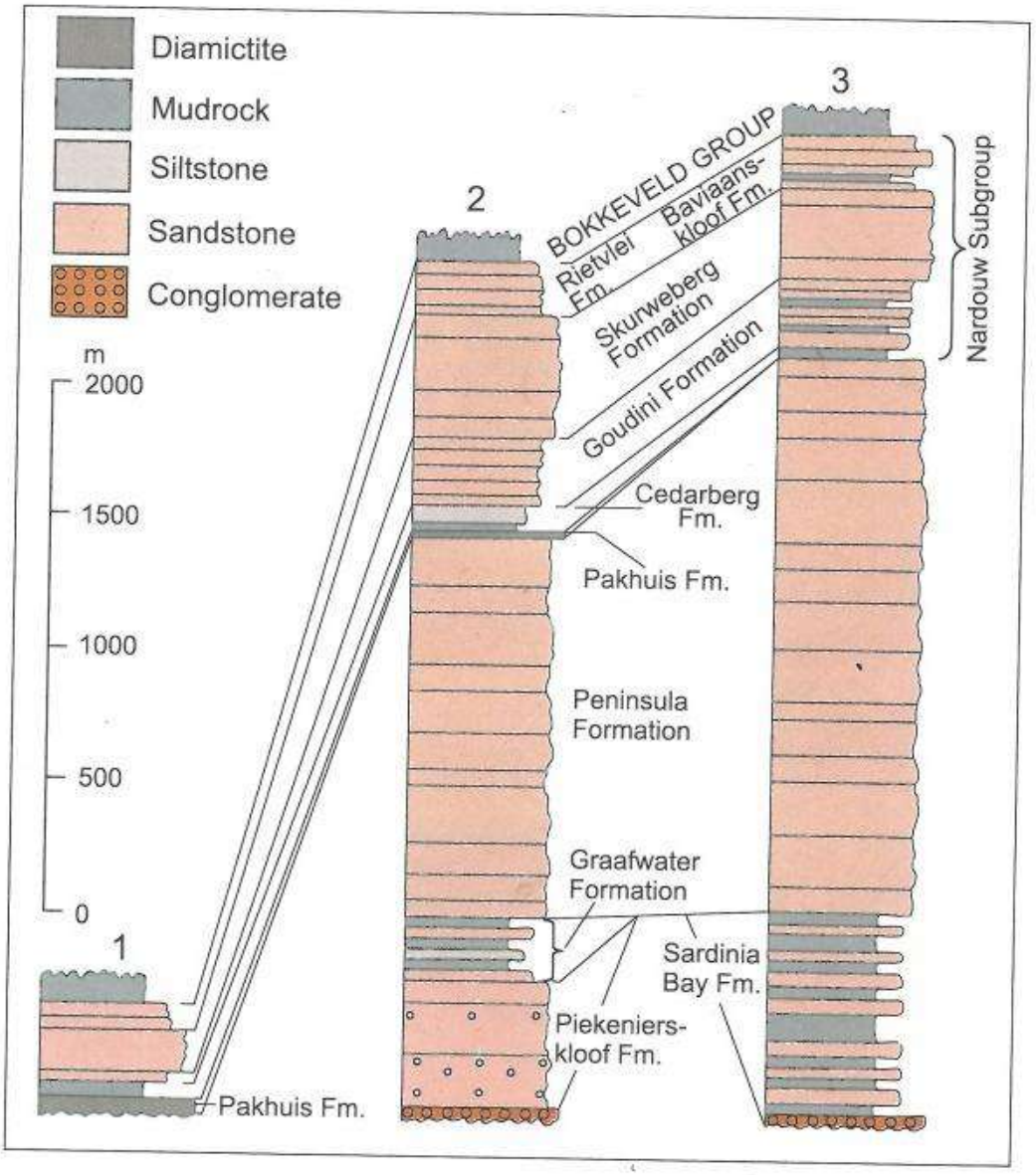

Figure 8 Representative sections of the Table Mountain Group. (Thomas & Johnson 2006)

The following is a brief discussion on the Formation relevant to this study.

Peninsula Formation (High Palaeo-Sensitivity)

The Peninsula Formation is the main unit in the Cape Supergroup. It comprises of quartz arenites, with minor shales and conglomerates. The maximum thickness of this formation ranges from ~2700m in the east, to 2000m in the west (Thomas & Johnson 2006). The Peninsula Formation contains sparse fossils of freshwater, estuarine, shallow marine, and coastal origin. These include eurypterid track ways and trilobite borrows (Cruziana and Skolithos ichnofacies). (Braddy & Almond 1999, Almond et al. 2009)

3. Assessment of impact of the development

The area lays over two formations from two different groups. The inland side of the site is underlain by the Nanaga Formation of the Algoa Group, and the seaward side is underlain by the Peninsula Formation of the Table Mountain group. The sediment overlaying the Nanaga Formation in the study area is likely devoid of significant fossils. The Nanaga Formation contains sparse fossils of foraminifera, rhizo-creations (root concretions) and root casts. The Peninsula Formation contains sparse fossils of freshwater, estuarine, shallow marine, and coastal origin including eurypterid trackways and trilobite borrows.

