Heritage Impact Assessment (Desktop) and Palaeontological Assessment (Walk-down) for a Prospecting Right Application on Portion 8, Portion 9, the Remaining Extent of Portion 10, and Portion 11 of the Farm Bruidegomskraal 179 IP near Ventersdorp, Northwest Province

ARCHAEOLOGICAL AND HERITAGE CHANCE FINDS PROCEDURE

Prepared by

Edward Matenga (Ph.D.)

March 2022

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ABBREVIATIONS

BGG	Burial Grounds and Graves unit of SAHRA
CPF	Chance Finds Procedure
ECO	Environmental Control Officer
ESA	Early Stone Age
LSA	Later Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act (No 25/1999)
SAPS	South African Police Services
SAHRA	South African Heritage Resources Agency

1. BACKGROUND

Arediremmogo (Pty) Ltd has applied for a mine prospecting right on Portion 8, Portion 9, the Remaining Extent of Portion 10, and Portion 11 of the Farm Bruidegomskraal 179 IP near Ventersdorp, Northwest Province. When the environmental and heritage approvals have been received prospecting operations will commence at which time the Archaeological and Heritage Chance Find Procedure (CPF) will be applied as a manual for the protection of unidentified heritage resources which may occur in the footprint of the proposed mining.

2. LEGAL FRAMEWORK

The National Heritage Resources Act is the principal law for the protection of heritage resources Act (No 25 / 1999) and for the application of the CPF attention is drawn to the following Sections:

- Section 3 on the definition and types of heritage resources
- Section 4 on the provisional protection of buildings more than 60 years old
- Section 35 on the protection of archaeological and palaeontological resources
- Section 36 on the protection of graves and human remains

3. HERITAGE SITES AND OBJECTS THAT MIGHT OCCUR IN AREA

The following site types/objects have been encountered in the broader region and are therefore flagged:

- Surface scatters or concentrations of stone tools of the ESA, MSA, LSA periods
- Substantial subsurface occurrences of stone tools
- Rock paintings and rock engravings (petroglyphs) (MSA to LSA period)
- Stone-walled settlements and stone settings of the Iron Age period
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

4. GENERAL

A principal aim of the CFP is to raise awareness of all personnel in the project regarding the prospect of finding archaeological resources that unseen during the Phase 1 scoping

heritage assessment and establish a protocol for the protection of these resources. The appointed Environmental Control Officer (ECO) and Site Manager keep copies of the CPF at the field offices. Training of field personnel on cultural heritage resources that might potentially be found on area should be provided.

5. PROCEDURE FOR ARCHAEOLOGICAL FINDS

If you discover what you suspect may be a possible archaeological site:

- Stop all work in the area to avoid damaging the site.
- Do not disturb any archaeological remains that you may encounter.
- The finds must be reported to ECO or Site Manager
- The finds must be reported to the heritage authority, i.e., SAHRA and/or the provincial heritage resources agency.
- The heritage authority will send a heritage specialist and /or ask the permit holder to appoint a heritage specialist to make a preliminary assessment of the findings.
- If the potential significance of the finds are deemed to warrant further action and they cannot be avoided, then then heritage specialist will submit a report advising SAHRA accordingly.
- SAHRA will determine the appropriate course of action.

6. PROCEDURE FOR GRAVES, BURIAL GROUNDS AND HUMAN REMAINS

If you discover what you suspect may be possible human remains:

- Stop all work in the area to avoid damaging the site.
- Do not disturb any possible human remains that you may encounter.
- The finds must be reported to ECO or Site Manager.
- The finds must be reported to the local area station of SAPS.
- The finds must be reported to the SAHRA Burial Grounds and Graves (BGG) Unit.
- The BGG Unit will send a heritage specialist and /or ask the permit holder to appoint a heritage specialist to make a preliminary assessment of the findings.
- If the graves/human remains cannot be avoided SAHRA will require that the human remains to be re-interred in a formal cemetery.

- Public participation to identify interested and affected parties (if any) will be undertaken in terms of NHRA Regulations 39, 41 and 41 in the Government Notice No R548 (year 2000).
- An application will be lodged to the BGG for the relocation of the human remains in terms of NHRA Regulations 34 in the Government Notice No R548 (year 2000).
- If the graves/ human remains must not be relocated, the BGG Unit may require that any damage done to the site is repaired and a 100m buffer zone is enforced around the site.

7. SAHRA CONTACT DETAILS

SAHRA Head Office	SAHRA Burial Grounds & Graves Unit
111 Harrington Street Cape Town, 8001 Email: info@sahra.org.zaTel: (021) 462 4502 Fax: (021) 462 4509	Office 101, 1st floor, Sancardia Mall, 541 Madiba Street Pretoria Tel: 012 320 8490/ 4965 Fax: +27 12 320 8486

Palaeontological Impact Assessment for the proposed Prospecting Right for Bruidegomskraal 179 IP, between Ventersdorp and Darby, North West Province

Desktop Study (Phase 1)

For

Archaeological and Heritage Services, Africa (Pty) Ltd

26 March 2023

Prof Marion Bamford
Palaeobotanist
P Bag 652, WITS 2050
Johannesburg, South Africa
Marion.bamford@wits.ac.za

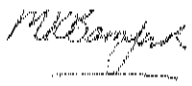
Expertise of Specialist

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf
Experience: 34 years research and lecturing in Palaeontology
26 years PIA studies and over 350 projects completed

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Archaeological and Heritage Services, Africa (Pty) Ltd, Pretoria, 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: 

Executive Summary

A Palaeontological Impact Assessment was requested for the Prospecting Right application for alluvial diamonds by means of test pits for portions of Farm Bruidegomskraal 179 IP and Droegpan 178 IP, between Venterspos and Derby, North West Province on behalf of Aredirommogo (Pty) Ltd.

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 site lies on the very highly sensitive rocks of the Malmani Subgroup that might preserve trace fossils such as stromatolites, oolites or microbial mats in the dolomites. NO FOSSILS were seen during the site visit and walk down in mid March 2023 (summer). 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, drilling or mining activities have commenced. Since the impact will be low, as far as the palaeontology is concerned, the prospecting right application should be authorised.

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1. Background

A Palaeontological Impact Assessment was requested for the Prospecting Right application (PRA) for alluvial diamonds by means of test pits for portions of Farm Bruidegomskraal 179 IP and Droegpan 178 IP, between Venterspos and Derby, North West Province on behalf of Arediromogo (Pty) Ltd (Figures 1-2).

The target area is Portion 8, Portion 9, Remaining Extent of Portion 10 and Portion 11 of Farm Bruidegomskraal 179 IP (Figures 2-3) and portions of Farm Droegpan 178 IP (Figure 4). The applicant is Arediremoggo (Pty) Ltd in terms of Regulation 2(2) of the MPRDA, Act 28 of 2002

A Palaeontological Impact Assessment was requested for the Bruidegomskraal PRA 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.

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).

	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,	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
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 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	March 2023 summer
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
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 5
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 4
k	Any mitigation measures for inclusion in the EMPr	Section 8, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 8, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 6
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 6, 8
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 Bruidegomskraal and Droegpan prospecting area, and the relative landmarks (towns). The project is shown by the red polygon.

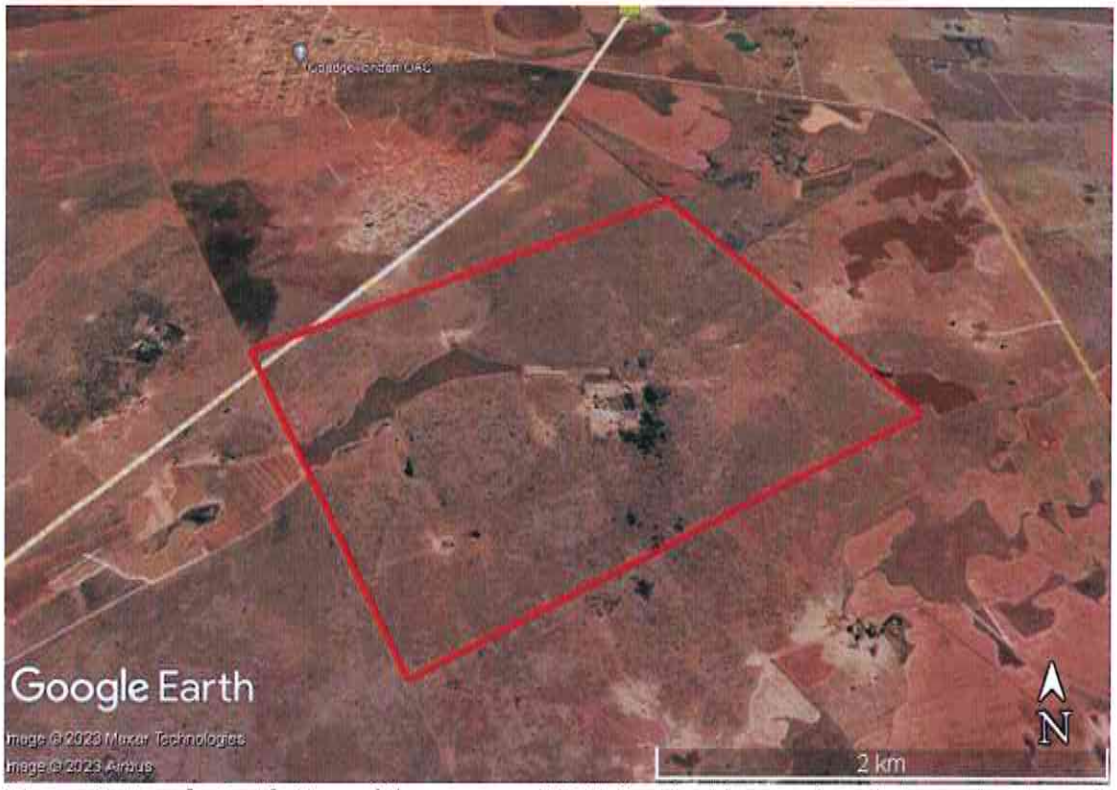


Figure 2: Google Earth Map of the proposed PRA for Bruidegomskraal shown by the red outline. Map supplied by EM.

