



forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE

PALAEONTOLOGY DESKTOP STUDY FOR THE PROPOSED CONSTRUCTION OF THE 6KM IMPALA ZIRCON TEMPORARY BY-PASS 132KV POWERLINE WITH ASSOCIATED INFRASTRUCTURE WITHIN THE UMHLATHUZE MUNICIPALITY,
KWA-ZULU NATAL PROVINCE

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.dffe.gov.za/documents/forms>.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with 'the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020', where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Palaeontology
Specialist Company Name	Marion Bamford Consulting
Specialist Name	Marion Bamford
Specialist Identity Number	Click or tap here to enter text.
Specialist Qualifications:	PhD Palaeontology (Wits, 1990)
Professional affiliation/registration:	PSSA, SASQUA, INQUA, IOP, FRSSAI mASSAf
Physical address:	24a Eighth Avenue, Parktown North
Postal address:	P O Box 652
Postal address	2050
Telephone	01 1 7176690
Cell phone	0825556937
E-mail	marionbamford12@gmail.com

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SPECIALIST DECLARATION FORM – AUGUST 2023

2. DECLARATION BY THE SPECIALIST

I, Marion Bamford declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
 - any decision to be taken with respect to the application by the competent authority; and;
 - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

Marion Bamford Consulting

Name of Company:

21 May 2026

Date

SPECIALIST DECLARATION FORM – AUGUST 2023

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _ Marion Bamford _____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

MBamford

Signature of the Specialist

Marion Bamford Consulting

Name of Company

21 May 2026

Date

AKS 71991816

Signature of the Commissioner of Oaths

21 May 2026

Date



**Palaeontological Impact Assessment for the
proposed construction of the Impala Zircon
temporary by-pass 132kV powerline with
associated infrastructure and the maintenance
of the existing Impala Zircon 132kV main line
within the Umhlathuze Municipality,
KwaZulu Natal Province**

Desktop Study (Phase 1)

Subcontracted by

Vhubvo Consultancy

27 March 2026

Prof Marion Bamford

Palaeobotanist

P Bag 652, WITS 2050

Johannesburg, South Africa

Marion.bamford@wits.ac.za

1. Executive Summary

A Palaeontological Impact Assessment was requested for the proposed construction of the Impala Zircon temporary by-pass 132kV powerline with associated infrastructure and the maintenance of the existing Impala Zircon 132kV main line within the Umhlathuze Municipality, KwaZulu Natal Province.

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

The proposed route lies on the Quaternary sands and aeolian sands of the Umkwelane Formation (Maputaland Group). The latter might have marine invertebrate shells but is covered with soil and vegetation. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling for pole foundations and infrastructure have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

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

2. Declaration of independence and summary of expertise.

a. Declaration

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

Specialist: Prof Marion Bamford

Signature: 

b. Expertise

The Palaeontologist Consultant: Prof Marion Bamford

Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf, PSSA

Experience: 37 years research and lecturing in Palaeontology; over 29 years PIA studies and over 500 projects completed.

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

Declaration of Independence

I, Marion Bamford, declare that –

General declaration:

- I act as the independent palaeontology practitioner in this application,
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant,
- I declare that there are no circumstances that may compromise my objectivity in performing such work,
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation,
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application,
- I have no, and will not engage in, conflicting interests in the undertaking of the activity,
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority,
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties

and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application,

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

Disclosure of Vested Interest

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

d. Summary of the specialist's expertise

I, Marion Bamford, am a professional Palaeontologist with a PhD in Palaeontology (Wits University, 1990). I have more than 35 years of experience in palaeontological research and have published over 190 papers in peer-reviewed journals and published more than 14 scholarly book chapters. I review manuscripts for international and local journals and also review funding proposals for international funding bodies. Currently I am the Director of the Evolutionary Studies Institute, the only palaeontological institute in Southern Africa.

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

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3. Project Background

Eskom is proposing the construction of the Impala Zircon temporary by-pass 132kV powerline with associated infrastructure and the maintenance of the existing Impala Zircon 132kV main line within the Umhlathuze Municipality, KwaZulu Natal Province.

