PALAEONTOLOGICAL DESKTOP ASSESSMENT FOR THE PROPOSED SPIONKOP PROSPECTING RIGHT PROJECT, NORTHERN CAPE PROVINCE

Prepared for:

PSG Heritage

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Prepared by

BANZAI ENVIRONMENTAL (PTY) LTD
P.O. BOX 11023
UNIVERSITAS
BLOEMFONTEIN
9323

EXECUTIVE SUMMARY

Black Mountain Mining (PTY) Ltd., appointed Environmental Impact Management Services (PTY) Ltd (EIMS) as the independent environmental consulting firm to assist in preparing and submitting, an Environmental Authorisation Application, Basic Assessment Report, Environmental Management Programme as well as an integrated and Affected Party Consultation, in support of a Prospecting Right Application. According to the National Heritage Resources Act (Act No 25 of 1999, section 38), a palaeontological impact assessment is required to detect the presence of fossil material within the proposed development footprint and to assess the impact of the mine and operation of the mining on the palaeontological resources.

The broader area near Aggeneys is underlain by the Mid-Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group), Dwyka Group and Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed and their palaeontological sensitivity is correspondingly low The Permo-Carboniferous Dwyka Group is largely known for its trace fossils. The palaeontological sensitivity of these fossils is low. The low palaeontological sensitivity of the Cenozoic superficial deposits van be attributed to the scarcity of fossil heritage in this deposits. The specific development footprint (footprints of each of the RAB points is 20m x 20m) as well as the wider development area have been assessed and the results on the impacts on the palaeontological heritage was found to be the same. In Palaeontological terms the significance is thus rated as LOW (negative). Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.

Thus, the proposed Spionkop Prospecting Right Project, may be authorised as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.

CONTENTS

1 INTRODUCTION

Banzai Environmental was appointed by PSG Heritage to conduct the EIA Report for the proposed Spionkop Prospecting Right Project. The proposed prospecting activity area is located between 31 and 62 km southwest of the town of Aggeneys and the Aggeneys-Gamsberg base metal mines in the District Namakwaland, Northern Cape Province. The following farm portions are included:

- Remaining Extent of the farm Dikbek 81
- Portion 3 ; 4 and 5 of the farm Karas 76
- Portion 1 and the Remaining Extent of the farm Kliphakskeen 98
- Portion 1 and Remaining Extent of the farm Kraalbosch Vlei 99
- Portion 1 of the farm Ou Taaibosmond 66
- Remaining Extent of the farm Rooi Duin 101
- Remaining Extent of the farm Taaibosmond 580
- Portion 1 of the farm Tweeling 79
- Remaining Extent of the farm Tweeling 80
- Remaining Extent of the farm Donkerduispraat 95

The Spionkop Prospecting Right Project covers a total area of approximately 81 599 hectares (Fig.1-2).

1.1 Project Description (Information Provided By EIMS)

Black Mountain Mining (Pty) Ltd is applying for a prospecting right in order to establish if economically viable mineral deposits exist within the area for the following: ferrous and base metals (Zink Ore, Lead Ore, Copper Ore, Iron Ore and Manganese Ore) as well as associated metals and mineral, and precious metals (e.g. Gold Ore and Silver Ore) and associated metals and minerals. Both non-invasive and invasive prospecting techniques will be utilized. The Bushmanland Group (Namaqua-Natal Metamorphic Province) geological formation will be targeted.

The project will consist off several phases and the different phases and timeframes of the prospecting envisaged are by their nature, dependant on the results obtained during the preceding phases of prospecting. The project will use both non-invasive and invasive prospecting techniques.

1.1.1 Non-Invasive Prospecting Techniques

- Desktop Study/Literature Review.
- Geological Field Mapping/Semi-Ground Geophysical Mapping.
- Compilation, Interpretation and Modelling of Data.
- Detailed Ground Geophysical Survey on individual positively mineralized targets to define possible extent.

