

**PHASE 1 ARCHAEOLOGICAL/HERITAGE IMPACT ASSESSMENT FOR
THE PROPOSED LOMOND-SAFARI 88 KV POWERLINE CONSTRUCTION
WITHIN MADIBENG LOCAL MUNICIPALITY UNDER BOJANALA DISTRICT
MUNICIPALITY IN THE NORTH-WEST PROVINCE**

18 December 2021

<p>PREPARED FOR</p>   <p>Eskom Holdings SOC Limited PO Box 242 Klerksdorp 2570 Tel: 018 464 6691 Fax: 086 662 3952 E-mail: SeboleM@eskom.co.za</p>	<p>Prepared by</p>  <p>MuTingati Environmental, Health & Safety Consulting</p> <p><i>“Changing the world for a sustainable living”</i></p> <p>MuTingati Environmental & Projects No 121 GrandRapid 476 Feltead street Northriding 2169 Tel: 076 267 9717 Email: Info @mutingati.co.za</p>
--	--

TABLE 1: DOCUMENT SYNOPSIS (EXECUTIVE SUMMARY)

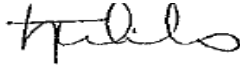
Item	Description
Proposed development and location	Proposed Lomond-Safari 88 KV Powerline construction within Madibeng Local Municipality under Bojanala District Municipality in the North West Province.
Purpose of the study	Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the area demarcated for the proposed powerline
Municipality	Madibeng Local Municipality
Predominant land use of surrounding area	NECSA
Heritage Consultant	MuTingati Environmental & Projects (Pty) Ltd
Date of Report	18/ 12/ 2021

APPROVAL PAGE / DOCUMENT CONTROL

Consultant

MuTingati Environmental & Projects Pty Ltd Reg: 2014/ 168639/07

Compiled by: Trust Mlilo (*BA Hons & MA. Archaeology Univ. of Pretoria*)



.....

Review

Lizette Klopper

.....

Second Review

Charlotte Maphaha (*BSc Hons Environmental Management- Unisa*)

.....

Acceptance

Client:

Eskom Holdings SOC Limited

Note that by signing this report, the client is accepting that the report and its contents are correct and final.

Client representatives

Received:

Name & surname: Mulalo Muelelwa.....

Position.....Signature.....at.....on

.....

Approved:

Name & surname.....

Position.....Signature.....at

.....on.....

NATIONAL LEGISLATION AND REGULATION GOVERNING THIS REPORT

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence.

I, **Trust Mliilo**, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for preparation of this report.

Expertise:

Trust Mliilo, BA Hons & MA. (Archaeology), (Univ. of Pretoria) ASAPA (Professional member)

Independence

The views expressed in the document are the objective, independent views of Mr Trust Mliilo and the survey was carried out under MuTingati & Project Consulting. MuTingati and appointed associate has no any business, personal, financial or other interest in the proposed development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. MuTingati Environmental & Project and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the author and the relevant team from MuTingati Environmental division. This also refers to electronic copies of the report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

Introduction

This report serves to inform and guide the developer and contractors about the possible impacts that the proposed powerline construction may have on heritage resources (if any) located in the study area. In the same light, the document must also inform South African heritage authorities (SAHRA/PHRA) about the presence, absence and significance of heritage resources located in the study area. As required by South African heritage legislation, developments such as this require pre-development assessment by a competent heritage practitioner in order to identify, record and if necessary, salvage the irreplaceable heritage resources that may be impacted upon by the proposed development. In compliance with these laws Eskom Holdings SOC Ltd appointed MuTingati Environmental & Project (Pty) Ltd to conduct a Phase 1 Archaeological and Heritage Impact Assessment (AIA/HIA) for the proposed Lomond-Safari 88 KV Powerline construction within Madibeng Local Municipality under Bojanala District Municipality in the North West Province. Desktop studies, drive-throughs and fieldwalking were conducted in order to identify heritage landmarks on and around the proposed development site. The study site is not on pristine ground, having seen significant transformations owing to infrastructure developments, agriculture and powerlines. The general project area is known for historical and LIA occurrences such as the Medunsa Late Iron Age complex. The sites were extensively researched by a number of archaeologists such Kusel (2003), Pelsler (2007) and several others. In terms of the built environment of the project area, structures older than 60 years of age may occur in the surrounding areas. In addition, sub-surface archaeological material and unmarked graves may still exist and when encountered during construction, work must be stopped forth-with, and the finds must be reported to the South African Heritage Resource Agency (SAHRA) or the heritage practitioner. This report must also be submitted to the SAHRA or PHRA for review.

1. TABLE OF CONTENTS

1.	TABLE OF CONTENTS	6
2.	EXECUTIVE SUMMARY	9
3.	ABBREVIATIONS	11
4.	DEFINITIONS	12
5.	INTRODUCTION	15
	BACKGROUND.....	15
	PROJECT DESCRIPTION.....	15
	PROJECT LOCATION.....	16
6.	LEGAL REQUIREMENTS	19
	ASSESSING THE SIGNIFICANCE OF HERITAGE RESOURCES.....	20
	CATEGORIES OF SIGNIFICANCE.....	21
	AESTHETIC VALUE:.....	22
	HISTORICAL VALUE:.....	22
	SCIENTIFIC VALUE:.....	22
	SOCIAL VALUE:.....	22
	FORMALLY PROTECTED SITES.....	23
	GENERAL PROTECTION.....	23
	SIGNIFICANCE RATING ACTION.....	23
	OTHER RELEVANT LEGISLATIONS.....	26
	TERMS OF REFERENCE (TOR).....	26
7.	METHODOLOGY	27
	THE FIELDWORK SURVEY.....	27
	PHASE III: CONSULTATION.....	28
	VISIBILITY AND CONSTRAINTS.....	28
	ASSUMPTIONS AND LIMITATIONS.....	28
	THE FOLLOWING PHOTOGRAPHS ILLUMINATE THE NATURE AND CHARACTER OF THE PROJECT AREA.....	29
8.	CULTURE HISTORY BACKGROUND OF THE PROJECT AREA	- 38 -
	STONE AGE ARCHAEOLOGY.....	- 39 -
	IRON AGE ARCHAEOLOGY.....	- 40 -
	HISTORICAL (~ AD 1840 TO 1950) ARCHAEOLOGY.....	- 42 -
	INTANGIBLE HERITAGE.....	- 43 -
	SAHRIS DATA BASE AND IMPACT ASSESSMENT REPORTS IN THE PROJECT AREA.....	- 43 -
9.	RESULTS OF THE FIELD STUDY	- 44 -
	ARCHAEOLOGY.....	- 45 -
	BURIAL GROUNDS AND GRAVES.....	- 45 -
	PUBLIC MONUMENTS AND MEMORIALS.....	- 46 -
	HISTORICAL BUILDINGS AND STRUCTURES.....	- 46 -
	PALAEONTOLOGY.....	- 46 -
10.	ASSESSMENT OF SIGNIFICANCE	- 46 -
	ASSESSMENT CRITERIA.....	- 46 -
	CUMULATIVE IMPACTS.....	50
	MITIGATION.....	51