The Applicant (Eskom) intends for the Maintenance and Refurbishment of the Impala Zircon 132kV powerline located in Empangeni, under Richards Bay. The existing 1 powerline spans approximately 10,582 km in length, but Eskom is only responsible for about 7.6km of this line; the rest of the powerline belongs to the uMhlathuze Local Municipality. The Impala Zircon 132kV powerline is a radial line with no back-feeding capabilities and distributes electricity to approximately 6062 customers. It feeds Cygnus Substation, which supplies all the Esikhaweni networks, uMhlathuze Local Municipality and Lake Qube water pump (LPU).

The 10km powerline is from the North coast of KwaZulu-Natal and is exposed to both industrial and coastal pollution. Therefore, due to the proximity to the coast, this powerline is experiencing severe corrosion and deterioration on tower foundations. Therefore, a temporary bypass powerline is required in order to continue with the Maintenance of the Main powerline.

The proposed temporary 132kV bypass powerline will be approximately 6.01 km in length and will be built on wooden poles as a temporary option, which will allow the Maintenance of the Main powerline. The temporary bypass powerline will be in use for a period of 3 years. The temporary bypass powerline will run parallel (within its servitude) to the existing Main powerline (approximately 15m apart) and cross the uMhlathuze River, most of the powerline is traverses a sugarcane farm.

Selahle Consultancy and Projects (Pty) Ltd (herein referred to as SCP) has been appointed as the Environmental Assessment Practitioners (EAPs) to handle the BA, MMP and WULA processes. The proposed development requires authorisations under the EIA Regulations, 2014 (as amended) published under NEMA, and the Water Use License Application and Appeals Regulations, 2017 (amended) promulgated under the National Water Act (Act 36 of 1998) to ensure compliance with Environmental and Water legislation and regulations. The Competent Authorities that would be responsible for processing these applications are:

- Department of Forestry, Fisheries and Environment (DFFE) – for Basic Assessment Process and Maintenance Management Plan
- Department of Water and Sanitation (DWS) – Water Use License Application

SITE DESCRIPTION

The proposed temporary and existing main powerline routes can be accessed along the N2 and R34 roads (Figures 1-2). Much of the area is under agriculture.

A Palaeontological Impact Assessment was requested for the Impala-Zircon 132 kV line by pass and maintenance project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein. The minimum requirements for reporting are listed in Table 1.

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6). Includes the requirements from GNR Appendix 6 of GN 326 EIA Regulation 2017.

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
ai	Details of the specialist who prepared the report,	Section 2
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Section 2
b	A declaration that the person is independent in a form as may be specified by the competent authority	Section 2
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 3
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 6
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 4
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 6
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 8
k	Any mitigation measures for inclusion in the EMP	Section 10, Appendix A

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 8
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 8, 10
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A



Figure 1: Google Earth map of the general area to show the relative landmarks. The Impala-Zircon 132kV bypass project is shown by the red and blue lines.