- Analytical Desktop Pre-Feasibility Study.

1.1.2 Invasive Prospecting Techniques

- Exploration Boreholes.
- Boreholes to confirm continuity of mineralization and potential deposit size.
- Resource Definition Drilling.

1.1.3 Duration Of The Activity

The proposed project is scheduled to take place over a period of 5 years.

1.1.4 NEMA Listed Activities

The following NEMA listed activities have been applied for, in this application:

Listing Notice 1 (GNR 983) Activity 20: Activities directly related to prospecting of a mineral resource. Including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002), including associated infrastructure, structure and earthworks, directly related to prospecting of a mineral resource.

1.1.5 Typical Activities

Both non-invasive and invasive prospecting techniques will be utilized. Site access will be required during the topographical and geophysical surveys. Potential impacts that may occur as a result of the proposed activities are:

- Top soil removal.
- Vegetation clearance.
- Surface and Ground water contamination.
- Noise and Air Pollution; and
- General and Hazardous Waste Generation.

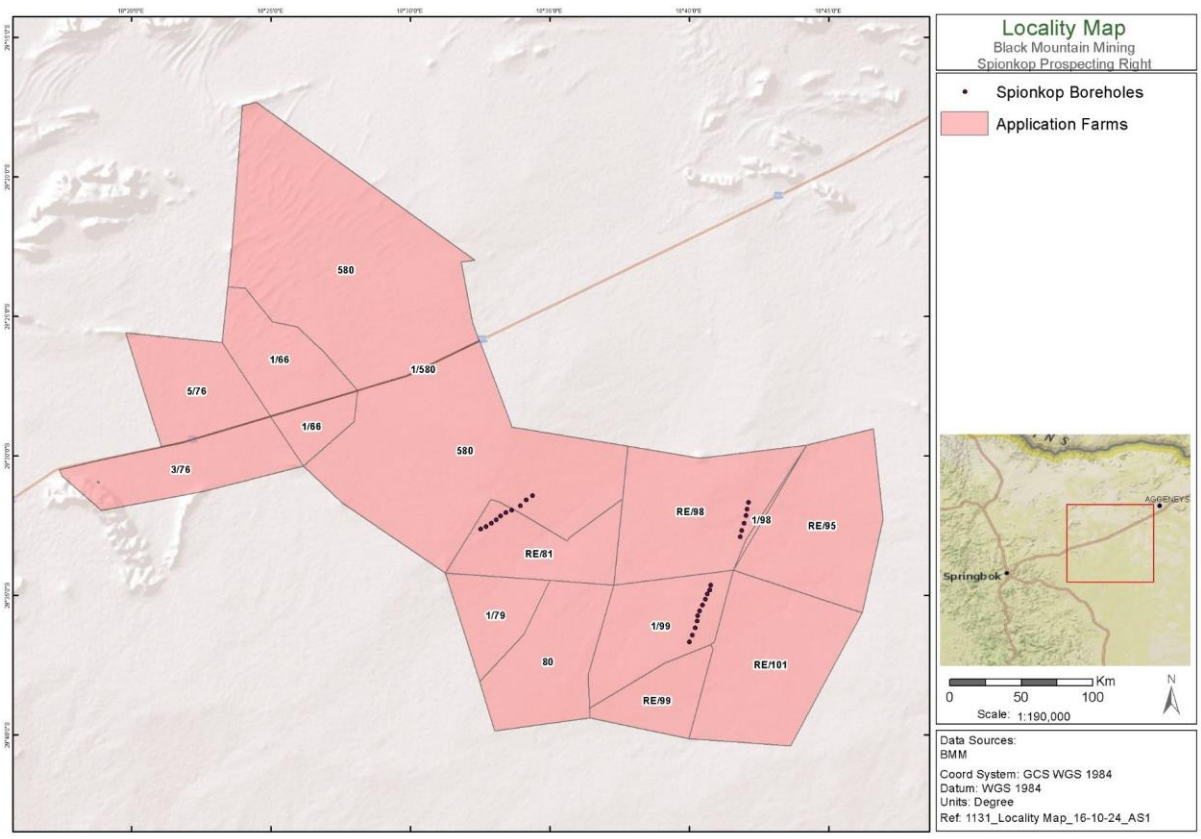

Figure 1. Location of the proposed Spionkop Prospecting Right Project, Northern Cape Province. Map provided by EIMS.