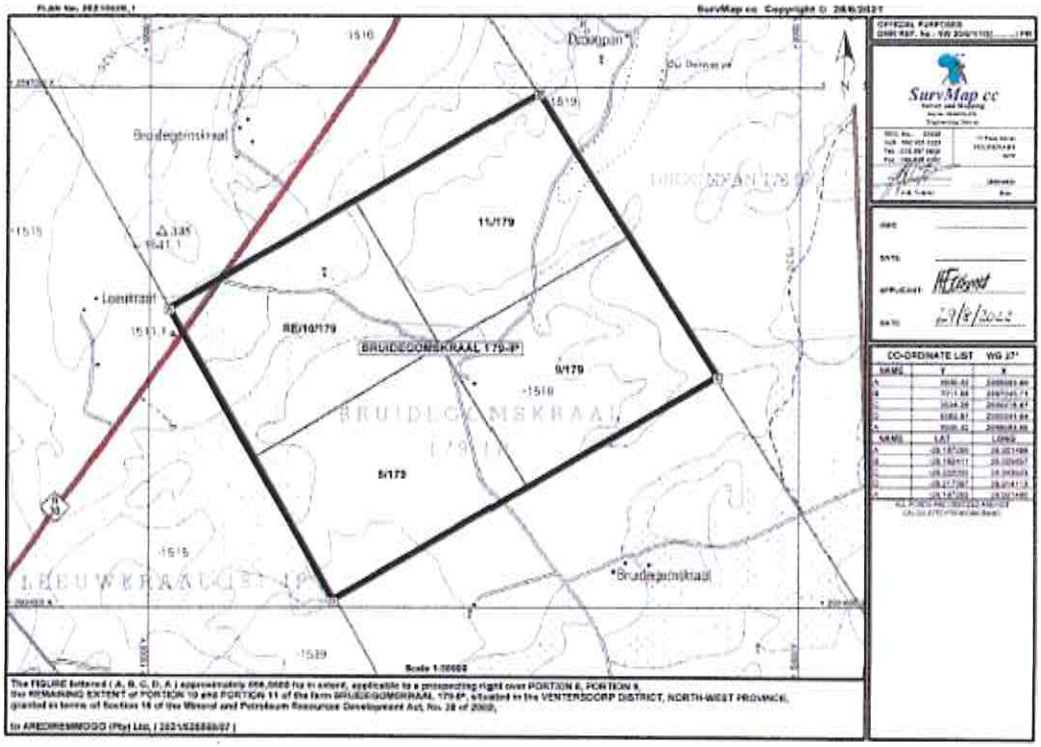


Figure 3: Topographic map for the Bruidekomskraal PRA area.

Figure 4: Google Earth map to show the Droegpan 178 IP prospecting area (red outline) and the Bruidegomskraal prospecting area (yellow polygon).

2. 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;
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*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' representivity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

3. Geology and Palaeontology

i. Project location and geological context

The project lies in the Transvaal Basin of the Transvaal Supergroup where the various formations of the Malmani Subgroup (Chuniespoort Group) are exposed. Much younger sands and alluvium occur in the river valleys, mostly of Quaternary age, but diamondiferous sands would be of Cretaceous to Tertiary age (De Wit, 1999).

GENERAL
The Late Archaean to early Proterozoic Transvaal Supergroup is preserved in three structural basins on the Kaapvaal Craton (Eriksson et al., 2006). In South Africa are the Transvaal and Griqualand West Basins, and the Kanye Basin is in southern Botswana. The Griqualand West Basin is divided into the Ghaap Plateau sub-basin and the Prieska sub-basin. Sediments in the lower parts of the basins are very similar but they differ somewhat higher up the sequences. Several tectonic events have greatly deformed the south western portion of the Griqualand West Basin between the two sub-basins

The Transvaal Supergroup comprises one of world's earliest carbonate platform successions (Beukes, 1987; Eriksson et al., 2006; Zeh et al., 2020). In some areas there are well preserved stromatolites that are evidence of the photosynthetic activity of blue green bacteria and green algae. These microbes formed colonies in warm, shallow seas.

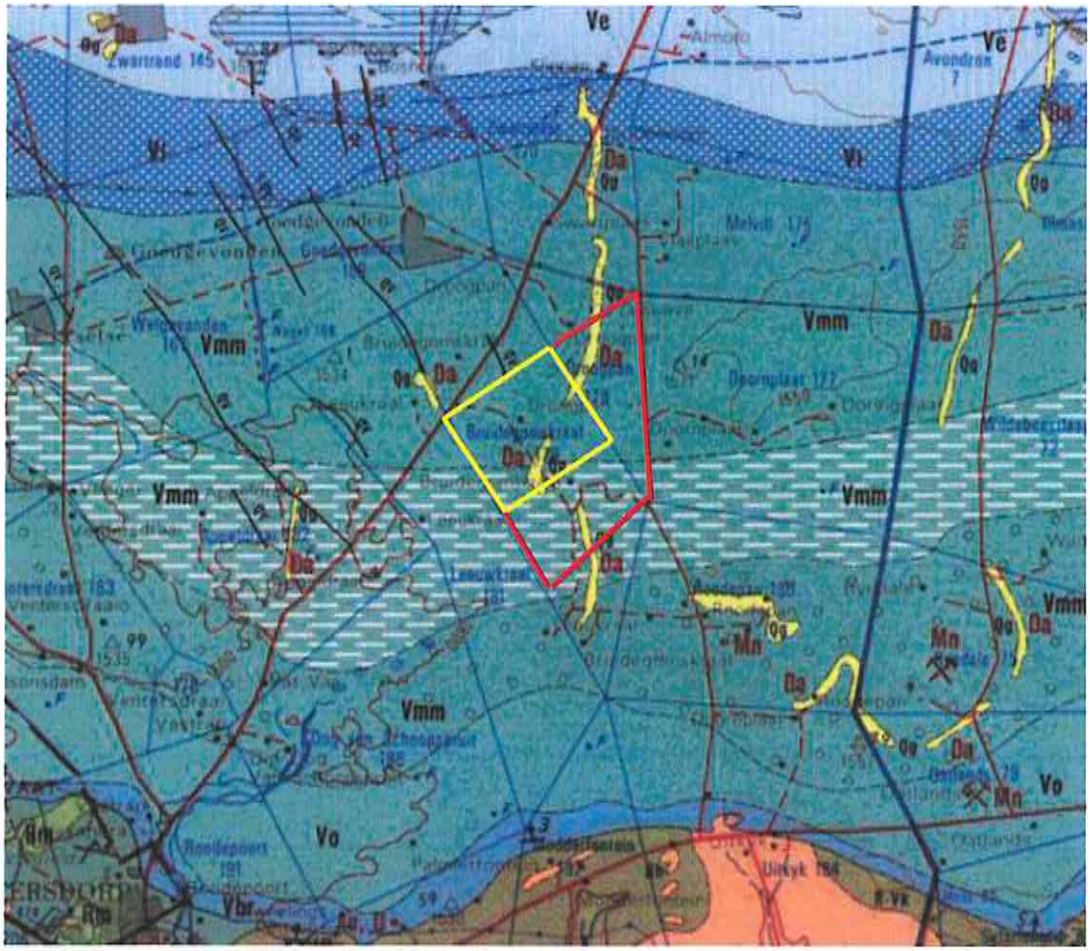


Figure 5: Geological map of the area around the Bruidegomskraal prospeting area (yellow polygon) and Droegpan prospecting area (red polygon). Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 2626 West Rand.

Table 2: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006. Johnson et al., 2006; Zeh et al., 2020). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Quaternary, ca 1.0 Ma to present
Vt	Timeball Hill Fm Pretoria Group, Transvaal SG	Shale, siltstone, conglomerate in places; dotted = Quartzite	Ca 2316 – 2266 Ma
Vf	Frisco Fm, Malmani Subgroup, Chuniespoort Group, Transvaal SG	Dark, chert-free dolomite, locally with tremolite; dots = stromatolitic; lines = shale; vert = tuff	Ca 2585 – 2480 Ma

Symbol	Group/Formation	Lithology	Approximate Age
Ve	Eccles Fm, Malmani Subgroup, Chuniespoort Group, Transvaal SG	Light banded dolomite and chert	Ca 2585 – 2480 Ma
Vl	Littleton Fm, Malmani Subgroup, Chuniespoort Group, Transvaal SG	Dark chert-poor dolomite	Ca 2585 – 2480 Ma
Vmm	Monte Christo Fm, Malmani Subgroup, Chuniespoort Group, Transvaal SG	Chert-rich dolomite; circles = oolitic	Ca 2585 – 2480 Ma
Vo	Oaktree Fm, Malmani Subgroup, Chuniespoort Group, Transvaal SG	Dark chert-free dolomite	Ca 2585 – 2480 Ma
Vbr	Black Reef Fm, Transvaal SG	Quartzite, conglomerate, shale	<2618 Ma

In the Transvaal Basin the Transvaal Supergroup is divided into two Groups, the lower Chuniespoort Group and the upper Pretoria Group (with ten formations; Eriksson et al., 2006). The Chuniespoort Group is divided into the basal Malmani Subgroup that comprises dolomites and limestones and is divided into five formations based on chert content, stromatolitic morphology, intercalated shales and erosion surfaces. The top of the Chuniespoort Group has the Penge Formation and the Duitschland Formation, followed by the lower Pretoria Group that includes the Timeball Hill Formation.

The Transvaal sequence has been interpreted as three major cycles of basin infill and tectonic activity with the first deep basin sediments forming the Chuniespoort Group, the second cycle deposited the lower Pretoria Group, and the sediments in this area are from the interim lowstand that preceded the third cycle. These sediments were deposited in shallow lacustrine, alluvial fan and braided stream environments (Eriksson et al., 2012).

The **Malmani Subgroup** is up to 2000m thick and has been divided into five formations based on the composition of cherts, stromatolites, limestones and shales. At the base, overlying the Black Reef Formation, is the base is the **Oaktree Formation** that represents a transition from siliciclastic sedimentation to platform carbonates (Eriksson et al., 2006). It is composed of carbonaceous shales, stromatolitic dolomites and locally developed quartzites. Next is the **Monte Christo Formation** that has an erosive breccia base and continues with stromatolitic and oolitic platformal dolomites. Above that is the **Lyttleton Formation** that is composed of shales, quartzites and stromatolitic dolomites. The overlying **Eccles Formation** includes a series of erosion breccias that locally contain gold deposits. This mineralisation has been attributed to hydrothermal remobilisation of fluids by the Bushveld complex (Eriksson et al., 2006). The topmost formation is the **Frisco Formation** that is composed mainly of stromatolitic dolomites but these become more shale rich towards the top of the sequence because of the deepening depositional environment.

QUATERNARY

There were two large basins dominating southern Africa during the Cenozoic, with the Kalahari Basin to the west and the Bushveld basin to the east. Both basins are bounded

along their southern extent by the more or less west-east trending Griqualand-Transvaal Axis (Partridge et al., 2006). These sediments are not easy to date but recent attempts are gradually filling in the history of the sands, sand dunes and inter-dunes (Botha, 2021).

Quaternary Kalahari sands cover large parts of the rocks in this region, especially to the west. This is the largest and most extensive palaeo-erg in the world (Partridge et al., 2006) and is composed of extensive aeolian and fluvial sands, sand dunes, calcrete, scree and colluvium. Periods of aridity have overprinted the sands, and calcrete and silcrete are common. Most geological maps indicate these sands simply descriptively (aeolian sand, gravelly sand, calcrete) or they are lumped together as the Gordonia Formation because the detailed regional lithostratigraphic work has not been done, Nonetheless, these sands have eroded from the interior and have been transported by wind or water to fill the basin. Reworking of the sands or stabilisation by vegetation has occurred. Probable ages of dune formation are around 100 kya (thousand years), 60 kya, 27-23 kya and 17-10 kya (in Botha, 2021).

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 6. The site for development is in the Monte Christo Formation that is chert-rich dolomite in the central band (horizontal hatching) and has interbedded oolitic chert to the north and south of the central band (Figure 5).

The Transvaal Supergroup sequence of sedimentary and volcanic rocks has been interpreted as having undergone three cycles of tectonically controlled basin subsidence and infilling with clastic deposits from the west and northwest. The first cycle (Chuniespoort Group) was a shallow seaway in a marine environment where the carbonate platform (Malmani Subgroup) was deposited and has a variety of limestones and dolomite (Erikson et al., 2012). The different lithofacies represent different depths of formation of carbonates, for example, intertidal zone, high energy zone and shallow subtidal deposits are limestone and dolomite, with flat domes and columnar stromatolites being formed in the intertidal zone. In the high energy zone oolites, oncolites and ripples were formed, while in the deep tidal zone elongated stromatolitic mounds were formed (Truswell and Eriksson, 1973; Eriksson and Altermann, 1998).