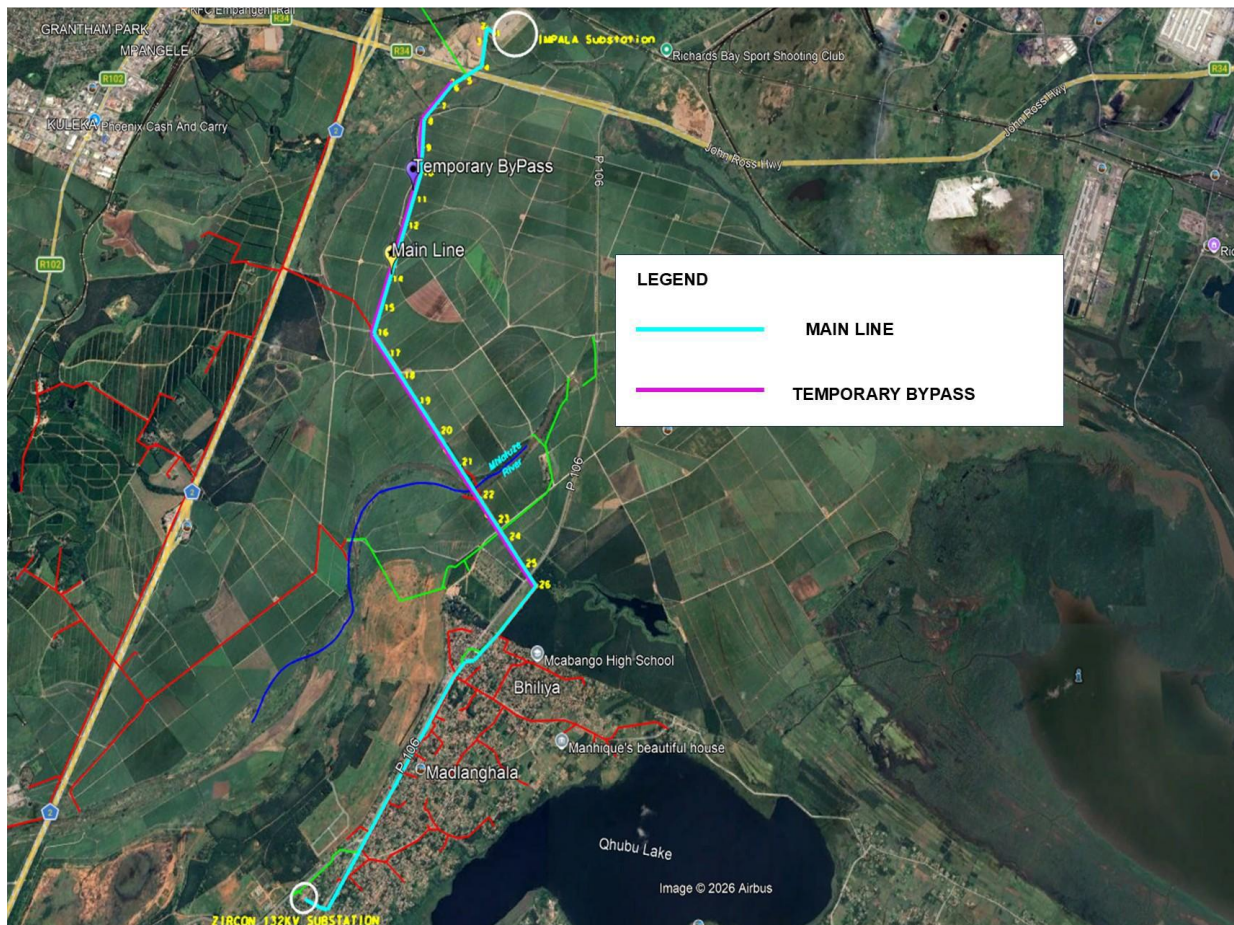


Figure 2: Google Earth Map of the proposed temporary 132kV line (lilac) for the Impala-Zircon maintenance project.

4. Methods and Terms of Reference

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

The methods employed to address the ToR included:

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

5. Geology and Palaeontology

i. Project location and geological context

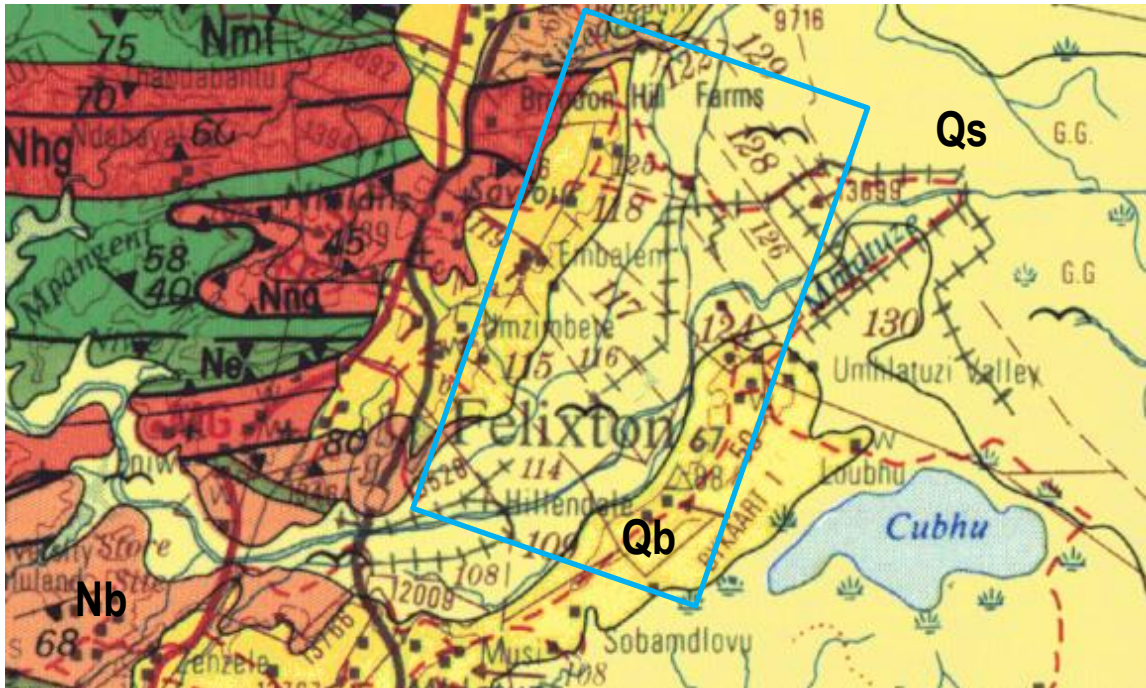


Figure 3: Geological map of the area around the Impala-Zircon 132kV line bypass that is indicated within the blue rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2830 Dundee.

Table 2: Explanation of symbols for the geological map and approximate ages (Botha, 2021; Cornell et al., 2006; Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Qs	Quaternary sands	Alluvium, sand, calcrete	Quaternary ca 1.0 Ma to Present
Qb	Umkwelane Fm (formerly Berea Fm, Muzi Fm), Uloa Subgroup, Maputaland Group	Aeolianite, decalcified to "Berea-type" reddish-brown soil profile	Mid Miocene – Pliocene 10 – 2.5 Ma
Nb	Buhleni Gneiss, Natal Sector of the Natal-Namaqua Metamorphic Suite	Quartz feldspar gneiss	Neoproterozoic
Nmt	Mtentu Fm, Tugela Group, Natal Sector of the Natal-Namaqua Metamorphic Suite	Amphibolite	Neoproterozoic
Nhg	Halambu Gneiss, Natal Sector of the Natal-Namaqua Metamorphic Suite	Granite gneiss, granodiorite gneiss	Neoproterozoic
Ni	Nsuze Gneiss, Natal Sector of the Natal-Namaqua Metamorphic Suite	Biotite-rich gneiss	Neoproterozoic

The project lies in the eastern margin of South Africa where the older rocks of the Namaqua-Natal Metamorphic Suite are unconformably overlain by the much younger Quaternary sands of the Maputaland Group (Figure 3).

The granites and gneisses of the Natal Sector of the Namaqua-Natal Province were formed about 1000 million years ago (Neoproterozoic) and extend from the Tugela River in Zululand, Natal, to the northern Transkei in the Eastern Cape Province (Cornell et al., 2006). This suite of rocks has been divided into three discontinuity-bound tectono-stratigraphic terranes composed of different rock types and metamorphic grades (ibid). They lap onto the Kaapvaal Craton. From the north to the south, they are known as the Tugela Terrane (greenschist to amphibolite grade), the Mzumbe Terrane (upper amphibolite facies) and the Margate Terrane (granulite facies). Since these are volcanic rocks and have been metamorphosed by heat and pressure they do not preserve any fossils.