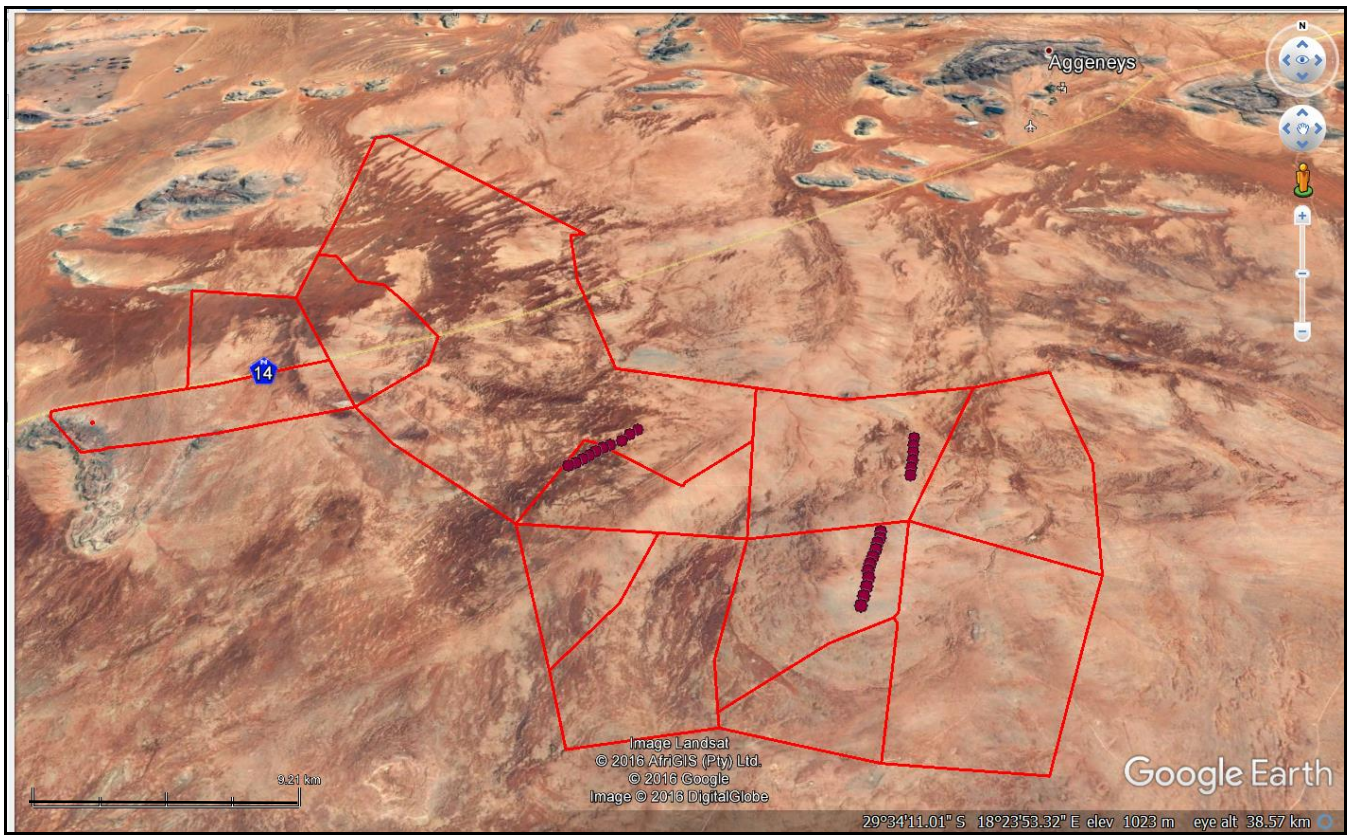

Figure 2. Google Earth image (2016) of the proposed Spionkop Prospecting Right Project, Northern Cape Province.