Stromatolites are the trace fossils that were formed by colonies of green algae and blue-green algae (Cyanobacteria) that grew in warm, shallow marine settings. These algae were responsible for releasing oxygen via the photosynthetic process where atmospheric carbon dioxide and water, using energy from the sun, are converted into carbon chains and compounds that are the building blocks of all living organisms. The released carbon dioxide initially was taken up by the abundant reducing minerals to form oxides, e.g. iron oxide. Eventually free oxygen was released into the atmosphere and some was converted into ozone by the bombardment of cosmic rays. The ozone is critical for the filtering out of harmful ultraviolet rays.

Stromatolites are the layers upon layers of inorganic materials that were deposited during photosynthesis, namely calcium carbonate, magnesium carbonate, calcium

sulphate and magnesium sulphate. These layers can be in the form of flat layers, domes or columns depending on the environment where they grew (Beukes, 1987). Some environments did not form stromatolites, just layers of limestone that later was converted to dolomite. The algae that formed the stromatolites are very rarely preserved, and they are microscopic so they can only be seen from thin sections studies under a petrographic microscope.

Microbialites (sensu Burne and Moore, 1987) are organo-sedimentary deposits formed from interaction between benthic microbial communities (BMCs) and detrital or chemical sediments. In addition, microbialites contrast with other biological sediments in that they are generally not composed of skeletal remains. Archean carbonates mostly consist of stromatolites. These platforms could have been the site of early O2 production on our planet. Stromatolites are the laminated, organo-sedimentary, non-skeletal products of microbial communities, which may have included cyanobacteria, the first photosynthetic organisms to produce oxygen. Another type of trace fossil has been termed Microbially-induced sedimentary structures (MISS sensu Noffke et al., 2001) or simply 'fossil mats' (sensu Tice et al., 2011). These include swirls, rip-ups, crinkled surfaces and wrinkles that were formed by the mucus extruded by littoral algae or microbes and bound together sand particles. Davies et al. (2016) caution against the assumption that all such structures are microbially induced unless there is additional evidence for microbes in the palaeoenvironment.

Nonetheless, stromatolites, oolites and microbialites are accepted as trace fossils of algal colonies. MISS could be microbially or abiotically formed. The oldest stromatolites have been recorded from the Barberton Supergroup that was deposited between 3.55 to ca. 3.20 Ga, and stromatolites still form today in warm, shallow seas (Homan, 2019).

Aeolian sands and alluvium are fairly mobile and very porous so they not provide suitable conditions for preservation of organic matter (Cowan, 1995). Only in places where the sands have been waterlogged, such as palaeo-pans or palaeo-springs, is there any chance of fossilisation. For example, roots can be encased in calcium-rich or silica-rich sands and crusts, known as rhizoliths or rhizocretions, can form around the roots, invertebrates or bones around the margin of a pond, pan or spring (Klappa, 1980; Cramer and Hawkins, 2009; Peters et al., 2022).

Figure 6: SAHRIS palaeosensitivity map for the site for the proposed Bruidegomskraal prospecting area (yellow rectangle) and Droegpan prospecting area (blue polygon). Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

From the SAHRIS map above the whole area is indicated as very highly sensitive (red) so a site visit and walk down are required to check for the presence of trace fossils.

iii. Site visit observations

The site was visited in mid March 2023 (summer) but because the soils are thin and the vegetation is fairly sparse, visibility of the ground was good (Figures 8-22). Currently the land is used for grazing for wild animals but may have been cleared some while ago for agriculture because there are piles of surface rocks and pebbles in some parts of the farm. Old diamond workings are also visible.

Outcrops of quartzite and chert were abundant. Only one exposure of dolomite was seen and this did not have stromatolites or oolites in it (Figure 20a, b). NO FOSSILS were seen in the project area.

Figures 7-8: Site visit photographs for Bruidegomskraal PRA. General view to show low grassland and a few scattered quartzite rocks. 8 – Quartzite and chert rocks.

8

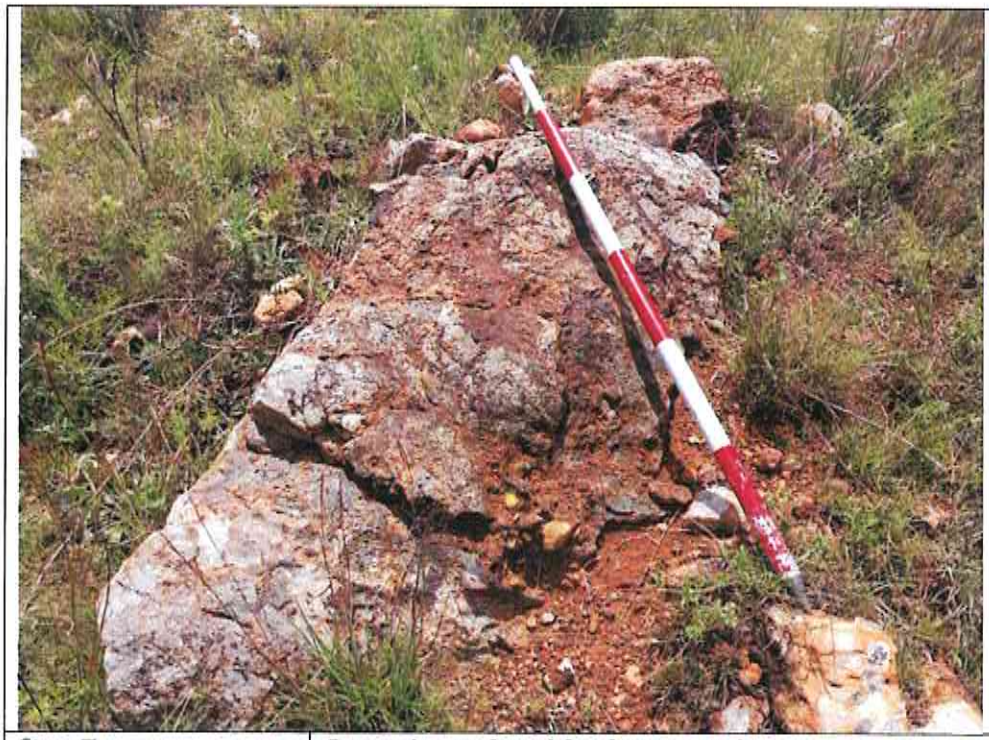
		
Stop 1 **26°13'23.26"S** **26°56'59.42"E**	**On the edge of an old mine working. Exposed rocks with a brown stain – chert and quartzite.**	**9**
		
Stop 2 **26°12'10.50"S** **26°55'52.91"E**	**Surface flint-like rocks. This is chert that formed in deepwaters and may have laminae but not visible with the naked eye.**	**10**

Stop 3 **26°12'44.46"S** **26°55'53.78"E**	**Discard stone stockpile and evidence of old mine workings in the vicinity**	**11**

12a

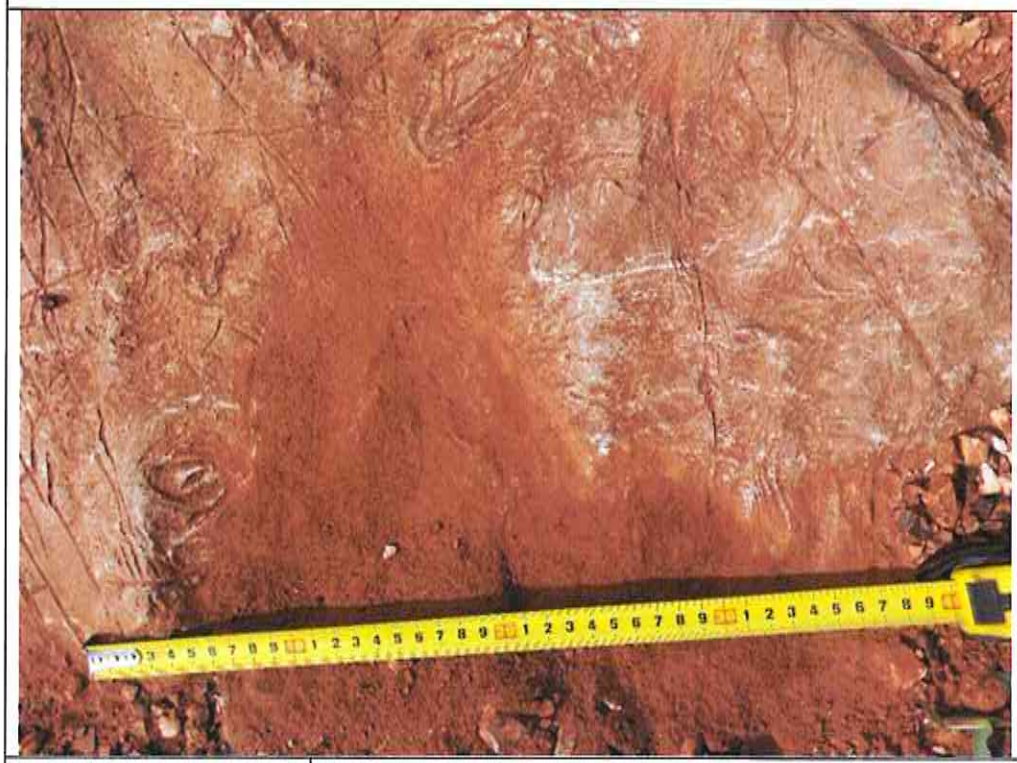
		12b
Stop 4 **26°12'8.50"S** **26°55'39.30"E**	**Discard rock stockpile and evidence of old mine workings in the vicinity**	**12** **a, b**
		13
Stop 5 **26°12'28.24"S** **26°56'19.59"E**	**Quartzite outcrop**	13

		14a
		14b
Stop 6 **26°12'46.89"S** **26°56'23.51"E**	**Quartzite rocks with a brown stain. Some sections look more like chert. Cannot see microbialites with the naked eye on weathered surfaces.**	**14a, b**

		15
Stop 7 **26°11'15.73"S** **26°56'41.76"E**	**Quartzite rocks with a brown stain**	**15**
		
Stop 8 **26°12'14.28"S** **26°56'51.55"E**	**Quartzite rock with a colony of green lichens**	**16**

		17a
		17b
Stop 9 **26°13'13.49"S** **26°55'26.02"E**	**Natural exposures of quartzite rocks. No dolomite and no stromatolites.**	**17a, b**

		18
Stop 10 **26°13'4.73"S** **26°55'3.71"E**	**A line of quartzite boulders**	**18**
		19
Stop 11 **26°12'51.84"S** **26°55'23.80"E**	**Discard stockpile of stones with a brown stain, and no evidence of old mine workings in the vicinity**	**19**

		20a
		20b
Stop 12 **26°11'43.60"S** **26°54'21.20"E**	**Dolomite outcrop. A close-up photo shows a variety of impressions, 'elephant skin' but no stromatolites.**	**20a, b**

		21a
		21b
Stop 13 **26°13'33.03"S** **26°56'15.12"E**	**Natural exposures of quartzite rocks. When broken open looks like a conglomerate. No fossils.**	**21a, b**

		22
Stop 14 **26°11'18.70"S** **26°56'2.80"E**	**Profile of a long prospecting trench shows wavy strata of white rocks. This is probably from an ancient river channel and the stones are imbricated (aligned in the direction of the current). No dolomite or stromatolites were seen in the profile.**	**22**

4. 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	-
	L	Soils do not preserve fossils; so far there are no records from the Quaternary sands or the Monte Christo Fm of trace fossils that is known to be chert rich 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 trace fossils of stromatolites or microbialites in the dolomites, 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 cherts and quartzite that are abundant. 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 the wrong kind to contain fossils. Furthermore, the material to be prospected for diamonds are the ancient river gravels and sands and this does not preserve in situ fossils. Since there is an extremely small chance that fossils from the Malmani Subgroup 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 extremely low.