The Cenozoic Maputaland stratigraphy has been revised over the last few decades and the most recent iteration recognises seven formations (Botha, 2018). The basal Uloa Subgroup is composed of the Uloa Formation and the overlying Umkwelane Formation (previously the Berea Formation, noted on the maps). The upper Umfolosi Subgroup has been divided into five formations, from the base upwards, the Port Durnford Formation, Isipingo formation (six members), the KwaMbonambi Formation (two members) and the youngest Sibayi Formation (two members).

The basal Uloa Formation was deposited during the mid- to late Miocene and is composed of calcified beach gravels with coquina and subtidal channel sands with oysters, representing a dynamic coastline and sealevel changes. It lies on a basement ranging from Archaean to Oligocene rocks. The Umkwelane formation is slightly younger at late Miocene and comprises the aeolianite and decalcified aeolianite to “Berea-type” reddish brown soil profile (Botha, 2018). The overlying Port Durnford Formation occurs in the east and is composed of Early to mid Miocene sands dunes and Late-Middle Pleistocene clay and sand with coquina and mammal fossils.

The Kosi Bay Formation is the dominant stratum in the area and ranges from the middle to Late Pleistocene. It has a discontinuous basal lignite bed dated to more than 295 ka. The rest of the formation has been divided into members of the Isipingo Formation representing different beaches and aeolianites of the glacial and interglacial phases of the late Pleistocene.

The Lake Sibayi Formation is the name given to the stacked parabolic dunes and palaeosols of Late Pleistocene to Holocene age. It is overlain, or rather replaced, by the KwaMbonambi Formation coastal plain parabolic dunes.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 4. The route for the bypass powerline is on the moderately sensitive Late Quaternary sands and alluvium (green) while the existing lines that will maintenance over time are on the highly sensitive Umkwelane Formation (orange). The Namaqua-Natal Group metamorphic rocks have zero to negligible palaeosensitivity (grey).