1.2 GENERAL MANAGEMENT GUIDELINES

1. The National Heritage Resources Act (Act 25 of 1999) states that, any person who intends to undertake a development categorised as-

(a) the construction of a road, wall, transmission line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site;-

  (i) exceeding 5 000 m^2 in extent; or

  (ii) involving three or more existing erven or subdivisions thereof; or

  (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

  (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA.SAHRA;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Cultural Heritage in South Africa is governed by the National Heritage Resources Act (Act 25 of 1999). This Palaeontological Environmental Impact Assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the above mentioned Act. In accordance with Section 38, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

SECTION 35 OF THE NATIONAL HERITAGE RESOURCES ACT 25 OF 1999

- The protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.
- All archaeological objects, palaeontological material and meteorites are the property of the State.
- Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
- No person may, without a permit issued by the responsible heritage resources authority—
  - destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
  - destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

- trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
- bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

- When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—
  - serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order; and/or
  - carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary.

2 Objective

According to the SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports' the aims of the palaeontological impact assessment are:

- to identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assess the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources; and
- To make recommendations as to how the developer should conserve or mitigate damage to these resources.

The objective is thus to conduct a Palaeontological Impact Assessment, which forms of part of the Heritage Impact Assessment (HIA) and the EIA Report, to determine the impact of the development on potential palaeontological material at the site.

When a palaeontological desktop/scoping study is conducted, the potentially fossiliferous rocks (i.e. groups, formations, members, etc.) represented within the study area are determined from geological maps. The known fossil heritage within each rock unit is collected from published scientific literature; fossil sensitivity map; consultations with professional colleagues, previous palaeontological impact studies in the same region and the databases of various institutions may be consulted. This data is then used to assess the palaeontological sensitivity of each rock unit of the study area on a desktop level. The likely impact of the proposed development on local fossil heritage is subsequently established on the basis of the palaeontological sensitivity of the rocks and the nature and scale of the development itself (extent of new bedrock excavated).

If rocks of moderate to high palaeontological sensitivity are present within the study area, a Phase 1 field-based assessment by a professional palaeontologist is necessary. Generally, damaging impacts on palaeontological heritage occur during the construction phase. These excavations will modify the existing topography and may disturb damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific study.

When specialist palaeontological mitigation is suggested, it may take place prior to construction or, even more successfully, during the construction phase when new, potentially fossiliferous bedrock is still exposed and available for study. Mitigation usually involves the careful sampling, collection and recording of fossils as well as relevant data concerning the surrounding sedimentary matrix. Excavation of the fossil heritage will require a permit from SAHRA and the material must be housed in a permitted institution. With appropriate mitigation, many developments involving bedrock excavation will have a *positive* impact on our understanding of local palaeontological heritage.

3 GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

3.1 GEOLOGY

The development footprint is underlain by the Mid Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group), Dwyka Group and Cenozoic superficial deposits (Fig. 3). The Namaqua-Natal Province is primarily highly metamorphosed sediments and volcanic rocks (e.g. gneisses, schists, quartzites, amphibolites) plus major granitic and gabbroic (norite) intrusions, are dated between 2050 and 1000 Ma (million years ago). They have been assigned to several rock successions such as the intrusive Spektakel Suite (c. 1170 Ma) and Little Namaqualand Suite (c. 1200 Ma) and the metamorphic crustal rocks of the Gladkop Metamorphic Suite.