5. 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 contain trace fossils. The soils and sands of the Quaternary period would not preserve fossils.

6. 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 and sands of the Quaternary. From the site visit and walkdown in mid March 2023, NO FOSSILS were seen. There was abundant chert and quartz but only one outcrop of dolomite. No stromatolites or oolites were visible in the dolomite.

There is a very small chance that fossils may occur below ground in dolomites of the Malmani Subgroup, so a Fossil Chance Find Protocol should be added to the EMPr. Note – dolomites are not the target for prospecting; ancient fluvial channels with sands, gravels and diamonds are the target of this project. Nonetheless, if fossils are found by the contractor, environmental officer or other responsible person, once trenching and 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, so as far as the palaeontological heritage is concerned, the prospecting application should be granted.

7. References

Beukes, N.J., 1987. Facies relations, depositional environments and diagenesis in a major early Proterozoic stromatolitic carbonate platform to basinal sequence, Campbellrand Subgroup, Transvaal Supergroup, southern Africa. Sedimentary Geology 54, 1-46.

Beukes, N.J., 1980. Stratigrafie en lithofacies van die Campbellrand-Subgroep van die Proterofitiese Ghaap-Groep, Noordkaapland. Transactions of the Geological Society of South Africa 83, 141-170.

Bosch, P., Eriksson, P., 2008. A note on two occurrences of inferred microbial mat features preserved in the c. 2.1 Ga Magaliesberg Formation (Pretoria Group, Transvaal Supergroup) sandstones, near Pretoria, South Africa. South African Journal of Geology 111, 251-262.

Button, A., 1976. Iron formation as an end member in carbonate sedimentary cycles in the Transvaal Supergroup, South Africa. Economic Geology 71, 193-201.

Burne, R.V., Moore, L.S., 1987. Microbialites; organosedimentary deposits of benthic microbial communities. Palaios 2(3), 241-254.

Cramer, M.D., Hawkins, H.-J., 2009. A physiological mechanism for the formation of root casts. Palaeogeography, Palaeoclimatology, Palaeoecology 274, 125-133.

Cowan, R., 1995. History of Life. 2nd Edition. Blackwell Scientific Publications, Boston. 462pp.

Davies, N.S., Liu, A.G., Gibling, M.R., Miller, R.F., 2016. Resolving MISS conceptions and misconceptions: A geological approach to sedimentary surface textures generated by microbial and abiotic processes Earth-Science Reviews 154, 210–246.

Eriksson, P.G., Altermann, W., 1998. Eriksson, An overview of the geology of the Transvaal Supergroup dolomites (South Africa). Environmental Geology 36, 178-188.

Eriksson, P.G., Altermann, W., Hartzer, F.J., 2006. The Transvaal Supergroup and its precursors. 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 237-260.

Eriksson, P.G., Bartman, R., Catuneanu, O., Mazumder, R., Lenhardt, N., 2012. A case study of microbial mats-related features in coastal epeiric sandstones from the Palaeoproterozoic Pretoria Group, Transvaal Supergroup, Kaapvaal craton, South Africa; the effect of preservation (reflecting sequence stratigraphic models) on the relationship between mat features and inferred palaeoenvironment. Sedimentary Geology 263, 67-75.

Homann, M., 2019. Earliest life on Earth: Evidence from the Barberton Greenstone Belt, South Africa. Earth Science Reviews 196, 102888.

Noffke, N., Gerdes, G., Klenke, T. and Krumbein, W.E. (2001). Microbially induced sedimentary structures – a new category within the classification of primary sedimentary structures. Journal of Sedimentary Research, A71, 649-656.

Klappa, C.F., 1980. Rhizoliths in terrestrial carbonates: classification, recognition, genesis and significance. Sedimentology 27, 613-629.

Parizot, M., Eriksson, P.G., Aifa, T., Sarkar, S., Banerjee, S., Catuneanu, O., Altermann, W., Bumby, A.J., Bordy, E.M., Rooy, J.L. and Boshoff, A.J. (2005). Suspected microbial mat-

related crack-like sedimentary structures in the Palaeoproterozoic Magaliesberg Formation sandstones, South Africa. Precambrian Research, 138, 274-296.

Peters, C.R., Bamford, M.K., Shields, J.P., 2022. Ch 33. Lower Bed II Olduvai Basin, Tanzania: Wetland Sedge Taphonomy, Seasonal Pasture, and Implications for Hominin Scavenging. In Reynolds, SC., Bobe, R., (Eds). African Paleoecology and Human Evolution, Cambridge University Press & Assessment. 413-434.

Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.

Schröder, S., Beukes, N.J., Armstrong, R.A., 2016. Detrital zircon constraints on the tectonostratigraphy of the Paleoproterozoic Pretoria Group, South Africa. Precambrian Research 278, 362 – 393.

Sumner, D.Y., Beukes, N.J., 2006. Sequence stratigraphic development of the Neoarchean Transvaal carbonate platform, Kaapvaal Craton, South Africa. South African Journal of Geology 109, 11–22.

Tice, M.M., Thornton, D.C.O., Pope, M.C., Olszewski, T.D., Gong, J., 2011. Archean microbial mat communities. Annual Review of Earth and Planetary Sciences 39, 297–319.

Truswell, J.F., Eriksson, K.A., 1973. Stromatolitic associations and their palaeo-environmental significance: a reappraisal of a lower Proterozoic locality from the northern Cape Province, South Africa. Sedimentary Geology 10, 1–23.

Walraven, F., Martini, J., 1995. Zircon-Pb evaporation age determinations of the Oaktree Formation, Chuniespoort Group, Transvaal Sequence: implications for Transvaal-Griqualand West basin correlations. South African journal of Geology 98, 58-67.

Zeh, A., Wilson, A.H., Gerdes, A., 2020. Zircon U-Pb-Hf isotope systematics of Transvaal Supergroup – Constraints for the geodynamic evolution of the Kaapvaal Craton and its hinterland between 2.65 and 2.06 Ga. Precambrian Research 345, 105760. https://doi.org/10.1016/j.precamres.2020.105760

8. Chance Find Protocol

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

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
2. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace

fossils, plants, insects, bone or coal) 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 trace fossils such as stromatolites or microbially features (trails, curls, rip-ups, mudcracks) trace fossils in the dolomites, limestones, shales and mudstones (for example see Figure 23-24). 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/miners 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 vertebrates 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 a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA 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 SAHRA 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.

9. Appendix A – Examples of fossils from the Malmani Subgroup

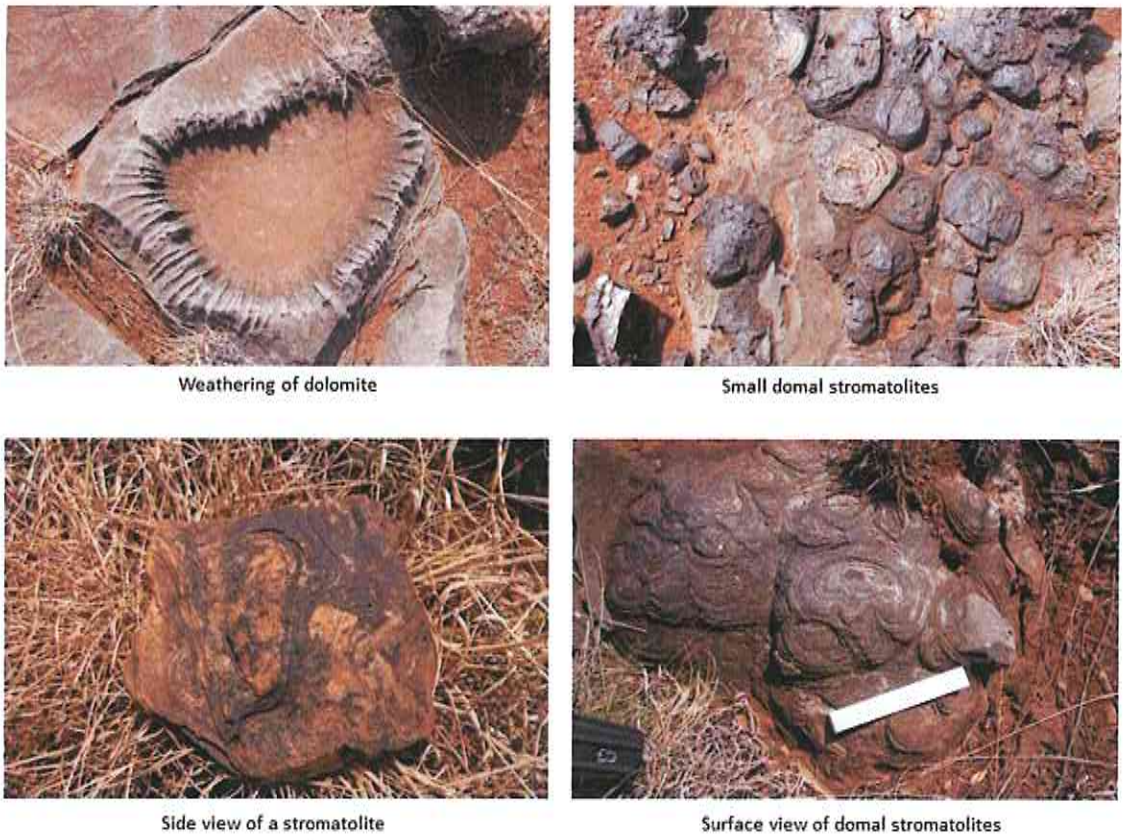
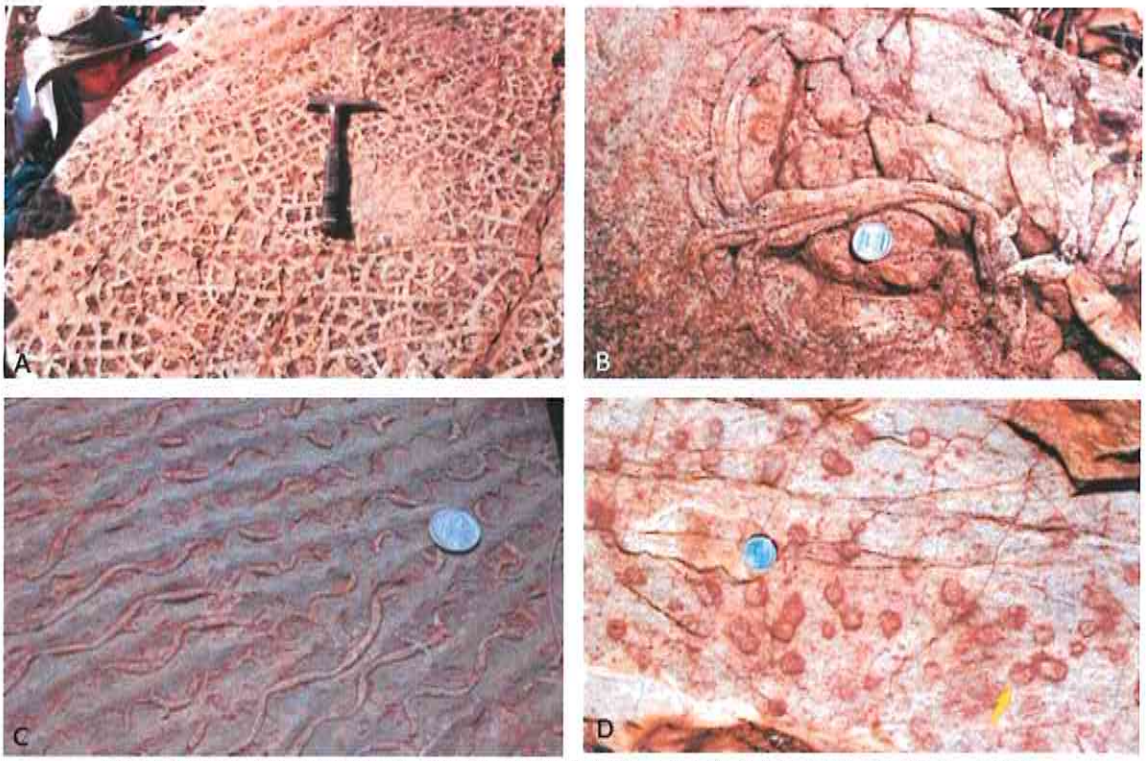