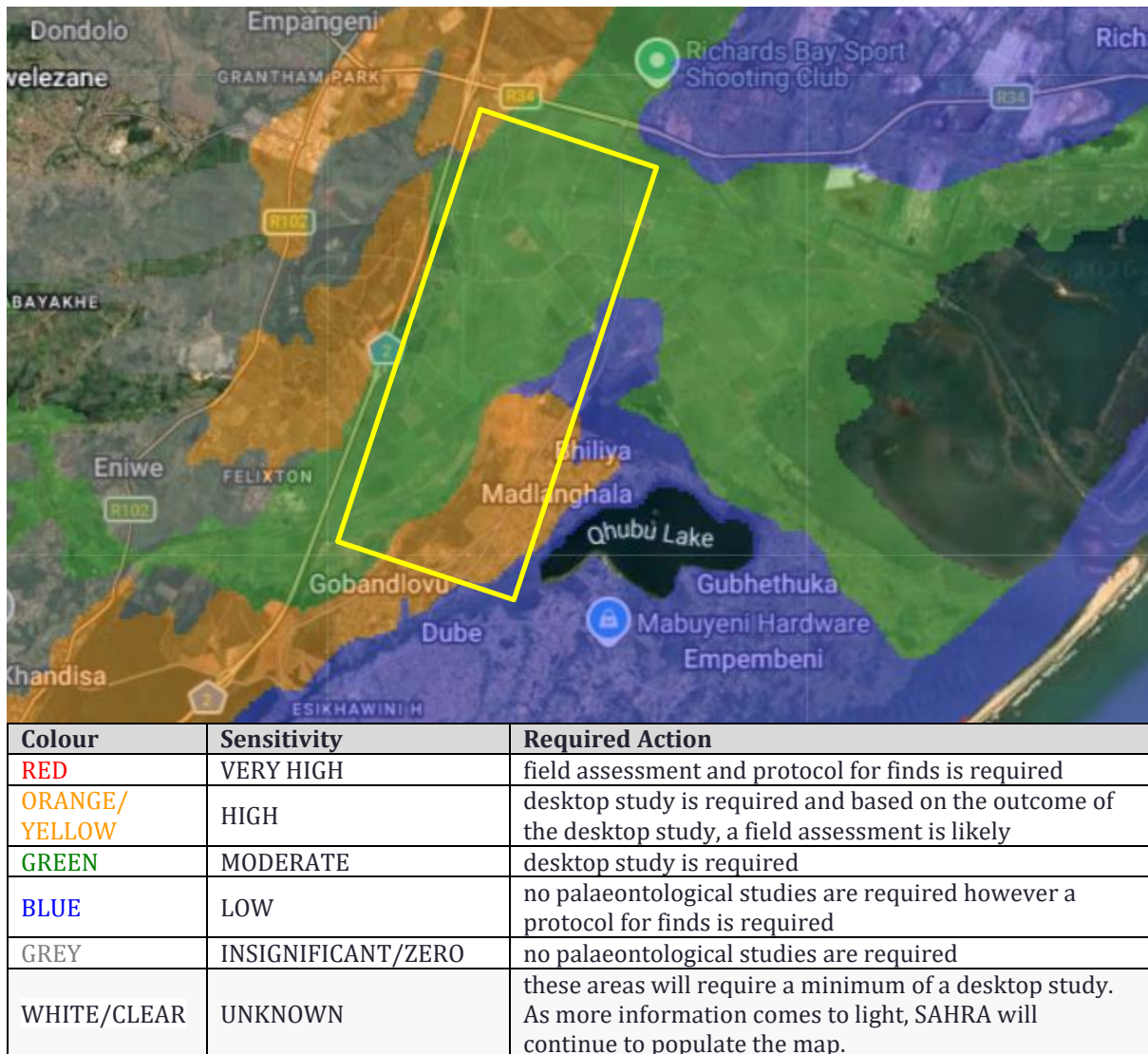


Figure 4: SAHRIS palaeosensitivity map for the site for the proposed Impala-Zircon 132 kV powerline bypass and maintenance project shown within the yellow rectangle.

The Uloa Formation is composed of calcified coquina (coquinites), shelly conglomerate and stratified, low-angle boulder conglomerate (Roberts et al., 2006). In surface exposures the shells weather rapidly and are usually fragmented.

From the Umkwelane Formation marine molluscs, shark teeth and foraminifera have been reported (King, 1953, 1970; Stapleton, 1977; Botha, 2018). The area is very

disturbed from rural and urban development so any fossils are likely to have been displaced or even destroyed or collected.

It should be noted that the powerline route is in fields that have been cleared and planted for agriculture so the dune sands have been disturbed and covered with soils. This greatly reduces the chance of finding fossils.

6. Impact assessment

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

Table 3a: Criteria for assessing impacts

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

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	M	-

PART B: Assessment		
	L	Soils do not preserve fossils; so far there are no records from the Umkwelane Fm of marine or invertebrate fossils in this region so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be fossil invertebrates in the sands and aeolian sands, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	-
	L	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area or in the sands below the soils that might be excavated. Nonetheless, a Fossil Chance Find Protocol should be added to the eventual EMPr.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either the wrong kind to contain fossils or there is only a very small chance of fossils surviving the agricultural activities. Furthermore, the material to be excavated is soil and this does not preserve fossils. Since there is a small chance that fossils from the Umkwelane Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

7. Assumptions and uncertainties

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

8. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the

Quaternary. There is a very small chance that invertebrate fossils or shells may occur in the aeolian sands of the Quaternary Umkwelane Formation (Maputaland Group) so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

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

9. References

Botha, G. A., 2018. Lithostratigraphy of the late Cenozoic Maputaland Group. South African Journal of Geology 121, 95-108.

Braun, J., Guillocheau, F., Robin, C., Baby, G., Jelsma, H., 2014. Rapid erosion of the Southern African Plateau as it climbs over a mantle superswell, Journal of Geophysical Research; Solid Earth 119, 6093–6112. doi:10.1002/2014JB010998.