11. STATEMENT OF SIGNIFICANCE	51
AESTHETIC VALUE.....	51
HISTORIC VALUE.....	52
SCIENTIFIC VALUE.....	52
SOCIAL VALUE.....	52
12. DISCUSSION	53
13. RECOMMENDATIONS	53
14. CONCLUSION	54
15. BIBLIOGRAPHY	55
16. CHANCE FIND PROCEDURE	67
INTRODUCTION.....	67
DEFINITIONS.....	67
BACKGROUND.....	68
PURPOSE.....	68
CHANCE FIND PROCEDURE.....	69
MANAGEMENT OF CHANCE FINDS.....	70
17. PALAEOLOGICAL DESKTOP STUDY FOR THE PROPOSED CONSTRUCTION OF ESKOM LOMOND SAFARI 88KV POWERLINE, NORTHWEST PROVINCE	73
TABLE CONTENTS	75
EXECUTIVE SUMMARY	76
INTRODUCTION	77
TERMS OF REFERENCE FOR THE REPORT	78
DETAILS OF THE STUDY AREA AND THE TYPE OF ASSESSMENT:	82
GEOLOGICAL SETTING OF THE STUDY AREA	85
. PALAEOLOGICAL POTENTIAL OF THE STUDY AREA	87
CONCLUSION AND RECOMMENDATIONS:	90
. CHANCE FINDS PROCEDURE	91
REFERENCES:	92

List of Tables

TABLE 1: DOCUMENT SYNOPSIS (EXECUTIVE SUMMARY).....	2
Table 2: Evaluation of the proposed development as guided by the criteria in NHRA and NEMA	25
Table 3: Summary of findings	- 44 -
Table 4: Criteria Used for Rating of Impacts	- 46 -

Table 5: Criteria for Rating of Classified Impacts	- 47 -
Table 6: Impact Assessment Matrix for proposed development.....	- 49 -

List of Figures

Figure 1: Location of proposed powerline routes	17
Figure 2: Location of proposed powerline route	18
Figure 3: Google Earth photo indicating the study site (red line)	83
Figure 4: Geological Map of the study area and surroundings (adapted from the 2526 Rustenburg 1:250 000 Geology Map, Geological Survey, 1981) (White line indicates study site).....	85
Figure 5: Palaeontological sensitivity of the region (SAHRA, 2022) (Blackline indicates Study Site)	87
Figure 6: Stromatolites at Sterkfontein Caves	89
Figure 7: Polished vertical section through stromatolites (from: https://www.google.co.za/imgres?imgurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fekmps%2Fshops%2Ftherockgallery%2Fimages%2Fstromatolite-large-polished-slice-100-million-years-old-andes-mountains-bolivia-%5B4%5D-1997-p.jpg&imgrefurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fstromatolite-large-polished-slice----100-million-years-old----andes-mountains-bolivia-1997p.asp&docid=2vFkg_vqTH0I5M&tbnid=FQcixxQGdtBUFM%3A&vet=10ahUKEwinl8rfwqjcAhUGsKQKHf8wBy0QMwgsKAYwBg..i&w=500&h=500&bih=918&biw=1280&q=stromatolites&ved=0ahUKEwinl8rfwqjcAhUGsKQKHf8wBy0QMwgsKAYwBg&iact=mr&uact=8).....	89

List of Plates

Plate 1: Showing the substation associated with the proposed development.	29
Plate 2: Showing the existing substation associated with the proposed powerline development	30
Plate 3: Showing access roads within the project area	30
Plate 4: Showing buildings and structures in the vicinity of the proposed powerline route.	31
Plate 5: Showing proposed powerline route.....	31
Plate 6: Showing the proposed powerline route.....	32
Plate 7: Showing existing powerline distribution lines within the proposed development area.	32
Plate 8: Showing tall grass and shrubs along the proposed powerline route.....	33
Plate 9: Showing the proposed powerline route.....	33
Plate 10: Showing access roads within the proposed project area	34
Plate 11: Showing the proposed powerline route.....	34
Plate 12: Showing the proposed powerline route.....	35
Plate 13: Showing the proposed powerline route.....	35
Plate 14: Showing existing water distribuion networks within the proposed project area.....	36
Plate 15: Showing buildings and infrastructure whose age could not be confirmed during the survey. ..	36
Plate 16: Showing existing Safari substation	37
Plate 17: Showing existing developments within the proposed project area.....	37

2.EXECUTIVE SUMMARY

The applicant is proposing to construct a ±2.3km Lomond-Safari 88 KV Powerline within Madibeng Local Municipality under Bojanala District Municipality in the North West Province. This Archaeology and Heritage Impact Assessment (AIA/HIA) is to fulfil the requirements of Section 38 of the National Heritage Resources Act (Act 25 of 1999). This document is a Phase 1 Archaeological and Heritage report serves to inform and guide the applicant and contractors about the potential impacts that the proposed powerline development may have on heritage resources (if any) located in the study area. The document must also inform the responsible Heritage Resource Agency (PHRA) and the South African Heritage Resource Agency (SAHRA) Burial Ground and Graves Unit about the presence, absence and significance of heritage resources that may be located in the study area.

The identification, recording, reporting and salvaging (if necessary) of significant heritage resources that may occur on the development footprint should be undertaken by a competent heritage practitioner as required by South African heritage legislation. In compliance with heritage legislation, Eskom Holdings SOC Ltd appointed MuTingati & Project Consulting to conduct Phase 1 AIA/HIA for the proposed Lomond-Safari 88 KV Powerline construction the in the Madibeng Local Municipality of the North West Province.

A stepped approach involving desktop studies, drive-through and detailed field walking was employed in order to identity any heritage landmarks on and around the development footprint. However, it should be noted that the proposed powerline development route is not on pristine grounds, having been previously disturbed by NECSA infrstructure and powerlines. However, when these heritage resources (including graves) are encountered, work must be stopped forth-with, and the finds must be reported to the PHRA. In terms of the archaeology of the area under study, no mitigation will be required prior to construction. This report must also be submitted to the SAHRA for review.

- The findings of this report have been informed by desktop data review, field survey and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed powerline development.
- The proposed powerline development route is accessible, and the field survey was effective enough to cover most sections of the project receiving environs.
- The proposed powerline is located within NECSA property.

The report sets out the potential impacts of the proposed powerline development on heritage matters and recommends appropriate safeguard and mitigation measures that are designed to reduce the impacts where appropriate. The report makes the following recommendations:

- The construction team must be inducted on the possibility of encountering archaeological resources that may be accidentally exposed during clearance, trenching and construction along the proposed powerline route prior to commencement of work on the site in order to ensure appropriate mitigation measures and that course of action is afforded to any chance finds.
- If archaeological materials are uncovered, work must cease immediately and the SAHRA be notified, and activity should not resume until appropriate management provisions are in place.
- The findings of this report, with approval of the SAHRA, may be classified as accessible to any interested and affected parties within the limits of the legislations.

This report concludes that the impacts of the proposed powerline development on the cultural environmental values are not likely to be significant on the entire along the entire powerline route if the Environmental Management Programme (EMPr) includes recommended safeguard and mitigation measures identified in this report.