Figure 23: Photographs from the Malmani Subgroup of different types of stromatolites in dolomite.



Magaliesberg Fm trace fossils, near Pretoria (all from Bosch & Eriksson, 2008): A – cracks,. B – sinuous structure, C – *Manchuriphycus*, D – circular structures. R1 coin for scale.

Figure 24: Photographs of microbial features from the Magaliesberg Formation (in Bosch and Eriksson, 2008).

10. Appendix B – Details of specialist

Curriculum vitae (short) - Marion Bamford PhD
January 2023

Present employment:		Professor; Director of the Evolutionary Studies Institute. Member Management Committee of the NRF/DSI Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa
Telephone	:	+27 11 717 6690
Cell	:	082 555 6937
E-mail	:	marion.bamford@wits.ac.za ; marionbamford12@gmail.com

ii) **Academic qualifications**
Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.

1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.

iii) **Professional qualifications**
Wood Anatomy Training (overseas as nothing was available in South Africa):
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) **Membership of professional bodies/associations**
Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+
Botanical Society of South Africa
South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative
ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

v) **Supervision of Higher Degrees**

All at Wits University

Degree	Graduated/completed	Current
Honours	13	0
Masters	13	3
PhD	13	7
Postdoctoral fellows	14	4

vi) **Undergraduate teaching**
Geology II – Palaeobotany GEOL2008 – average 65 students per year
Biology III – Palaeobotany APES3029 – average 25 students per year
Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology; Micropalaeontology – average 12 - 20 students per year.

vii) **Editing and reviewing**
Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor
Guest Editor: Quaternary International: 2005 volume
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –
Associate Editor: Cretaceous Research: 2018-2020
Associate Editor: Royal Society Open: 2021 -
Review of manuscripts for ISI-listed journals: 30 local and international journals

viii) **Palaeontological Impact Assessments**

25 years' experience in PIA site and desktop projects

- Selected from recent projects only – list not complete:
- Skeerpoort Farm Mast 2020 for HCAC
- Vulindlela Eco village 2020 for 1World
- KwaZamakhule Township 2020 for Kudzala
- Sunset Copper 2020 for Digby Wells
- McCarthy-Salene 2020 for Prescali
- VLNR Lodge 2020 for HCAC
- Madadeni mixed use 2020 for Enviropro
- Frankfort-Windfield Eskom Powerline 2020 for 1World
- Beaufort West PV Facility 2021 for ACO Associates
- Copper Sunset MR 2021 for Digby Wells
- Sannaspos PV facility 2021 for CTS Heritage
- Smithfield-Rouxville-Zastron PL 2021 for TheroServe
- Glosam Mine 2022 for AHSA
- Wolf-Skilpad-Grassridge OHPL 2022 for Zutari
- Iziduli and Msenge WEFs 2022 for CTS Heritage
- Hendrina North and South WEFs & SEFs 2022 for Cabanga
- Dealesville-Springhaas SEFs 2022 for GIBB Environmental
- Vhuvhili and Mukondeleli SEFs 2022 for CSIR
- Chemwes & Stilfontein SEFs 2022 for CTS Heritage
- Equestria Exts housing 2022 for Beyond Heritage
- Zeerust Salene boreholes 2022 for Prescali
- Tsakane Sewer upgrade 2022 for Tsimba
- Transnet MPP inland and coastal 2022 for ENVASS
- Ruighoek PRA 2022 for SLR Consulting (Africa)
- Namli MRA Steinkopf 2022 for Beyond Heritage

ix) **Research Output**

Publications by M K Bamford up to January 2022 peer-reviewed journals or scholarly books: over 170 articles published; 5 submitted/in press; 14 book chapters.
Scopus h-index = 30; Google Scholar h-index = 39; -i10-index = 116 based on 6568 citations.
Conferences: numerous presentations at local and international conferences.

Heritage Impact Assessment (Desktop) and Palaeontological Assessment (Walk-down) for a Prospecting Right Application on Portion 8, Portion 9, the Remaining Extent of Portion 10, and Portion 11 of the Farm Bruidegomskraal 179 IP near Ventersdorp, Northwest Province

Prepared by

Edward Matenga

(Ph.D. Archaeology &Heritage, MPhil, Archaeology; Uppsala/Sweden)

Tuesday, 28 March 2023

(AHSA) Archaeological and Heritage Services Africa (Pty) Ltd

Reg. No. 2016/281687/07

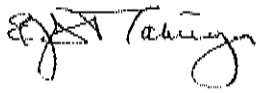
P O Box 2702, The Reeds, 0158, Centurion, Pretoria

Email: e.matenga598@gmail.com.

Cell: +27 73 981 0637

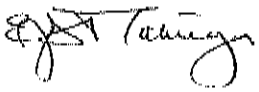
Website: www.archaeologicalheritage.co.za

APPLICANT	ENVIRONMENTAL CONSULTANT
Arediremmogo (Pty) Ltd	DERA Omgewingskonsultante (Pty) Ltd.

	Name	Signature	Date
FIELD WORK & REPORT	E. Matenga		27 March 2023

DECLARATION OF INDEPENDENCE

AHSA Pty Ltd is an independent consultancy: We hereby declare that I have no interest, be it business, financial, personal, or other vested interest in the undertaking of the proposed activity, other than remuneration for work performed in terms of the National Heritage Resources Act (No 25 of 1999).



Full Name: Edward J. Matenga

Title / Position: Heritage Management Consultant

Qualifications: Ph.D. (Archaeology & Heritage, Uppsala University, Sweden), MPhil (Uppsala), Certificate in the Integrated Conservation of Territories and Landscapes of Heritage Value (ICCROM, Rome)

EXECUTIVE SUMMARY

1. A desktop Heritage Impact Assessment (HIA) has been prepared in support of a Mine Prospecting Right Application on Portion 8, Portion 9, the Remaining Extent of Portion 10, and Portion 11 of the Farm Bruidegomskraal 179 IP near Ventersdorp in the Northwest Province. The report fulfills a statutory requirement in terms of Section 38(8) of the National Heritage Resources Act (No 25/1999) to protect heritage resources where a development project is likely to cause damage or destruction. In-depth literature was undertaken to provide data on the potential heritage sensitivity of the area.

2. *General observations*

   The Northwest Province abounds with stone-walled settlements which attest to an established stone-building tradition possibly dating from the 17th century. The stone walls are thus of a Later Stone Age date, normally associated with hills. A culutral landscape associated with modern commercial farming from the 19th century typically features a farmstead with tree plantings and historic buildings as focal points on each property. The principal dwellings occupied by the farm owner tend to be of superior architectural quality compared to the outbuildings. Stone Age Sites tend to be sparsely distributed in comparison to densities that have been encountered further to the west in the Northern Cape Province.

3. *Other heritage resources that may occur in the broader area*

   The following site types/objects have been encountered in the broader region and are therefore flagged:

   - Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
   - Rock Paintings from the Middle Stone Age to Later Stone Age periods
   - Buildings and objects associated with modern commercial farming from the 19th century
   - Graves, burial grounds and human bones.

4. *Postulated heritage sensitivity of the study area*

   Studies undertaken in the broader area provide a good theoretical foundation from which to extrapolate the more likely scenarios on the farms under study.

5. The Table below provides a summary of the probability of the occurrence of different typologies of heritage and a confidence rating of the predictions:

	HERITAGE TYPOLOGY	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1	MSA/LSA	80%	High
2	Rock engravings	60%	High
3	Rock paintings	5%	High
4	Early Iron Age / Later Iron Age	50%	High
5	Burial grounds	60%	Medium
6	Farm buildings and structures	75%	High

6. The ranking system in the Table below is adapted from Guidelines for Involving Heritage Specialists in EIA processes by Winter S and & N. Baumann (2005, p19). The probability of occurrence of different grades of sites confirms the view that no finds in the study area are likely to warrant further action apart from the documentation.

GRADE	RANKING	SIGNIFICANCE	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1a	National	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources,	0%	High
1b	Burial grounds	Graves are sacred and their treatment is a sensitive issue.	60%	High
2	Provincial	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential 2 heritage resources	0%	High
3A	Local	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 3A heritage resources	5%	Medium
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources	5%	High
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources	99,99%	High

7. *Chance Finds Procedure*

   A heritage Chance Finds Procedure has been prepared to curate heritage resources found during the prospecting activities.

8. *Conclusion and Recommendations*

   In light of the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

TABLE OF CONTENTS

ABBREVIATIONS

CPF	Chance Finds Procedure
EIA	Environmental Impact Assessment
ESA	Early Stone Age
HIA	Heritage Impact Assessment
LSA	Late Stone Age
LIA	Later Iron Age
PHRA	Provincial Heritage Resources Authority
MSA	Middle Stone Age
NEMA	National Environmental Management Act.
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

1. INTRODUCTION

A desktop Heritage Impact Assessment (HIA) report has been requested in support of a mine prospecting right application on Portion 8, Portion 9, the Remaining Extent of Portion 10, and Portion 11 of the Farm Bruidegomskraal 179 IP near Ventersdorp in the Northwest Province. The report fulfills a statutory requirement in terms of Section 38(8) of the National Heritage Resources Act (No 25/1999) to protect heritage resources where a development project is likely to cause damage or destruction. An in-depth literature survey has been undertaken to provide data on the potential heritage sensitivity of the area.