The Permo-Carboniferous Dwyka Group forms the lowermost and oldest deposit in the Karoo Supergroup basin. This Group represents the lowermost unit of the Karoo Supergroup and are between 300 and 290 million years old. Dwyka deposits were deposited in a cold, glacially-dominated environment which occurred when South Africa lay below a massive ice sheet some 4km thick. The Dwyka Group consists almost throughout of gravelly sediments with subordinate vorved shale and mudstone containing scraped and facetted pebbles. Dark-grey tillite was deposited by retreating glaciers. This rock unit is characterised by a rich assemblage of dropstones that vary in size from millimetre scale to nearly a meter in diameter.

Various types of superficial deposits of Late Caenozoic (Miocene to Pliocene to Recent) age occur throughout the Karoo Basin (Partridge *et al*. 2006). They include pedocretes (*e.g*..calcretes), colluvial slope deposits, down wasted surface gravels, river alluvium, wind-blown sands as well as spring and pan sediments. Hill slopes are usually mantled with a thin to thick layer of colluvium or slope deposits (*e.g.* sandstone and dolerite scree or talus deposits, sheetwash).

3.2 PALAEONTOLOGY

The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed (Almond & Pether 2008), and their palaeontological sensitivity is correspondingly low (Almond & Pether 2008, Almond 2008).

Trackways, produced mostly by fish and arthropods (invertebrates), have been recovered in shales from the uppermost Dwyka Formation. Other trace fossils include coprolites (fossilized faeces) of chondrichthyians (sharks, skates and rays). Body fossils include aranaceous foraminifera and radiolarians (single-celled organisms), bryozoans, sponge spicules (internal support elements of sponges), primitive starfish, orthoceroid nautiloids (marine invertebrates similar to the living Nautilus), goniatite cephalopods (Eoasinites sp.), gastropods (marine snails such as Peruvispira viperdorfensis), bivalves

(Nuculopsis sp., Phestia sp., Aphanaia haibensis, Eurydesma mytiloides), brachiopods (Attenuatella sp.) and palaeoniscoid fish such as Namaichthys schroederi and Watsonichthys lotzi. Fossil plants have also been found, including lycopods (Leptophloem australe), moss, leaves and stems (possibly belonging to a proto-glossopterid flora). Fossil spores and pollens (moss, fern and horsetail spores and primitive gymnosperm pollens) as well as fossilized wood probably belonging to primitive gymnosperms have also been recorded from Dwyka deposits (MacRae, 1999; McCarthy and Rubidge, 2005). Fossils other than trace assemblages are generally scarce and most of the Dwyka sediments are of low overall palaeontological sensitivity.

The **Cenozoic superficial** deposits have been relatively neglected in palaeontological terms. They may occasionally contain important fossil biotas, e.g. bones, teeth and horn cores of mammals as well as remains of reptiles like tortoises. Non-marine molluscs (bivalves, gastropods), ostrich egg shells, trace fossils (*e.g.* calcretised termitaria, coprolites), and plant remains such as peats or palynomorphs (pollens, spores) in organic-rich alluvial horizons and siliceous diatoms in pan sediments have also been found. However, these fossil assemblages are generally sparse, low in diversity, and occur over a wide geographic area, so the palaeontological sensitivity of the calcretes within the study region is rated as low. This applies equally to the thin veneer of other surface deposits (rocky scree, stream alluvium etc.) within this highly arid region.