The assessment reached the following conclusions

- The entire development site has been altered by NECSA infrastructure developments

Recommendations

1. From a heritage perspective supported by the findings of this study, the proposed Safari-Lomond 88 KV powerline is feasible. However, the proposed powerline development should be approved to proceed as planned under observation that the development dimensions do not extend beyond the surveyed route.
2. The foot print impact of the proposed Lomond Safari 88KV powerline construction development and associated infrastructure should be kept to minimal to limit the possibility of encountering chance finds.
3. Should chance archaeological materials or human remains be exposed during subsurface construction work on any section of the proposed powerline servitude, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations.

4. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no significant cultural heritage resources barriers to the proposed development. The Heritage authority may approve the proposed Lomond Safari 88 KV powerline construction to proceed as planned with the view to implement the recommendations here in made

3.ABBREVIATIONS

AIA	Archaeological Impact Assessment
C	Contractor
CECO	Construction Environmental Conservation Officer
EAP	Environmental Assessment Practitioner
ECO	Environmental Conservation Officer
EIA	Environmental Impact Assessment
EM	Environmental Manager
EMP	Environmental Management Plan
HIA	Heritage Impact Assessment
LIA	Late Iron Age
NHRA	Nation Heritage Resources Act, Act 25 of 1999
PM	Project Manager
SM	Site Manager
SAHRA	South African Heritage Resources Agency

4. DEFINITIONS

The following terms used in this Archaeological /Heritage Impact Assessment are defined in the National Heritage Resources Act [NHRA], Act Nr. 25 of 1999, South African Heritage Resources Agency [SAHRA] Policies as well as the Australia ICOMOS Charter (*Burra Charter*):

Chance Finds means Archaeological artefacts, features, structures or historical cultural remains such as human burials that are found accidentally in context previously not identified during cultural heritage scoping, screening and assessment studies. Such finds are usually found during earth moving activities such as powerline pole position excavations.

Compatible use means a use, which respects the cultural significance of a place. Such a use involves no, or minimal, impact on cultural significance.

Conservation means all the processes of looking after a place so as to retain its cultural significance.

Cultural Heritage Resources Same as **Heritage Resources** as defined and used in the National Heritage Resources Act (*Act No. 25 of 1999*). Refer to physical cultural properties such as archaeological and palaeontological sites; historic and prehistoric places, buildings, structures and material remains; cultural sites such as places of ritual or religious importance and their associated materials; burial sites or graves and their associated materials; geological or natural features of cultural importance or scientific significance. **Cultural Heritage Resources** also include **intangible resources** such as religion practices, ritual ceremonies, oral histories, memories and indigenous knowledge.

Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations.

Cultural Significance also encompasses the complexities of what makes a place, materials or intangible resources of value to society or part of, customarily assessed in terms of aesthetic, historical, scientific/research and social values.

Environmental impact assessment An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the environment. The EIA includes an evaluation of alternatives. As well as recommendations for appropriate mitigation measures for minimising or avoiding negative

impacts, measures enhancing the positive aspects of the proposal and environmental management and monitoring measures.

Expansion means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased;

Fabric means all the physical material of the place including components, fixtures, contents and objects.

Grave A place of interment (*variably referred to as burial*), including the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery (*contemporary*) or **Burial Ground** (*historic*).

Heritage impact assessment (HIA) refers to the process of identifying, predicting and assessing the potential positive and negative cultural, social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and which may significantly affect the cultural and natural heritage resources. The HIA includes recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Historic Material remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

Impact The positive or negative effects on human well-being and / or on the environment.

In Situ material Material culture and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Interested and affected parties Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

Interpretation means all the ways of presenting the cultural significance of a place.

Material culture means buildings, structure, features, tools and other artefacts that constitute the remains from past societies.

Mitigate The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

Place means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views.

Public participation process A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific matters

Setting means the area around a place, which may include the visual catchment.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (*i.e. intensity, duration and likelihood*). Impact significance is the value placed on the change by different affected parties (*i.e. level of significance and acceptability*). It is an anthropocentric concept, which makes use of value judgments and science-based criteria (*i.e. biophysical, physical cultural, social and economic*).

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

Use means the functions of a place, as well as the activities and practices that may occur at the place.

5.INTRODUCTION

Background

Eskom Holdings SOC Ltd appointed MuTingati Environmental & Project (Pty) Ltd to conduct a Phase 1 Archaeological and Heritage Impact Assessment (AIA/HIA) for the proposed Lomond-Safari 88 KV Powerline construction within Madibeng Local Municipality under Bojanala District Municipality in the North West Province. In terms of Section 38 of the NHRA, an AIA/HIA must be conducted for any linear development exceeding 300m in length such as the proposed powerline. The overall purpose of this heritage report is to identify, assess any heritage resources that may be located in the study area and evaluate the positive and negative impacts of the proposed powerline development on these resources in order to make recommendations for their appropriate management. To achieve this, we conducted background research of published literature, maps and databases (desktop studies) which was then followed by ground-truthing by means of drive-through surveys and field walking. Desktop studies revealed that the general project area is rich in LIA and historical sites such the Medunsa LIA, Makau LIA complex and Sjambok LIA. The Medunsa LIA site is located further north of the project area. It should be noted that while heritage resources may have been located in the entire study area, subsequent developments such as NECSA infrastructure development work have either obliterated these materials or reduced them to isolated finds that can only be identifiable as chance finds during construction. The proposed 88 KV Powerline may be permitted subject to adopting recommendations and mitigation measures proposed in this report. Based on desktop and field study, there is no archaeological reason why the proposed powerline construction cannot proceed, taking full cognizance of clear procedures to follow in the event of chance findings.

Project Description

Safari Rural substation is an 88/11kV substation supplying the South African Nuclear Energy Corporation SOC Limited (NECSA). The substation is supplied through 88kV oil filled cables. The cables sometimes lose pressure and results in loss of supply to the substation. Frequent hot connections on 11kv isolators and busbar and all operating labels in the substation are not according to standard. Small oil volume breakers and single breaker isolators become redundant due to age and unavailability of spares. In order to address the situation on the substation and the environment, Eskom North West Operating Unit initiated a project. The project includes replacing the existing 2X 88kV oil cable with 1 x 88kV chickadee

power line of approximately ± 2.3 km. Refurbish the substation by replacing old and redundant equipment. The project falls under Madibeng Local Municipality in the North-West Province.

Project Location

The project is within the property of NECSA located on Portion 0 of the farm Weldaba 567 JQ, in the Madibeng Local Municipality under Bojanala District Municipality in North West Province (see Figure 1&2)