Figure 1: Google Earth map shows the location of the farm Bruidegomskraal 179 IP near northwest of Ventersdorp

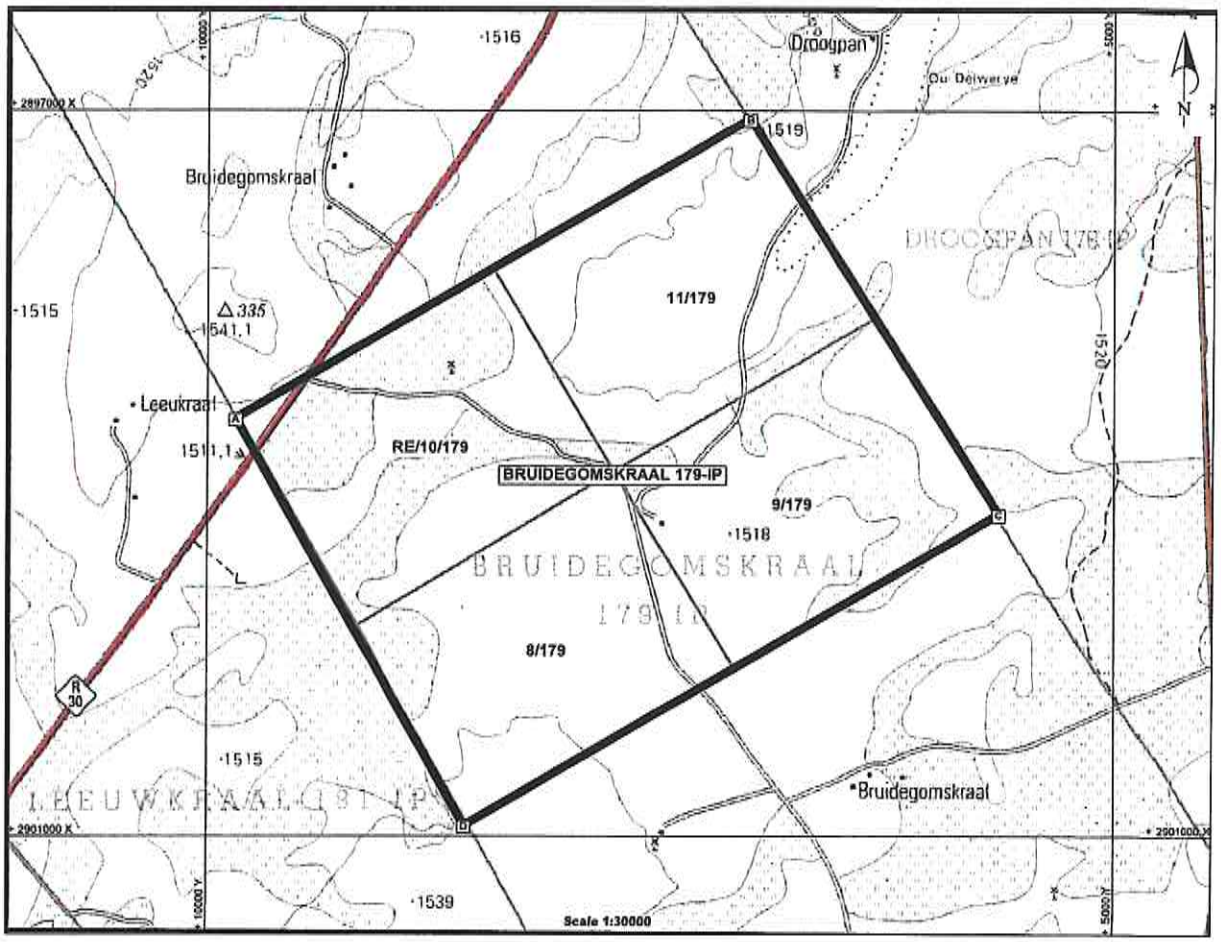


Figure 2: Standard Map showing the location of the farm Bruidegomskraal 179 IP

Prospecting for minerals entail the following activities:

- Open excavations and trenches;
- Test pits;
- Drilling;
- Opening of temporary service roads; and
- Location of processing plant.

These activities have potential detrimental impacts on heritage resources if they exist in the footprint of the proposed exploration.

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The farm Bruidegomskraal 179 IP lies 15 km northwest of Ventersdop. The high veld terrain on the property and extending to the broader area is generally flat occasionally interrupted by gentle slope depressions occupied by wetlands. This is a grassy plain which provides

excellent pasture for cattle and horses. The farm however is a diverse enterprise also producing chickens, and growing sunflowers and maize.

3. LEGAL FRAMEWORK

This study fulfils an onus on developers to safeguard heritage resources. This obligation is legislated with Sections 34, 35, 36 and 38 of the National Heritage Resources Act (No 25 of 1999) forming the legal framework in which this HIA report has been prepared.

3.1. Section 38 of National Heritage Resources Act on Heritage Impact Assessments

Section 38 of the NHRA states the nature and scale of development which triggers a HIA:

38. *(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—*

(a) the construction of a road, wall, powerline, 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 50 m in length;

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

(i) exceeding 5 000 m^2 in extent[1]; 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 or a provincial heritage resources authority;

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

(e) any other category of development provided for in the 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.

[1] Areal extent of the proposed development triggers the HIA.

3.2. Definition of heritage (National Estate)

Section 3 lists a wide range of cultural phenomena which could be defined as heritage, or the *National Estate* (3(2)). Section 3(3) outlines criteria upon which heritage value is ascribed. This Section is useful as a field checklist for the identification of heritage resources.

3.3. Protection of buildings and structures older than 60 years

Section 34 provides automatic protection for buildings and structures more than 60 years old until it can be proven that they do not have heritage value:

(1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

3.4. Protection of archaeological sites

Section 35 (4) of the NHRA prohibits the destruction of archaeological, palaeontological and meteorite sites:

No person may, without a permit issued by the responsible heritage resources authority—
(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
(c) 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
(d) 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.

3.5. Graves and burial grounds

Section 36 of the NHRA provides for the protection of certain graves and burial grounds. Graves are generally classified under the following categories:

- Graves younger than 60 years;
- Graves older than 60 years, but younger than 100 years;
- Graves older than 100 years; and

- Graves of victims of conflict
- Graves of individuals of royal descent
- Graves that have been specified as important by the Ministers of Arts and Culture.

Further to the legal prescripts, we are mindful of the fact that graves and burial grounds are held sacred whether they are protected by the law or not.

3.6. The National Environmental Management Act (No 107 of 1998)

The Act regards heritage as being a component of the environment. It states that a survey and evaluation of cultural resources must be done in areas where development projects that will affect the environment will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management is a much broader undertaking to cater for cultural and social needs of people. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

3.7. The Burra Charter on Conservation of Places of Cultural Significance

Generic principles and standards for the protection of heritage resources in South Africa are drawn from international charters and conventions. In particular South Africa has adopted the **ICOMOS Australia Charter for the Conservation of Places of Cultural Significance (the Burra Charter 1999)** as a benchmark for best practice in heritage management.

4. APPROACH AND METHODOLOGY

4.1. Literature study

This study is based on an intensive search through existing literature for data on the heritage sensitivity of the broader area around Ventersdorp. Heritage Impact Assessment studies conducted in the area are the principal source of information. These reports have been carefully selected considering factors such as distance from the target of the present study. Using this information the potential yield of the target area could be reasonably predicted by extrapolation. Extrapolation is a scientific method of building a hypothesis by estimating or predicting results by assuming that what is known and has been established

about a particular situation is likely to apply more or less for a neighbouring area/quantity that is unknown.

AUTHOR	YEAR	PROJECT	FINDINGS
Dreyer, C.	2006	The First phase cultural and archaeological heritage assessment of the proposed developments at the farms Bovenste Oog 63IQ, Sommerville 62 IQ, Preston Pans 59IQ and Drylands 64 IQ, Ventersdorp, North West Province.	Graves, a cemetery, ruins of stone built structures and historical structures. [2]
Birkholtz, P.	2008	Phase 1 Heritage Impact Assessment Proposed Etruscan Diamonds (Pty) Ltd Development Situated on The Remaining Extent Of The Farm Nooitgedacht 131 IP, Zwartrand 145 IP And Hartbeeslaagte 146 IP, Magisterial District Of Ventersdorp, North West Province	Two historic farm dwelling, four cemetery sites and two Later Stone Age sites.
Kusel, U.	2007	Cultural Heritage Resource Assessment of Portion 9 and 146 of the farm Klipplaatdrift 214 IP, Ventersdorp North West Province.	No sites were recorded.
Kusel, U.	2011	Cultural Heritage Resources Impact Assessment of The Farm Roodepoort 191 IP Ventersdorp North West Province	Remains of an old swimming pool that is older than 60 years were recorded.
Van Der Walt, J.	2017	Heritage Impact Assessment for the Proposed Ventersdorp Township Establishment, North West Province	A cemetery with grave dates from 1947 – 1979 (pages 39-40).
Van Schalkwyk, J.	2021	Phase 1 Cultural Heritage Impact Assessment: The Proposed Mining Right Application for the Mining of Diamonds General (d) on Various Portions of the Farms Sterkfontein 155, Putfontein 62, Omega 478, Holgat 63, Wildfontein 201, Leeuwfontein 64 and Farm 533, Registration Division: IP, Ditsobotla Local Municipality, North West Province	2 Later Stone Age sites, Rock Engraving of a rhino, 7 Burial Sites, Later Iron Age stone setting (the remains of cattle pens), Farmhouses.
Birkholtz, P.D.	2008	Proposed Etruscan Diamonds (Pty) Ltd Development Situated on the Remaining Extent of the Farm Nooitgedacht 131 IP, Zwartrand 145 IP and	8 sites were located: 2 historic farm dwellings , 4 cemetery sites, and two Later Stone Age sites (page 2).

[2] Cited in Van Der Walt, J. 2017. Heritage Impact Assessment for the Proposed Ventersdorp Township Establishment, North West Province.

		Hartbeeslaagte 146 IP, Magisterial District of Ventersdorp, North West Province	
Kruger, N.	2020	Archaeological Impact Assessment (AIA) on Portions of the Farms Kosterfontein 460JP, Kortfontein 461JP, kKeinfontein 463JP, Roodewal 322JQ, Doornlaagte 318JQ, Olievenfontein 434JP, Magathashoek 270JQ, and Kraalhoek 269JQ for the Proposed Rehabilitation of National Route R52 section 3 from Koster (km 0.00) to N4 Rustenburg (km 38.70), Bojanala District Municipality, North West Province.	The report spotlights the large Iron Age settlement of Molokwane, located north of Koster.
Matenga, E	2022	Phase 1 Heritage Impact Assessment & Palaeontological Desktop Assessment for the development of the Mushlendow Bio-CNG Facility in Koster, North West	A concrete structure associated with modern commercial farming was ranked of low significance.

4.2. General observations from the Literature Survey

The Northwest Province abounds with stone-walled settlements which attest to an established stone building tradition possibly dating from the 17th century. The stone walls are thus of Later Stone Age date, normally associated with hills. A cultural landscape associated with modern commercial farming from the 19th century typically features a farmstead with tree plantings and historic buildings as focal points on each property. The principal dwellings occupied by the farm owner tend to be of superior architectural quality compared to the outbuildings. Stone Age Sites tend to be sparsely distributed in comparison to densities that have been encountered further to the west in the Northern Cape Province.