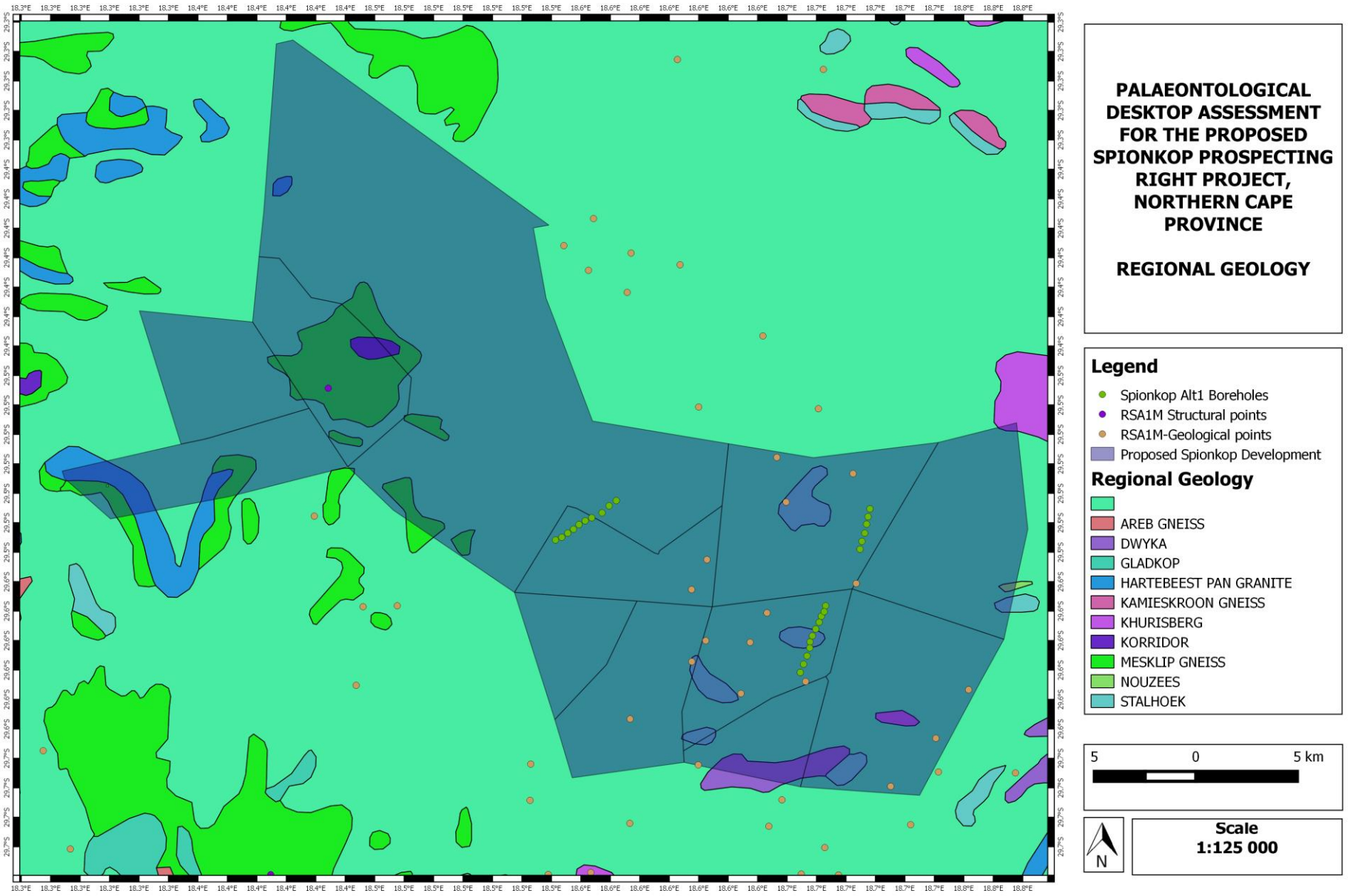

Figure 3. The surface geology of the proposed Spionkop Prospecting Right Project, Northern Cape Province. The development footprint is underlain by the Namaqua-Natal Metamorphic Province (Bushmanland Group), Dwyka Group and Cenozoic deposits.

4 GEOGRAPHICAL LOCATION OF THE SITE

Project Location

The proposed prospecting activity area is located between 31 and 62 km southwest of the town of Aggeneys and the Aggeneys-Gamsberg base metal mines in the District Namakwaland, Northern Cape Province. The following farm portions are included:

- Remaining Extent of the farm Dikbek 81
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The Spionkop Prospecting Right Project covers an area of approximately 81 599 hectares in total (Fig.1-2).