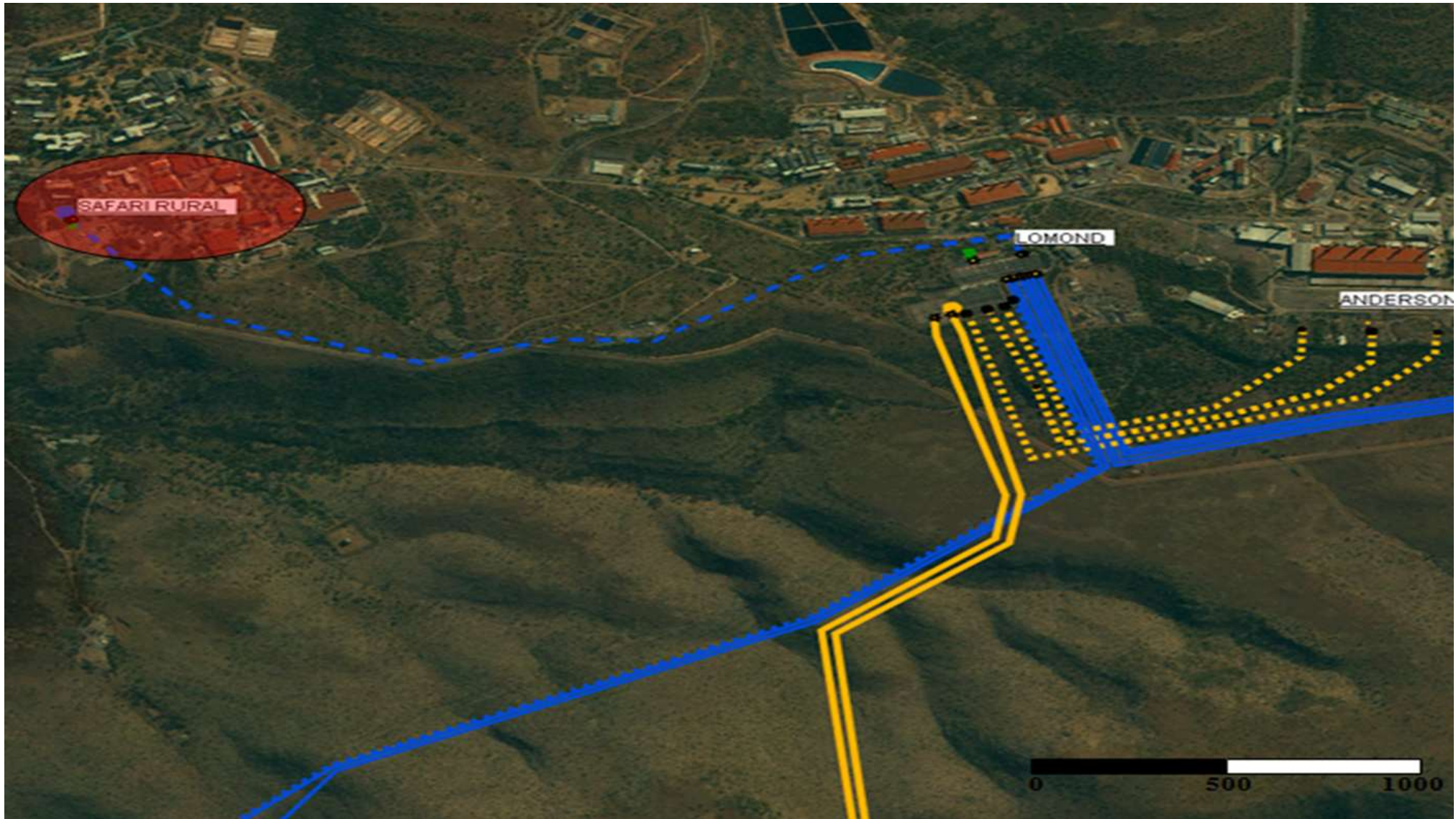


Figure 1: Location of proposed powerline routes

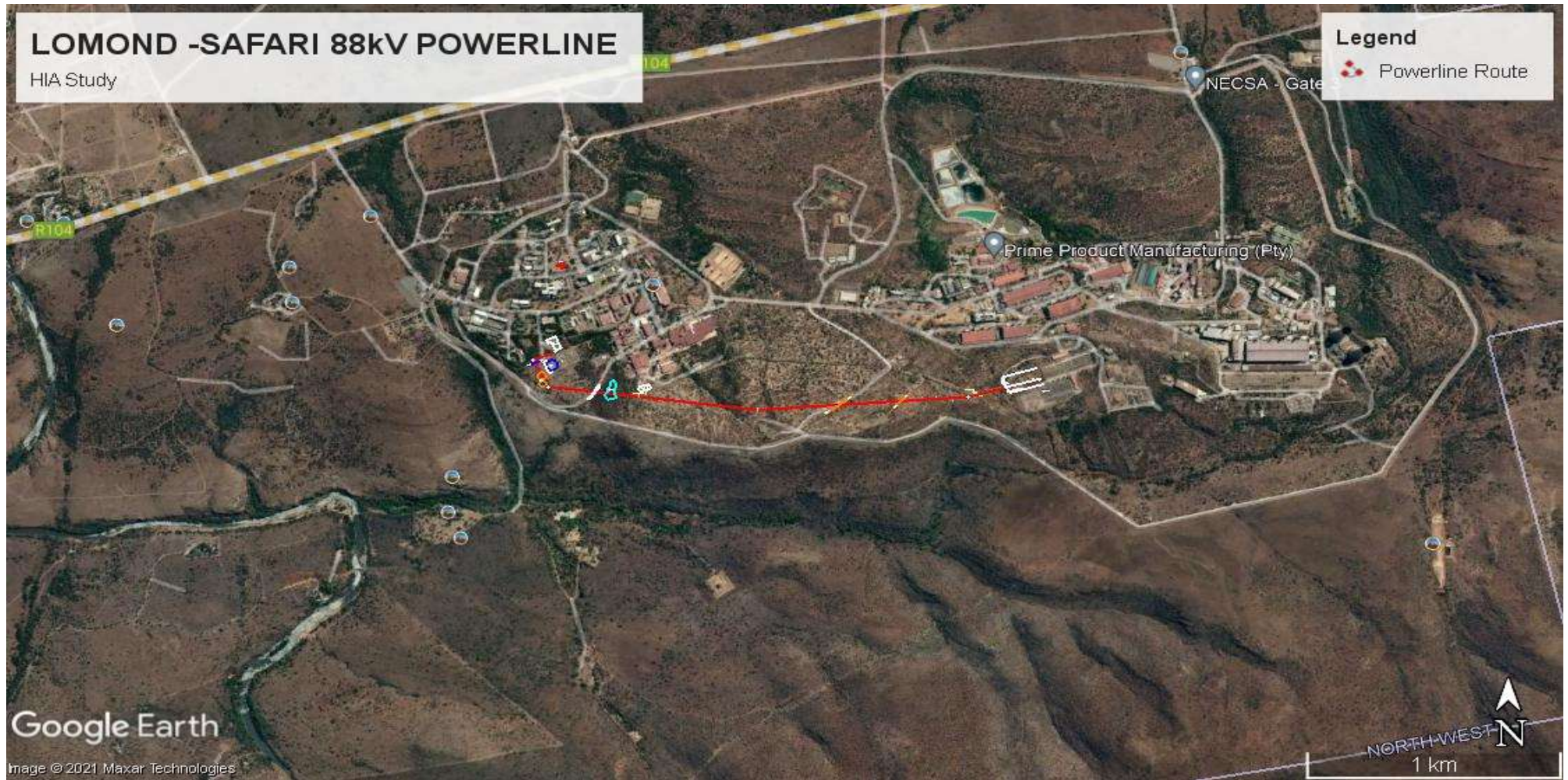


Figure 2: Location of proposed powerline route

6.LEGAL REQUIREMENTS

Two main pieces of legislations are relevant to the present study and there are presented here. Under the National Heritage Resources Act (Act 25 of 1999) (NHRA) and the National Environmental Management Act (NEMA), an AIA or HIA is required as a specialist sub-section of the EIA.