5. ARCHAEOLOGICAL AND HISTORICAL CONTEXT

An outline of the cultural sequence in South Africa provides a theoretical framework for the identification of features / structures and objects of archaeological, historical and cultural interest. As summary of the reconstructed cultural sequence is given below:

5.1. Cultural sequence summary[3]

PERIOD	EPOCH	ASSOCIATED CULTURAL GROUPS	TYPICAL MATERIAL EXPRESSIONS
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominids: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period c300 – 900 AD (or earlier)	Holocene	Iron Age Farmers	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Later Iron Age 900ADff	Holocene	Iron Age Farmers, emergence of complex state systems	Typically distinct ceramics, evidence of long-distance trade and contacts

[3] Adapted from Exigo Consultancy. 2015. Frances Baard District Municipality: Proposed Nkandla Extension 2 Township Establishment, Erf 258 Nkandla, Hartswater, Northern Cape Province.

(ii) Mapungubwe (K2)	1350AD		Metals including gold, long distance exchanges
(ii) Historical period	Tswana / Sotho, Nguni people	Iron Age Farmers	Stone walls Mfecane / Difaqane
(iii) Colonial period	19th Century	European settlers / farmers / missionaries/ industrialisation	Buildings, Missions, Mines, metals, glass, ceramics

5.2. Appearance of hominids

South Africa has a yielded a particularly good record of fossil hominids, proto-humans, which appeared in South Africa more than 3 million years ago. Three famous sites in Gauteng, Limpopo and Northwest Provinces have been collectively named the Cradle of Humankind and inscribed as a serial UNESCO World Heritage Site.[4] No hominid sites have been reported in the vicinity of the study area.

5.3. The Early Stone Age

The Early Stone Age may date back more than 2 million years. Much of the Karoo in the Northern Cape is covered by gravels from which ESA artefacts have been found. These artefacts are generally very well weathered and have been described as background scatters in that their distribution is conditioned more by geological actions than human actions (Orton 2013, p7). A good profile of the Stone Age in the Northern Cape has been reconstructed from many heritage impact assessments that have been conducted in recent years. Locales in the North West Province, along and adjacent to the Orange – Vaal River systems have yielded evidence of great interest.[5] Wonderwerk Cave, 350 km to the southwest, has become a benchmark for the characterisation of the Stone Age. Excavations reveal a long sequence of occupation spanning the Early (ESA), Middle (MSA) and Later Stone Ages.[6]

[4] Deacon, J. and N. Lancaster. 1986. *Later Quaternary Palaeo-environments of Southern Africa*. Oxford: Oxford University Press.

[5] Morris, D. 2009. Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape, p3.

[6] http://www.southafrica.net/za/en/articles/entry/article-southafrica.net-the-wonderwerk-cave.

5.3.1. Middle Stone Age (MSA) [250 000 yrs – 30 000 yrs BP]

The Middle Stone Age (MSA), dates from 250 000 years to 40 000 years ago, marked by the introduction of a new tool kit which included prepared cores, parallel-sided blades and triangular points hafted to make spears.

5.3.2. Later Stone Age (LSA)[40 000 yrs to ca2000 yrs BP]

Later Stone Age technology is characterised by microlithic scrapers and segments made from very fine-grained rock. The ephemeral pans in the Northwest and Northern Cape Province, also present in the locality of the present study hosted hunter gatherer communities as evidenced by a comparatively high density of LSA lithics found on the edges of these pans.

5.4. The Iron Age Culture [ca. 2000 years BP]

The Iron Age culture supplanted the Stone Age at least 2000 years ago, associated with the earliest farming communities keeping domestic animals such as cattle, sheep, goat and chickens, and using several metals and pottery (Huffman 2007). The transition to the Iron Age appears to coincide with the spread of Bantu speakers from the north into Southern Africa. Around the beginning of the 2nd millennium, radical changes in the Iron Age culture occurred signifying the transition to the Later Iron Age. Subsequently the Iron Age people built stonewalled settlements present in a large swathe of territory straddling the Northern Cape, Northwest Province, Limpopo Province and the Free State. One such site Dithakong near Kuruman.

5.5. Historical Period

The Northwest Province is home to several ethnic communities which together form the Tswana linguistic group - Ba Kgatla Ba Kgafela, Ba-Hurutse, Ba-Fokeng, and Ba Tlhako Ba-Fokeng to name but a few.

Before Mzilikazi arrived in the area around 1828, there were numerous Difaqane wars were fought during the last quarter of the 18th century and during the first quarter of the 19th century in the North West Province which led to the internal displacement of large numbers

of Tswana. There also were several Nguni groups in the study area as a result of earlier movements in the 17th and 18th centuries (the Transvaal Ndebele). The climax was the arrival of the Matabele of Mzilikazi from the Vaal River region to occupy the area in August 1827. The Ndebele destroyed the Kwena Môgôpa, the Kgatla and what had remained of the Bapô after an earlier defeat by the Pedi of Thulare. Both Molokwane and Kaditshwene were evacuated in the early 1820s during this period of conflict in which many African communities were attacked and dislodged, first, by refugee Sotho groups, who had been driven from the Free State and, finally, by the Ndebele of Mzilikazi. For ten years the Matabele settled around the Magaliesberg Mountains. In 1837 Mzilikazi and his people were forced out of the area after bloody wars with the Afrikaners, and trekked north to a final home in the Matobho Hills in present-day south-western Zimbabwe. Mzilikazi incorporated elements from several Tswana groups moving with them to south-western Zimbabwe, while some elements of the Ndebele including some of his sons remained in present-day North West Province

5.6. The European Contact Period

During the first half of the 19th century, the first colonial traders entered the area. Traders such as Robert Schoon and William McLuckie (1829), missionaries such as Robert Moffat (1829), the scientific expedition of Andrew Smith (1835), and adventurers such as Cornwallis Harris (1836) moved between the Magaliesberg and the Pilanesberg where they observed numerous pre-colonial communities living in this part of the north-west. Rustenburg 60 km to the south of Pilanesberg was the first colonial town to be established by the Voortrekkers during the first half of the 19th century. The missionary Robert Moffat visited Mzilikazi at his headquarters near present day Pretoria. In June 1835 Charles Bell and other members of Andrew Smith's expedition visited a Ndebele village near Rustenburg which Bell subsequently painted. One year later, in December 1836, Cornwallis Harris also visited the area where he painted emHlalandlela one of Mzilikazi's villages near present-day Brits (Kruger 2020 p33).

5.7. Early Contact with the Boers

In the early 19th century, a number of traders, hunters, explorers and missionaries transited the area. A few can be named here - PJ Truter's and William Somerville (arriving in 1801),

Donovan, Burchell and Campbell, and James Read (arriving around 1870). Subsequently, a large number of Great Trek Boers from the Cape Colony and established commercial farms in the area. The came into contact with local people who included the Khoisan, Korana, Tswana and Griqua (Van der Walt 2012).

5.7.1. A Brief History of Ventersdorp

The town crystallised around a Dutch Reformed Church that was established in 1866 in the aftermath of the Great Trek and the occupation of the land by the Boers. It was named after Johannes Venter, the owner of the farm Roodepoort who had donated land for the church. Ventersdop was proclaimed as a town in June 1887.

5.7.2. Anglo-Boer 1899 – 1902

During the South African Anglo-Boer War, an Irish soldier, G. Shaw, was bitterly opposed to the scorched earth policy in which the British army was destroying literally everything to wear down the Boers. Shaw joined the Boers and stayed with the Engelbrecht family at Ventersdorp. He was eventually captured by the British and executed and buried in Ventersdorp. The site is known as "The Grave with Eternal Flowers" (Van der Walt 2021).

The Battle of Koster River, fought on 21/22 July 1900, was a major confrontation between the Boers and British Forces. Here the Australian Bushman Contingent, on their way to Rustenburg, was caught in an ambush by the Transvaal soldiers. 39 casualties were recorded and over 200 of their horses killed. The town of Koster was proclaimed in 1913 (Schalkwyk 2012 p14).

Ventersdorp became a political hotspot in the last laps towards the end of apartheid which climaxed with the Battle of Ventersdorp on 9 August 1991. This was a violent clash between supporters of the far-right Afrikaner Weerstandsbeweging (AWB) and the South African Police and security forces. The confrontation took place outside the Town Hall where the State President F.W. de Klerk was scheduled to hold a public address. The AWB led by Mr. Eugène Terre Blanche was opposed to the National Party 's decision to recognise the African National Congress and the release of Nelson Mandela the previous year. On the day, the right-wingers thronged the town, which caused panic. The South African Police responded

by setting up roadblocks and confiscating weapons. In the melee, three AWB members and one passer-by were killed. Six policemen, 13 AWB members, and 29 civilians were injured. The tragic events in Ventersdorp led President De Klerk to call a white referendum in March 1992, which gave the government the mandate to continue with the negotiations in spite of the opposition from the far-right.[7]

5.7.3. JB Marks Memorial

John Beaver (JB) Marks was a political activist who joined the ANC and later the South African Communist Party and both instances rose to the highest ranks. He was born on 21 March 1903 in Ventersdorp. Marks was banned after participating in the 1952 Defiance Campaign. He went into exile in Russia where he died on 1 August 1972. His remains were repatriated in 2015 and reinterred in Ventersdorp where his memorial stands. In 1999, the South African Government posthumously conferred on Marks the Order for Meritorious Service, Class I: Gold (Van der Walt .

The above forms the archaeological and historical context for the identification of heritage resources in the study area.

6. FINDINGS FROM HERITAGE IMPACT ASSESSMENT STUDIES CARRIED OUT IN THE BROADER AREA

6.1. General observations

As mentioned in Section 4.2 above, many stone-walled settlements have been recorded in the North West Province dating which attest to an established stone building tradition possibly dating from the 17th century. The stone walls are thus of Later Stone Age date, normally associated with hills. A modern landscape associated with modern commercial farming from the 19th century typically features a farmstead with tree plantings and historic buildings as a focal point on each property. The principal dwellings occupied by the farm owner tend to be of superior architectural quality compared to the

[7] Battle of Ventersdorp. Found at: https://en.wikipedia.org/wiki/Battle_of_Ventersdorp.

outbuildings. Stone Age Sites tend to be sparsely distributed in comparison to densities that have been encountered further to the west in the Northern Cape Province.

6.2. Other heritage resources that may occur in the broader area

The following site types/objects have been encountered in the broader region and are therefore flagged:

- Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
- Rock Paintings from the Middle Stone Age to Later Stone Age periods
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

6.3. Postulated heritage sensitivity of the study area

Studies undertaken in the broader area provide a good theoretical foundation from which to extrapolate the more likely scenarios on the farms under study.

The Table below provides a summary of the probability of occurrence of different typologies of heritage and a confidence rating of the predictions:

	HERITAGE TYPOLOGY	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1	MSA/LSA	80%	High
2	Rock engravings	60%	High
3	Rock paintings	5%	High
4	Early Iron Age / Later Iron Age	50%	High
5	Burial grounds	60%	Medium
6	Farm buildings and structures	75%	High

The ranking system in the Table below is adapted from Guidelines for Involving Heritage Specialists in EIA processes by Winter S and & N. Baumann (2005, p19). The probability of

occurrence of different grades of sites confirms the view that no finds in the study area are likely to warrant further action apart from documentation.