Figure 9. The road created to the back of the house; the area is covered in thick dune vegetation, it is highly unlikely that any fossil material was destroyed during this development.

Figure 10. a Small cutting on the road to the house (not on the property) indicating some trace fossil and rhizoliths (very low significance) over a loosely consolidated dune.

Figure 11. The sediment around the house consists of recent course shell gravel.

Table 2. Impact Assessment Criteria pre and post Mitigation.

	Pre-Mitigation		**Post-Mitigation**	
Criteria	**Category**	**Explanation**	**Category**	**Explanation**
Overall Nature	***Slightly Negative***	Fossil find is highly unlikely	**Slightly Negative**	Fossil find is highly unlikely
Type	***Direct***	The development will directly impact these resources	***Direct***	The development will directly impact these resources
Extent	***Site***	Impact is limited to the site footprint	***Site***	Impact is limited to the site footprint
Duration	***Short term***	Only during Construction	***Short term t***	Only during Construction
Severity	***Negative***	Fossil find is highly unlikely	***Negative***	Fossil find is highly unlikely
Reversibility	***Completely reversable***	If Fossil Find procedure is followed in case of fossil find.	***Completely reversable***	If Fossil Find procedure is followed in case of fossil find.
Irreplaceable Loss	***Resources may be partialy destroyed.***	Fossil find is highly unlikely. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.	***Resources may be partialy destroyed.***	Fossil find is highly unlikely. Impact will remain negligible if the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Probability	***Unlikely***	Fossil find is highly unlikely	***Unlikely***	Fossil find is highly unlikely
Mitigation Potential	***High***	If the Chance Fossil Find Procedure is followed in the case of any fossil finds.	***High***	If the Chance Fossil Find Procedure is followed in the case of any fossil finds.
Impact Significance	***Negligible***	Fossil find is highly unlikely	***Negligible***	Fossil find is highly unlikely
Overall significance	***Low***		***Low***	

Table 3. Assessment criteria on the NO GO option.

	No Go	
Criteria	**Category**	**Explanation**
Overall Nature	***Negative***	No fossils could be discovered.
Type	***Direct***	There will be no impact
Extent	***Site (0)***	No development negates the possibility of finding Fossils.
Duration	***Very short term (0)***	No development negates the possibility of finding Fossils.
Severity	***Negative (0)***	No development negates the possibility of finding Fossils.
Reversibility	***Completely reversable (0)***	No development negates the possibility of finding Fossils.
Irreplaceable Loss	***Resources will not be lost. (0)***	But resources can also not be discovered.
Probability	***Unlikely (0)***	Fossil find is highly unlikely
Mitigation Potential	***High***	No mitigation required.
Impact Significance	***Negligible***	No development negates the possibility of finding Fossils.
Overall significance	***Negligible***	

4. Assumptions and Uncertainties

Based on the palaeontological record and the geology of the area, it is assumed that the Nanaga Formation and the Peninsula Formation could contain valuable fossils, however these fossils are sparse and the chance of finding valuable fossils in either of these formations are low. The aeolian sediment that overlays the Nanaga Formation in the area of interest is most likely devoid of fossils of palaeontological interest.

“The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. When ground-truthing is done work is often hampered by sediment and vegetation cover. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering or are buried beneath a thick mantle of un-fossiliferous “drift” (soil, alluvium etc.).” Groenewald (2016)

It is important to note that field assessments are often hampered by vegetation and thick sediment cover, and it is often the case that fossil material is only uncovered and discovered during excavation.

5. Conclusion and Recommendations

The area under investigation lays over two formations from two different groups. The inland side of the site is underlain by the Nanaga Formation of the Algoa Group, and the seaward side is underlain by the Peninsula Formation of the Table Mountain Group. to the north the area partially covered by aeolian (Windblown) sediment.
The Nanaga Formation and its overlaying aeolian sands are rated as very highly sensitive, while the Peninsula Formation is ranked as highly sensitive. Both these formations have the potential to contain fossil material. However, fossils in both these formations are very sparsely distributed, and it is very unlikely that the expansion of the dwelling has caused loss or damage to the palaeontological heritage of the area. There would be no objection to further development of the property as long as the fossil find procedure at the end of this document is followed in the unlikely event of fossil material being found.

Should important new fossil remains be found the finder should alert ECPHRA (*i.e.* The Eastern Cape Provincial Heritage Resources Authority. Contact details: Ms. Lungiswa Mzaza, 16 Commissioner Street, East London; lungiswam@ecphra.org.za, (081 434 3544) 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 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 summarised in tabular form in Appendix 1 (Chance Fossil Finds Procedure) and should be incorporated into the Environmental Management Programme (EMPr) for the proposed development.

6. References

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Appendix 1

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;
- 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 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.

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:		