Heritage management and conservation in South Africa is governed by the NHRA and falls under the overall jurisdiction of the SAHRA and its PHRAs. There are different sections of the NHRA that are relevant to this study. The present proposed development is a listed activity in terms of Section 38 of the NHRA which stipulates that the following development categories require an HIA to be conducted by an independent heritage management consultant:

- *Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length*
- *Construction of bridge or similar structure exceeding 50m in length*
- *Development or other activity that will change the character of a site -*
 - ❖ *Exceeding 5000 sq m*
 - ❖ *Involving three or more existing erven or subdivisions*
 - ❖ *Involving three or more erven or divisions that have been consolidated within past five years*
 - ❖ *Rezoning of site exceeding 10 000 sq m*
 - ❖ *The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority*
- *Any other development category, public open space, squares, parks, recreation grounds*

Thus, any person undertaking any development in the above categories, 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. Section 38 (2) (a) of the same act also requires the submission of a heritage impact assessment report for authorization purposes to the responsible heritage resources agencies (SAHRA/PHRAs). Because the proposed powerline development exceeds 300m, then an HIA is required according to this section of act.

Related to Section 38 of the NHRA are Sections 34, 35, 36 and 37. Section 34 stipulates that no person may **alter damage, destroy and relocate any building or structure older than 60 years, without a permit issued by SAHRA or a provincial heritage resources authority**. This section may not apply to present study since none were identified. Section 35 (4) of the NHRA stipulates that no person may,

without a permit issued by SAHRA, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object. This section may apply to any significant archaeological sites that may be discovered before or during construction. This means that any chance find must be reported to the heritage practitioner or SAHRA/PHRA-G, who will assist in investigating the extent and significance of the finds and inform about further actions. Such actions may entail the removal of material after documenting the find site or mapping of larger sections before destruction. Section 36 (3) of the NHRA also stipulates that no person may, without a permit issued by the South African Heritage Resources Agency (SAHRA), destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority. This section may apply in case of the discovery of chance burials, which is unlikely. The procedure for reporting chance finds also applies to the unlikely discovery of burials or graves by the developer or his contractors. Section 37 of the NHRA deals with public monuments and memorials but this may not apply to this study because no protected monument will be physically affected by the proposed project.

In addition, the new EIA Regulations (04 December 2014 as amended) promulgated in terms of NEMA (Act 107 of 1998) determine that any environmental reports will include cultural (heritage) issues. The new regulations in terms of Chapter 5 of the NEMA provide for an assessment of development impacts on the cultural (heritage) and social environment and for Specialist Studies in this regard. The end purpose of such a report is to alert the developer, the environmental consultant (MuTingati Environmental & Projects (Pty) Ltd), SAHRA and interested and affected parties about existing heritage resources that may be affected by the proposed development, and to recommend mitigatory measures aimed at reducing the risks of any adverse impacts on these heritage resources.

Assessing the Significance of Heritage Resources

The appropriate management of cultural heritage resources is usually determined on the basis of their assessed significance as well as the likely impacts of any proposed developments. Cultural significance is defined in the Burra Charter as meaning aesthetic, historic, scientific, or social value for past, present, or future generations (Article 1.2). Social, religious, cultural, and public significance are currently identified as baseline elements of this assessment, and it is through the combination of these elements that the overall cultural heritage values of the site of interest, associated place or area are resolved. Not all sites are equally significant and not all are worthy of equal consideration and management. The significance of a place is not fixed for all time, and what is considered of significance at the time of assessment may

change as similar items are located, more research is undertaken, and community values change. This does not lessen the value of the heritage approach but enriches both the process and the long-term outcomes for future generations as the nature of what is conserved and why, also changes over time (Pearson and Sullivan 1995:7). This assessment of the Indigenous cultural heritage significance of the site of Interest as its environments of the study area will be based on the views expressed by the traditional authority and community representatives, consulted documentary review and physical integrity.

African indigenous cultural heritage significance is not limited to items, places or landscapes associated with pre-European contact. Indigenous cultural heritage significance is understood to encompass more than ancient archaeological sites and deposits, broad landscapes, and environments. It also refers to sacred places and story sites, as well as historic sites, including mission sites, memorials, and contact sites. This can also refer to modern sites with particular resonance to the indigenous community. The site of interest considered in this project falls within this realm of broad significance.

Archaeological sites, as defined by the National Heritage Resources Act (Act 25 of 1999) as places in the landscape where people once lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and non-renewable. Many such sites are unfortunately lost on a daily basis through infrastructure developments such as powerlines, roads and other destructive economic activities such as mining and agriculture. This is true for the proposed powerline project area whose main economic activities are industrial. It should be noted that once archaeological sites are destroyed, they cannot be replaced as site integrity and authenticity is permanently lost. Archaeological heritage contributes to our understanding of the history of the region and of our country and continent at large. By preserving links with our past, we may be able to appreciate the role past generations have played in the history of our country and the continent at large.

Categories of Significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer

present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

Aesthetic Value:

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses, and the aesthetic values commonly assessed in the analysis of landscapes and townscape.

Historical Value:

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually, a place has historical value because of some kind of influence by an event, person, phase or activity.

Scientific Value:

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

Social Value:

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group. It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act

makes provision for two types or forms of protection of heritage resources; i.e., formally protected and generally protected sites:

Formally Protected Sites

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the PHRA.
- Grade 3 or local heritage sites.

General Protection

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

The certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories:

Significance Rating Action

No significance: sites that do not require mitigation.

Low significance: sites, which may require mitigation.

2a. Recording and documentation (Phase 1) of site; no further action required.

2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction.

Medium significance: sites, which require mitigation.

3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b].

High significance: sites, where disturbance should be avoided.

4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism.

High significance: Graves and burial places

4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinternment [including 2a, 2b & 3].

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e., primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

An important aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of the proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data /information, which would otherwise be lost.

Table 2: Evaluation of the proposed development as guided by the criteria in NHRA and NEMA

ACT	Stipulation for developments	Requirement details
NHRA Section 38	Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
	Construction of bridge or similar structure exceeding 50m in length	No
	Development exceeding 5000 sq m	No
	Development involving three or more existing erven or subdivisions	No
	Development involving three or more erven or divisions that have been consolidated within past five years	No
	Rezoning of site exceeding 10 000 sq m	Not available
	Any other development category, public open space, squares, parks, recreation grounds	None
NHRA Section 34	Impacts on buildings and structures older than 60 years	Subject to identification during Phase 1
NHRA Section 35	Impacts on archaeological and palaeontological heritage resources	Subject to identification during Phase 1
NHRA Section 36	Impacts on graves	Subject to identification during Phase 1
NHRA Section 37	Impacts on public monuments	Subject to identification during Phase 1
Chapter 5 (21/04/2006) NEMA	HIA is required as part of an EIA	Yes

Other relevant legislations

The Human Tissue Act

Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925 is relevant to relocation of graves affected by development. Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act 25 of 1999. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial Member of the Executive Committee (MEC) as well as the relevant Local Authorities.