Cornell, D.H., Thomas, R.J., Moen, H.F.G., Reid, D.L., Moore, J.M., Gibson, R.L., 2006. The Namaqua-Natal Province. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 325-379.

King, L.C., 1953. A Miocene marine fauna from Zululand. Transactions of the Geological Society of South Africa 56, 59-91.

King, L.C., 1970. Uloa revisited: A review of the essential data from this classic locality and a statement of Tertiary history of the Zululand coastal area. Transactions of the Geological Society of South Africa 73, 151-157.

Roberts, D.L., Botha, G.A., Maud, R.R., Pether, J., 2006. Coastal Cenozoic deposits. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 605-628.

Stapleton, R.P., 1977. Planktonic foraminifera and the age of the Uloa Pecten Bed. Bulletin of the Geological Survey of South Africa 60, 11-17.

10. Fossil Chance Find Protocol

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

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

11. Appendix A – Examples of fossils from the Maputaland Group

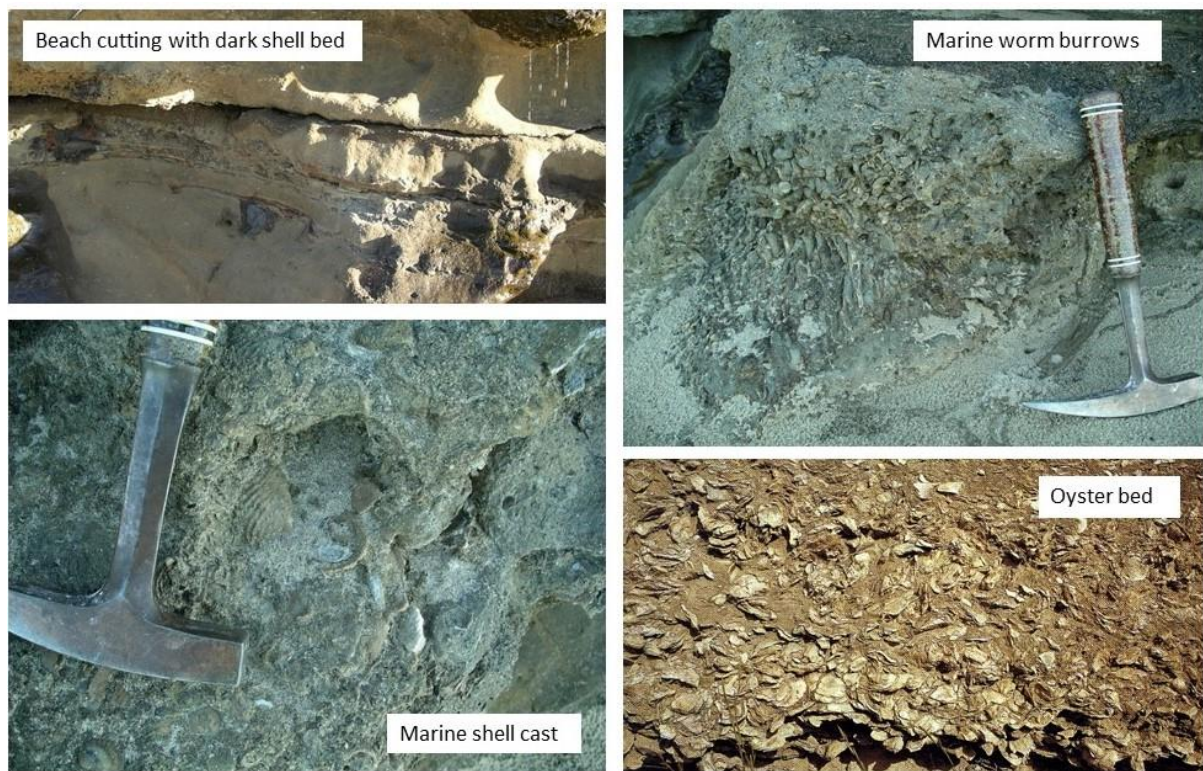


Figure 5: Photographs of invertebrate fossils from the Maputaland Group, to assist the on-site responsible person.