5 METHODS

A Palaeontological Scoping study was conducted on a desktop level to assess the potential risk to palaeontological material (fossil and trace fossils) within the site proposed for development. The author's experience, aerial photos (using Google Earth, 2015), topographical and geological maps and other reports from the same area were used to assess the site proposed for the development.

5.1 ASSUMPTIONS AND LIMITATIONS

The accuracy and reliability of desktop Palaeontological Impact Assessments as components of heritage impact assessments are normally limited by the following restrictions:

- Old fossil databases that have not been kept up-to-date or are not computerised. These databases do not always include relevant locality or geological information. South Africa has a limited number of professional palaeontologists that carry out fieldwork and most development study areas have never been surveyed by a palaeontologist
- The accuracy of geological maps where information may be based solely on aerial photographs and small areas of significant geology have been ignored. The sheet explanations for geological maps are inadequate and little to no attention is paid to palaeontological material.
- Impact studies and other reports (*e.g*. of commercial mining companies) - is not readily available for desktop studies.

Large areas of South Africa have not been studied palaeontologically. Fossil data collected from different areas but in similar Assemblage Zones might however provide

insight on the possible occurrence of fossils in an unexplored area. Desktop studies of this nature therefore usually assume the presence of unexposed fossil heritage within study areas of similar geological formations. Where considerable exposures of bedrocks or potentially fossiliferous superficial sediments are present in the study area, the reliability of a Palaeontological Impact Assessment may be significantly improved through field-survey by a professional palaeontologist.

6 IMPACT ASSESSMENTS

An assessment of the impact significance of the proposed Spionkop Prospecting Right Project on local fossil heritage is presented here:

6.1 Nature of the impact

The excavations and site clearance will involve substantial excavations into the superficial sediment cover as well as locally into the underlying bedrock. These excavations will modify the existing topography and may disturb damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific research. According to the Geology of the development site there is low possibility of finding fossils (see deception in text).

6.2 Sensitive areas

The broader area near Aggeneys is underlain by the Mid Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group), Dwyka Group and Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils. The Permo-Carboniferous Dwyka Group is largely known for its trace fossils, but has a low palaeontological sensitivity. The low palaeontological sensitivity of the Cenozoic superficial deposits can be attributed to the scarcity of fossil heritage in this deposits. In Palaeontological terms the **significance** is thus rated as **LOW (negative).**

6.3 Geographical extent of impact

The impact on fossil materials and thus palaeontological heritage will be limited to the construction phase when new excavations into fresh potentially fossiliferous bedrock take place. The extent of the area of potential impact is thus restricted to the project site and therefore categorised as **local**.

6.4 Duration of impact

The expected duration of the impact is assessed as potentially permanent to short term.

6.5 Potential significance of the impact

In Palaeontological terms the **significance** is thus rated as **LOW (negative).**

6.6 Severity / benefit scale

The proposed project is potentially **beneficial** on not only a local level, but regional and national levels as well. The mine will provide a long term benefit to the community in terms of the economy and job creation.

6.7 Intensity

The intensity of the impact on fossil heritage is rated as very low.

6.8 Probability of the impact occurring

The development area are not considered to be highly fossiliferous. Probable significant impacts on palaeontological heritage during the construction phase are rated as insignificant and the intensity of the impact on fossil heritage is rated as very low.

7 DAMAGE MITIGATION, REVERSAL AND POTENTIAL IRREVERSIBLE LOSS

7.1 Mitigation

The possibility of finding fossils in the development area is low and therefore no mitigation measures are recommended.

7.2 Degree of irreversible loss

The possibility of finding fossils in the development area is low and thus the irreplaceable loss of resources is rated as **insignificant**.

7.3 Degree to which the impact may cause irreplaceable loss of resources

The possibility of finding fossils in the development area is low and thus the irreplaceable loss of resources is rated as **insignificant**.