Terms of Reference (TOR)

The author was requested by Mutingati Environmental to conduct an AIA/HIA study addressing the following issues:

- Archaeological and heritage potential of the proposed Lomond- Safari 88KV powerline construction including any known data on affected areas;
- Provide details on methods of study; potential and recommendations to guide the PHRA/ SAHRA to make an informed decision in respect of authorisation of the proposed power distribution development.
- Identify all objects, sites, occurrences, and structures of an archaeological or historical nature (cultural heritage sites) located along the proposed development site;
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- Describe the possible impact of the proposed Lomond- Safari 88kV powerline construction on these cultural remains, according to a standard set of conventions;
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
- Review applicable legislative requirements;

7. Methodology

This document falls under the Basic assessment phase of the AIA/HIA and therefore aims at providing an informed heritage-related opinion about the proposed powerline development project. This is usually achieved through a combination of a review of any existing literature and a basic site inspection. As part of the desktop study, published literature and cartographic data, as well as archival data on heritage legislation, the history and archaeology of the area were studied. The desktop study was followed by field surveys. The field assessment was conducted according to generally accepted AIA/HIA practices and aimed at locating all possible objects, sites and features of cultural significance on the development footprint. Initially a drive-through was undertaken along the proposed powerline route as a way of acquiring the archaeological impression of the general area. This was then followed by a walk down survey along the proposed powerline route, with a handheld Global Positioning System (GPS) for recording the location/position of each possible site. Detailed photographic recording was also undertaken where relevant. The findings were then analysed in view of the proposed powerline development in order to suggest further action. The result of this investigation is a report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed powerline development.

The Fieldwork Survey

The fieldwork survey was undertaken on the 8th of December 2021. The main focus of the survey involved a pedestrian survey which was conducted across the project area. The pedestrian survey focused on parts of the project area where it seemed as if disturbances may have occurred in the past, for example bald spots in the grass veld; stands of grass which are taller than the surrounding grass veld; the presence of exotic trees; evidence for building rubble, and ecological indicators such as invader weeds.

The literature survey suggests that prior to the 20th century modern residential and on-going industrial developments; the general area where the proposed power generation development is located would have been a rewarding region to locate heritage resources related to Stone Age and particularly Iron Age and historical sites (Bergh 1999). However, the situation today is completely different. The study area now lies on a clearly modified landscape that has previously been cleared of vegetation but is now dominated by power generation infrastructure, roads, a continuous sweep of tall grass and shrubs that limit ground visibility (Plates 1-30).

Phase iii: Consultation

The EIA Public Participation process will be conducted by the EAP and specialists. The EIA Public Participation Process will invite and address comments from affected communities and any registered heritage bodies on any matter related to the proposed powerline construction including heritage concerns that may arise as a result of the project.

Phase iv: Report compilation

Report compilation and impact assessment.

Phase v: Report review, finalisation and submission

Before the final draft of the HIA is submitted to the client, the report will be reviewed internally. The client will be provided with the opportunity make some inputs before the report is finalised.

Visibility and Constraints

The proposed powerline route is accessible although visibility in some sections was compromised by dense vegetation cover. In addition, due to the subterranean nature of cultural remains this report should not be construed as a record of all archaeological and historic sites in the area.

Assumptions and Limitations

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be noted that archaeological deposits (including graves and traces of archaeological heritage) usually occur below the ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA, Section 36(6)). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion. Some assumptions were made as part of the study

and therefore some limitations, uncertainties and gaps in information would apply. It should, however, be noted that these do not invalidate the findings of this study in any significant way:

- The proposed project activities will be limited to specific right of site as detailed in the development layout.
- The construction team to provide link and access to the proposed powerline route by using the existing access roads and there will be no construction beyond the demarcated site.
- No excavations or sampling were undertaken, since a permit from heritage authorities is required to disturb a heritage resource. As such the results herein discussed are based on solely observed indicators. However, these surface observations concentrated on exposed sections such as road cuts and clear farmland.
- This study did not include any ethnographic and oral historical studies nor did it investigate the settlement history of the area.

The following photographs illuminate the nature and character of the project area.



Plate 1: Showing the substation associated with the proposed development.



Plate 2: Showing the existing substation associated with the proposed powerline development



Plate 3: Showing access roads within the project area



Plate 4: Showing buildings and structures in the vicinity of the proposed powerline route.



Plate 5: Showing proposed powerline route.



Plate 6: Showing the proposed powerline route.



Plate 7: Showing existing powerline distribution lines within the proposed development area.



Plate 8: Showing tall grass and shrubs along the proposed powerline route.



Plate 9: Showing the proposed powerline route.



Plate 10: Showing access roads within the proposed project area



Plate 11: Showing the proposed powerline route.



Plate 12: Showing the proposed powerline route.



Plate 13: Showing the proposed powerline route.



Plate 14: Showing existing water distribuion networks within the proposed project area.



Plate 15: Showing buildings and infrastructure whose age could not be confirmed during the survey.



Plate 16: Showing existing Safari substation



Plate 17: Showing existing developments within the proposed project area

8.CULTURE HISTORY BACKGROUND OF THE PROJECT AREA

The Madibeng area is dominated by stone walled sites that date from the Late Iron Age (LIA), some of which were occupied into the historical period. These sites are associated with Tswana groups such as the Kgatla Kgafêla, the Tlhako, the Tlôkwa and Nguni-affiliated clans who were either living in the area from an early time, before the Sotho-Tswana arrived, or who were descended from Mzilikazi's Ndebele who temporarily occupied several settlement complexes in the area before they moved to the Zeerust-Marico area in AD1832. Descendants of these original Nguni-speaking people today live in Groenfontein, Rhenosterhoek and Kraalhoek. Several heritage surveys have been conducted and established the spatial distribution of stone walled sites across the Madibeng area.

The focus of most of the research articles is on the distribution of stone walled sites across the region; settlement patterns, settlement features and settlement styles which can be distinguished. The research resulted in identifying a well and clearly defined Tswana settlement pattern which outlines the spatial composition of the Tswana village on a macro as well as on a micro level (Pistorius 1992, 1996). The pre-historical and historical background to the Madibeng area in the North-West Province of South Africa has been documented in a number of sources which range from oral historical accounts of the origins and settlement history of indigenous people such as Tswana groups who occupied the region from as early as AD1600 (Legassick 1969, 2010; Horn 1996; Manson 1996; Morton 2003, 2008; Bengha & Manson 2010); post-graduate studies which outline the origins and development of the town of Rustenburg (Pretorius 1967; Bergh 1992), and ethnographic accounts about the origins, settlement history, cultural life ways and material culture of Tswana groups who lived in the area during the last four centuries (McDonald 1940; Breutz 1953, 1987; Pauw 1960; Redelinghuys 1968).

Clusters of LIA stone walled sites occur along the lower slopes of mountains where dolerite was used in the construction of these sites. These clusters of sites are composed of varying numbers of individual sites (*dikgôrô* or *imisi*) that were grouped together to form villages which covered large surface areas. All these clusters are located along the lower contours or along the spurs of mountains such as Mogare, Mmatone, Patshwane and Mukukunupu on Tuschenkomst 135JP and Witkeifontein 136JP (Pistorius 1997a, 1997b, 1998). At least one remaining stone walled site was recorded near Assen Police Station. Most of these stone walled sites are located on hill tops and foothills. The majority of these settlements are well preserved and clearly represent Sotho-Tswana sites which are referred to as *dikgôrô* (*kgôrô*, singular).