GRADE	RANKING	SIGNIFICANCE	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1a	National	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources,	0%	High
1b	Burial grounds	Graves are sacred and their treatment is a sensitive issue.	60%	High
2	Provincial	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential 2 heritage resources	0%	High
3A	Local	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 3A heritage resources	5%	Medium
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources	5%	High
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources	99,99%	High

6.4. Assessment of Impacts using the Heritage Impact Assessment Statutory Framework

Section 38 of the NHRA

Section 38 (Subsection 3) of the National Heritage Resources Act also provides a schedule of tasks to be undertaken in an HIA process:

Section 38(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected

N/A

(b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7

There are no Grade I or Grade II sites.

(c) An assessment of the impact of the development on such heritage resources

The risk ranking is an index of potential risks based on perceived value of the heritage and potential threats posed by the proposed development. Any sites found during the exploration and are deemed to be significant will be dealt with in accordance with the mitigation procedures in the Heritage Chance Finds Procedure.

(i) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development

Mining makes a significant contribution to the growth of the South African economy. Mining is labour intensive and can contribute immensely to alleviate the current high rate of employment. General improvement in the quality of livelihoods in local communities and the country at large is expected.

(e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources

N/A

(f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives

A Chance Finds Procedure will be used to curate sites or objects found during the mine exploration and actual mining commences.

(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

In accordance with the CPF in the event of discovery of heritage resources deemed of significance during exploration or mining, the Provincial Heritage Resources Authority or SAHRA will be informed immediately, and an archaeologist or heritage expert called to attend.

6.5. Risk Assessment of the findings

EVALUATION CRITERIA	RISK ASSESSMENT
Description of potential impact	Negative impacts range from partial to total destruction of surface and under-surface movable/immovable relics.
Nature of Impact	Negative impacts can both be direct or indirect.
Legal Requirements	Sections 34, 35, 36, 38 of National Heritage Resources Act No. 25 (1999).
Stage/Phase	Prospecting for minerals (test pits, drilling); Mining Phase
Extent of Impact	Test pits, excavations and ground clearing can result in damage and destruction of archaeological resources above and below the surface not seen during the survey.
Duration of Impact	Any accidental destruction of surface or subsurface relics is not reversible but can be mitigated.
Intensity	Uncertain.
Probability of occurrence	Medium.
Confidence of assessment	High.
Level of significance of impacts before mitigation	Medium.
Mitigation measures	If archaeological or other heritage relics deemed of high significance are found during the exploration phase, heritage authorities will be advised, and a heritage specialist will be called to attend.
Level of significance of impacts	Low.

after mitigation	
Cumulative Impacts	None
Comments or Discussion	None.

7. HIA REPORT AND CHANCE FINDS PROCEDURE

A heritage Chance Finds Procedure has been prepared to curate heritage resources found during the prospecting activities.

8. CONCLUSION AND RECOMMENDATIONS

In light of the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

9. REFERENCES

Birkholtz, P. 2008. Phase 1 Heritage Impact Assessment Proposed Etruscan Diamonds (Pty) Ltd Development Situated on The Remaining Extent of The Farm Nooitgedacht 131 IP, Zwartrand 145 IP And Hartbeeslaagte 146 IP, Magisterial District of Ventersdorp, North West Province

Birkholtz, P.D. 2008 Proposed Etruscan Diamonds (Pty) Ltd Development Situated on the Remaining Extent of the Farm Nooitgedacht 131 IP, Zwartrand 145 IP and Hartbeeslaagte 146 IP, Magisterial District of Ventersdorp, North West Province

Deacon, J. and N. Lancaster. 1986. *Later Quaternary Palaeo-environments of Southern Africa*. Oxford: Oxford University Press.

Dreyer, C. 2006. The First phase cultural and archaeological heritage assessment of the proposed developments at the farms Bovenste Oog 63IQ, Sommerville 62 IQ, Preston Pans 59IQ and Drylands 64 IQ, Ventersdorp, North West Province.

Government of South Africa. 1999. The National Heritage Resource Act (25 of 1999).

Huffman, T. N. 2007. A Handbook of the Iron Age. Cape Town: UKZN Press

Kruger, N. 2020. Archaeological Impact Assessment (AIA) on Portions of the Farms Kosterfontein 460JP, Kortfontein 461JP, kKeinfontein 463JP, Roodewal 322JQ, Doornlaagte 318JQ, Olievenfontein 434JP, Magathashoek 270JQ, and Kraalhoek 269JQ for the Proposed Rehabilitation of National Route R52 section 3 from Koster (km 0.00) to N4 Rustenburg (km 38.70), Bojanala District Municipality, North West Province.

Kusel, U. 2007. Cultural Heritage Resource Assessment of Portion 9 and 146 of the farm Klipplaatdrift 214 IP, Ventersdorp North West Province.

Kusel, U. 2011. Cultural Heritage Resources Impact Assessment of The Farm Roodepoort 191 IP Ventersdorp North West Province

Matenga, E 2022 Phase 1 Heritage Impact Assessment & Palaeontological Desktop Assessment for the development of the Mushlendow Bio-CNG Facility in Koster, North West.

Van Der Walt, J. **2017.** Heritage Impact Assessment for the Proposed Ventersdorp Township Establishment, North West Province

Van Schalkwyk, J. 2021 Phase 1 Cultural Heritage Impact Assessment: The Proposed Mining Right Application for the Mining of Diamonds General (d) on Various Portions of the Farms Sterkfontein 155, Putfontein 62, Omega 478, Holgat 63, Wildfontein 201, Leeuwfontein 64 and Farm 533, Registration Division: IP, Ditsobotla Local Municipality, North West Province

GLOSSARY

Archaeological material: remains older than 100 years, resulting from human activities left as evidence of their presence, which are in the form of structure, artefacts, food remains and other traces such as rock paintings or engravings, burials, fireplaces etc.

Artefact: Any movable object that has been used modified or manufactured by humans.

Catalogue: An inventory or register of artefacts and / or sites.

Conservation: All the processes of looking after a site or place including maintenance, preservation, restoration, reconstruction and adaptation.

Cultural Heritage Resources: refers to physical cultural properties such as archaeological sites, palaeontological sites, historic and prehistoric places, buildings, structures and material remains, cultural sites such as places of rituals, burial sites or graves and their associated materials, geological or natural features of cultural importance or scientific significance. These include intangible resources such as religious practices, ritual ceremonies, oral histories, memories, indigenous knowledge.

Cultural landscape: a stretch of land that reflects "the combined works of nature and man" and demonstrates "the evolution of human society and settlement over time, under the influence of the physical constraints and / or opportunities presented by their natural environment and of successive social, economic and cultural forces, both internal and external".[8]

Cultural Resources Management (CRM): the conservation of cultural heritage resources, management and sustainable utilization for present and future generations.

Cultural Significance: is the aesthetic, historical, scientific and social value for past, present and future generations.

Early Iron Age: refers to cultural remains dating to the first millennium AD associated with the introduction of metallurgy and agriculture.

Early Stone Age: a long and broad period of stone tool cultures with chronology ranging from around 3 million years ago up to the transition to the Middle Stone Age around 250 000 years ago.

Excavation: a method in which archaeological materials are extracted from the ground, which involves systematic recovery of archaeological remains and their context by removing soil and any other material covering them.

Historic material: means remains resulting from human activities, which are younger than 100 years and no longer in use; that include artefacts, human remains and artificial features and structures.

Historical: means belonging to the past, but often specifically the more recent past, and often used to refer to the period beginning with the appearance of written texts.

Intangible heritage: something of cultural value that is not primarily expressed in material form e.g. rituals, knowledge systems, oral traditions or memories, transmitted between people and within communities.

[8] This definition is taken from current terminology as listed on the World Heritage Convention website, URL: http://whc.unesco.org/en/culturallandscape/#1 accessed 17 March 2016.

***In situ* material:** means material culture and surrounding deposits in their original location and context, for instance archaeological remains that have not been disturbed.

Later Iron Age: The period from the beginning of the 2nd millennium AD marked by the emergence of complex state society and long-distance trade contacts.

Late Stone Age: The period from ± 30 000 years ago up until the introduction of metals and farming technology around 2000 years ago, but overlapping with the Iron Age in many areas up until the historical period.

Middle Stone Age: a period of stone tool cultures with complex chronologies marked by a shift towards lighter, more mobile toolkit, following the Early Stone Age and preceding the Late Stone Age; the transition from the Early Stone Age was a long process rather than a specific event, and the Middle Stone Age is considered to have begun around 250 000 years ago, seeing the emergence of anatomically modern humans from about 150 000 years ago, and lasting until around 30 000 years ago.

Monuments: architectural works, buildings, sites, sculpture, elements, structures, inscriptions or cave dwellings of an archaeological nature, which are outstanding from the point of view of history, art and science.

Place: means site, area, building or other work, group of buildings or other works, together with pertinent contents, surroundings and historical and archaeological deposits.

Preservation: means the protecting and maintaining of the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary.

Rock Art: various patterned practices of placing markings on rock surfaces, ranging in Southern Africa from engravings to finger paintings to brush-painted imagery.

Sherds: ceramic fragments.

Significance grading: Grading of sites or artefacts according to their historical, cultural or scientific value.

Site: a spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Site Recording Template: a standard document format for site recording.

DETAILS OF SPECIALIST

Surname	:	Matenga
First names	:	Edward
Position	:	Director & Principal Researcher, AHSA Archaeological and Heritage Services Africa (Pty) Ltd, Centurion, Pretoria
Cell	:	073 981 0637
E-mail	:	e.matenga598@gmail.com

(i) Academic qualifications

2011: Ph.D. in Archaeology & Heritage (Uppsala University, Sweden) with a published Thesis

2002. Certificate in the Integrated Conservation of Territories and Landscapes of Heritage Value (ICCROM, Rome)

1993: MPhil in Archaeology (Uppsala University, Sweden) with a published Thesis

(ii) Professional experience

1988-1993: Curator of Archaeology, Museum of Human Sciences, Harare

1994-1997: Senior Curator / Conservator, Great Zimbabwe World Heritage Site

1997-2004: Director, Great Zimbabwe World Heritage Site

2005 – 2016: Heritage Management Consultant (associateship with various other specialists), South Africa

2016 – present. Director & Principal Researcher, AHSA Archaeological and Heritage Services Africa (Pty) Ltd

(iii) Membership in professional bodies/associations

ASAPA – Association of Southern African Professional Archaeologists

ICOMOS – International Council of Monuments and Sites

WAC – World Archaeological Congress

(iv) Heritage Impact Assessments

Edward Matenga has undertaken more than 100 Heritage Impact Assessments and written as many reports submitted to regulating authorities including the South African Heritage Resources Agency (SAHRA). The reports were to enable various development projects including mining, public infrastructure development (e.g. agriculture, water reticulation) and power distribution. Matenga has a significant footprint in the Northern Cape, Northwest and Limpopo Provinces. He has also undertaken similar work in Mauritius.

Matenga has been involved in the preparation of Heritage Management Plans, otherwise called Conservation Management Plans for high-profile sites, e.g. the ten sites in the World Heritage Nomination Dossier for the Nelson Mandela Legacy Sites, which was submitted to UNESCO in 2021.

Matenga has undertaken exhumations and relocations of graves and has considerable experience in handling community issues relating to the treatment of human remains.

Matenga is a former Director of a World Heritage Site. UNESCO and its affiliated bodies (ICOMOS and ICCROM) sent him on World Heritage advisory missions to Cameroon (2002), Malawi (2005), Kenya (2006), Mauritius (2007), Ghana (2008) and Angola 2007 and 2010.