7.4 Cumulative impacts

The cumulative effect of the proposed development is considered to be low. This is as a result of the broader Aggeneys area is not being considered as highly fossiliferous.

8 FINDINGS AND RECOMMENDATIONS

The broader area near Aggeneys is underlain by the Mid Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group), Dwyka Group and Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed and their palaeontological sensitivity is correspondingly low The Permo-Carboniferous Dwyka Group is largely known for its trace fossils. The palaeontological sensitivity of these fossils is low. The low palaeontological sensitivity of the Cenozoic superficial deposits can be attributed to the scarcity of fossil heritage in this deposits. In Palaeontological terms the significance is thus rated as LOW (negative). Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.

The specific development footprint (footprints of each one of the RAB points is 20m x 20m) as well as the wider development area have been assessed and the results on the impacts on the palaeontological heritage was found to be the same.

Thus, the proposed Spionkop Prospecting Right Project, may be authorised as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.

9 IMPACT TABLE

The project phases are Planning, Construction, and Operational as well Decommissioning.

During the Planning phase there will be no impact on the palaeontological heritage in the development footprint thus no impacts will be discussed. There will only be Palaeontological Impacts in the Construction and Operational phases. These impacts will be similar for both phases and will be handled as the same.

Alternative 1: No Go Alternative

This alternative will imply that no development takes place in the study area and that the environment remains unchanged and unaltered. ***For this alternative, the assumption is that no heritage resources will be impacted on. As a result, no further evaluation of impacts will be done for this alternative.***

Alternative 2: Proposed Prospecting Activities Limited to the Identified Footprints in the Study Area. This alternative entails the proposed prospecting activities limited to the identified footprint areas in the study area that is the three RAB Lines formed by the proposed prospecting points.

Alternative 3: Possible Expansion of Proposed Prospecting Activities to Additional Sites within the Study Area. This alternative entails the proposed prospecting activities being extended to other areas within the overall study area beside the already identified and assessed footprint areas.

Method of Assessing Impacts: The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

Determination of Environmental Risk: The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

C= (E+D+M+R)/4 x N

= (2+5+1+1)/4 X1

=9/4 X1

=2.25

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1:

Table 1: Criteria for determination of impact consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 2.

Table 2: Probability scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P = 2.25 1= 2.25

Impact Name	**Disturbance/Damage/Destruction of Palaeontological Resources**				
Alternative	**Alternative 2:** Proposed Prospecting Activities Limited to the Identified Footprints in the Study Area				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature	1	1	Magnitude	1	1
Extent	2	1	Reversibility	1	1
Duration	5	5	Probability	1	1
Environmental Risk (Pre-mitigation)					2.25
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					**2.25**
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					
Low: Issue not raised in public responses					

Cumulative Impacts	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cummulative change.	
Degree of potential irreplaceable loss of resources	1
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or subsitituted) of resources but the value (services and/or functions) of these resources is limited.	
Prioritisation Factor	
Final Significance	

Impact Name	**Disturbance/Damage/Destruction of Palaeontological Resources**				
Alternative	**Alternative 3:** Possible Expansion of Proposed Prospecting Activities to Additional Sites within the Study Area				
Environmental Risk					
Attribute	**Pre-mitigation**	**Post-mitigation**	**Attribute**	**Pre-mitigation**	**Post-mitigation**
Nature	1	1	Magnitude	1	1
Extent	2	1	Reversibility	1	1
Duration	5	5	Probability	1	1
Environmental Risk (Pre-mitigation)					2.25
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					2
Degree of confidence in impact prediction:					High
Impact Prioritisation					
Public Response					
Low: Issue not raised in public responses					
Cumulative Impacts					
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikley that the impact will result in spatial and temporal cummulative change.					
Degree of potential irreplaceable loss of resources					1
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or subsitituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					
Final Significance					

10 REFERENCES

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