These sites were occupied by a few related family groups (*masika*/*Masika*) under the leadership of an elderly male (*dikgosana*/*Dikgosana*). The common *kgôrô* comprised of an outer scalloped wall in which the dwellings for the

family groups were constructed according to their social standing within the group (Harris 1963; Lye (ed.) 1975). The central part of the settlement housed the enclosures in which small and large stock such as cattle, goat and sheep were kept. An area in which the court (kgotla) was established also occurs near the centre of these villages and in close proximity of the dwelling complex of the ruler of the site. These settlements (dikgôrô) are usually clustered together and the number of individual sites in a cluster may vary. Clusters of dikgôrô cover large surface areas and in fact constitute small or large cultural landscapes (townscapes). Clusters of dikgôrô may constitute large villages known as metse (singular, motse) which falls under the supervision of a ruler (kgosi). Tswana sites are common on the mountain Patshwane, but also occur on Mmatone, Mogare, Mukukunupu and possibly Tlhorosane as well.

The following settlement types can be distinguished: Zulu or Ndebele villages (singular umuzi, plural imizi) were composed of oval outer walls that enclosed an inner set of structures consisting of several isolated or linked (cattle) enclosures and dwellings for the various ezigabeni (regiments) on opposite sides of centrally situated cattle enclosures, as well as an upper isigodlo area, where the village chief (induna) lived. Several of these Zulu (Ndebele) imizi were observed on the mountains of Mogare, Mmatone and Mukukunupu.

There are some sites that are composed of long terrace walls that are stepped down the slopes of mountains. The terrace walls are associated with a few small and large enclosures. These sites are not demarcated with clear outer boundary walls. It is possible that these sites, which also occur elsewhere in the Rustenburg and Brits areas, may have been built by Ndebele people. Sites were found that display a combination of Zulu (Ndebele) and Tswana features, such as Mogare, which has well-defined regimental quarters (ezigabeni). Such quarters are a characteristic feature of Zulu villages. These quarters occur in one half of the settlement and malapa, a Tswana feature, occur in the other half of the site. It seems as if sites with mixed Tswana and Zulu features also occur on Mmatone.

Large numbers of Late Iron Age communities established themselves in large village complexes near and on the slopes and spurs of mountains and kopjes such as Mogare, Mmatone, Patshwane and Mukukunupu. Some sites are located at isolated hills such as Mabjaneng and Motsotsodi also occur in the area. These communities were all probably related to the pre-historical and historical Kgatla. These pre-historical and historical Iron Age farmers were followed by the first colonists during the second half of the 19th century. The Voortrekkers continued a mixed farming existence in the Madibeng area until the land was expropriated in order to be incorporated in the former Bophuthatswana homeland.

Stone Age Archaeology

In the larger geographical area, there is material manifestation of Stone Age people but generally, Highveld area did not attract much of habitation in these early times due to lack of rock-shelters and domination of exposed environments. Thus, it is mostly in the vicinity of large watercourses and lower parts of mountains that some ESA

(~ 2.6 million to 250 000 years ago) materials (crude chopper and other unifacial tools of the Oldowan industry and the characteristic Acheulian hand axes and cleavers) and MSA (~ 250 000 to 40-25 000 years ago) materials are generally found. The MSA is a flake-technological stage characterized by faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology. More technological and behavioural changes than those witnessed in the MSA, occurred during the LSA (~ 40-25 000, to recently, 100 years ago), which is also associated with *Homo Sapiens* (Barham and Mitchell 2008). For the first time we get evidence of people's activities derived from material other than stone tools (ostrich eggshell beads, ground bone arrowheads, small bored stones and wood fragments) (Deacon and Deacon 1999). The LSA people are also credited with the production of rock art (engravings and paintings), which is an expression of their complex social and spiritual beliefs (Parkington *et al.* 2008). However, it is important to note that no Stone Age material was recorded during the limited field walking, perhaps due to the presence of tall grass. Nonetheless, it is possible to encounter isolated finds of these objects in the study area, even though these would most likely be out of context due to the modern disturbances.

Iron Age Archaeology

Metal using communities entered southern Africa from West and East Africa around AD 200 and brought with them settled agriculture, metal working, animal husbandry, pottery making and social stratification (Huffman 2007). The movement and spread of these EIA (~ AD200-1000) people within southern Africa seem to have been restricted to the summer rainfall (because of sorghum and millet farming) and they did not occupy much of the central interior Highveld area in South Africa. Ecologically, they preferred to settle on the alluvial soils near rivers for agricultural purposes and access to water. Thus, it was not until the mid-second millennium AD that serious Iron Age occupation began in the larger geographical area (including the study area) of the South African Highveld. The study area falls within the known distribution of LIA (~ AD1100-1840) people who made Uitkomst facies (AD1650-1820 and associated with a mixture of the Ntsuanatsatsi facies (ancestral Nguni speakers) and Olifantspoort facies (ancestral Sotho-Tswana speakers) (Huffman 2007: 173). Olifantspoort facies (AD1500-1700) represents the second phase of the Moloko sequence and settlements with people that made this type of ceramics are known in the area between the Vaal River and Pretoria. The people, just like the markers of Buispoort facies (third phase of the Moloko sequence AD1700-1840), settled in aggregated clusters where space was also demarcated by extensive stone walling. The distribution of Buispoort facies also covers the Tshwane area. The post 1600s coincided with dry spells that saw an incursion of the Tshwane area by Nguni-speaking groups such as the Manala and Ndzundza Ndebeles from KwaZulu Natal (Huffman 2007: 448).

The early 19th century also saw another invasion of the Tshwane area by Nguni-speakers who were running away from the widespread upheaval perpetuated by the reign of the Zulu king, Shaka. One of the fleers was Mzilikazi, the Ndebele king briefly settled north west of Pretoria, extensively raided the plateau between 1825 and 1837 and

displaced various Sotho-Tswana groups (Bergh 1999: 109-119). Mzilikazi was the cause of much of the destruction of the smaller tribes in the area across the Vaal. Mzilikazi decimated the Bakwena tribe, who had peacefully occupied the area. He also wiped out the Ba-Hurutsi for hundreds of miles around him. Mzilikazi wielded a path of destruction as far as the Orange River, annihilating all earlier inhabitants of the area. The men from these tribes were killed while the young boys and girls were incorporated into the Matabele fold. Mzilikazi made Pretoria his home by building two military kraals on the Apies River: "enDinaneni" was situated north-west of Pretoria on the road to Hartebeespoort Dam and "enKungweni" was built along the Daspoort range of hills. His main residence was on the south side of Meintjieskop, but he later moved to the north of the Magaliesberg range, to a place named "emHlahlandlela". However, in 1836 it was reported to Mzilikazi that thousands of White people were moving southwards to invade his land. Feeling threatened, Mzilikazi launched a devastating attack on the Voortrekkers, led by General Hendrik Potgieter. The Voortrekkers managed to ward off their attackers after suffering great loss of life and livestock. Shortly after this, Mzilikazi launched a second attack on the Voortrekkers, and this time his men carried off all the livestock owned by the Whites. Potgieter, determined to succeed, launched a counter-attack on the Matabele at Mosega and managed to recover a considerable number of their livestock. In December 1837, Potgieter launched another attack on Mzilikazi and his tribe. This battle, together with the one waged by Dingane a few months earlier, was enough to send Mzilikazi fleeing across the Limpopo. With Mzilikazi out of the way, it was easy for Potgieter to drive the rest of the Matabele stragglers to the north over Silkaatsnek.

Some 100 years earlier, African farmers in the Fokeng cluster built stonewalled settlements in the Tshwane area that emphasised the centre/side axis. From the air, these earlier settlements resemble a 'fried egg'; that is, a smooth outer ring about 60 metres across enclosed in a central cattle byre about 20 metres in diameter. This type has its origins among BaFokeng living near the hill Ntsuanatsatsi in the Free State (see pre- history of Bloemfontein). When these early BaFokeng people moved north across the Vaal River, the occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand in the region of Klipriviersberg and the Magaliesberg to the north (Horn 1996). Most of the LIA sites also tend to cluster around the hills and ridges as well as on the more open flatlands, especially in areas where outcrops (dolerite, etc.) occur. All the same, none of these LIA sites were identified in the study area. If any of these sites were available, they have since been destroyed by subsequent modern developments that took place since the mid-20th century.

The project area falls within a well-documented cultural landscape. Many Iron Age Sites around Ga Rankuwa to Zeerust have been recorded previously (Berg 1999:7-8). The general project area was previously inhabited by Twana speaking communities from around AD1600. The ceramic sequence for the Sotho Tswana is referred to as Moloko and consists of different facies with origins in either the Icon facies or a different branch associated with Nguni speakers. Several sites belonging to the Madikwe and Olifantspoort facies (from Icon) have been

recorded in the project area. These sites date to between AD 1500 and 1700 and predate stone walling ascribed to Sotho-Tswana speakers. Thousands of stone walled sites built along the bases of hills and mountain ranges in the project area (Pistorius 2012). Several LIA stone walled sites were recorded along the Swartkoppies mountain range which is located to the north of the project area. A detailed survey of the mountain range on the farm Hoekfontein recorded more than 470 individual archaeological sites (Kusel 2003) covering an area of about 1000 hectares (Pelser 2007). However, due to extensive residential and mining developments on the mountain range more than 110 of these sites were destroyed for example Mmakau LIA site was rescued after threats by mining (SAHRIS Case ID 3464 & 5686) (Kusel 2005, 2006).

Thirty-seven previously recorded sites are on record in the 2527 DB Topographic Map at Wits database (Van der Walt 2012). These include MSA, LSA, Rock Art and LIA Moloko Stone walled sites. The Medunsa LIA stone walled complex is located in the broader project area. Mike Taylor (1979) classified the Mmakau sites and the Medunsa sites fell within the group 2, particularly group 2a dating between AD 1650 and AD 1840. Sotho Tswana stonewalled sites with Uitkomst pottery have been recorded in the project area and dates to the seventeenth to nineteenth centuries. The most important heritage site near Ga-Rankuwa and Mabopane area is the Tswaing Meteorite Crater. The crater is 1.13 kilometre in diameter and originally was 200 meter deep. The crater was formed 200 000 years ago by a meteorite. The sediments in the crater contain salt which has been utilized by Stone Age people as far back as 100 000 years.

Historical (~ AD 1840 to 1950) Archaeology

During the 17th century isolated migrations of white travellers, missionaries and adventurers from the Cape who passed through Pretoria occurred. Notable amongst them include the Scottish travellers Robert Scoon and William McLuckie, Robert Moffat, James Archbell, Andrew Smith and Captain William Cornwallis Harris (Bergh 1999: 12-13). Some of these missionaries and explorers kept diaries that today form part of invaluable history about indigenous communities which these travellers encountered during missionary and exploration journeys. However, permanent and mass-movement of white settlers occurred in the 1830s with the arrival of Voortrekkers escaping British rule in the Cape Colony (Ross 2002: 39). Because, these first white colonists who settled on the Highveld were farmers, they were also interested in water and grazing for cattle, water for crop-farming, trees, thatching grass, clay for making bricks and pots, mild climate, wildlife and the presence of the mountains as shelter and protection. This resulted in fierce clashes with African communities were also farmers and iron workers. For example, the area claimed by the Voortrekkers after the conquest of Mzilikazi was declared at a public meeting on 16 October 1840 held in Potchefstroom and initially included the Suikerbosrant (Heidelberg), Schoonspruit (Klerksdorp), Moirivier (Potchefstroom) and Magaliesberg but by 1855 settlements had been established beyond the originally claimed area. It is within this early expansion that Pretoria was founded in 1855

and became the capital of South Africa, then known as the Zuid-Afrikaanse Republiek (ZAR), in 1860 (Theron 1984: 1-3).

In recent colonial history, the area played host to different competing local settler communities. The area was a scene of series of colonial wars. By the end of the 19th century, the region was placed under British rule and the local people displaced. This part of North West and Gauteng was scene of the most recorded colonial war, the Anglo-Boer War 1899-1902. At the end of these wars, the colonial era of the Union of South Africa and the subsequent apartheid regimes on the Republic of South Africa, some areas were reserved for African settlements often referred to as Bantu homelands such as the Bophuthatswana (Tswana Home land).

Intangible Heritage

As defined in terms of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003) intangible heritage includes oral traditions, knowledge and practices concerning nature, traditional craftsmanship and rituals and festive events, as well as the instruments, objects, artefacts and cultural spaces associated with group(s) of people. Thus, intangible heritage is better defined and understood by the particular group of people that uphold it. In the present study area, very little intangible heritage remains because no historically known groups occupied the study area and most of the original settler descendants moved away from the area.

SAHRIS Data Base and Impact Assessment Reports in the project area

Several AIA/HIA studies were conducted in the project area. The studies include powerline, substation and mining projects completed by Pelsler (2007), Van Sschalkwyk (2007, 2008, 2013, 2014), Pistorius, J.C.C. & Miller, S. (2011), Tomose (2015), Kusel (2005, 2006, 2008, 2011, 2012), Birkholtz (2007) and Mlilo 2018a, 2018b. The studies confirm the occurrence of several stone walled Late Iron Age sites in the project area. A search on the SAHRIS data base confirmed that several sites have been rescued or destroyed by infrastructure developments residential and agriculture. The reports also mention the existence of structures older than 60 years and traditional burial sites in the project area but none will be affected by the proposed development project.

9.Results of the Field Study

The main cause of impacts to archaeological sites is direct, physical disturbance of the archaeological remains themselves and their contexts. It is important to note that the heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from their original position. The severe impacts are likely to occur during clearance and digging for foundations, indirect impacts may occur during movement of construction vehicles. The excavation for underground distribution pipelines will result in the relocation or destruction of all existing surface heritage material. Similarly, the clearing of access roads will impact material that lies buried in the surface sand. Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified, and their significance assessed prior to construction.

It is important to note, that due to the localised nature of archaeological resources, that individual archaeological sites could be missed during the survey, although the probability of this is very low within the proposed development site. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during excavation. The purpose of the AIA is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed development by means of mitigation measures (see appended Chance Find Procedure). The study concludes that the impacts will be negligible since the site has previously been cleared. The following section presents results of the field survey. The following section presents results of the archaeological and heritage survey conducted within the proposed development project site.

Table 3: Summary of findings

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	None exists within the development footprint
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists
Historical settlements and townscapes	None survives along the proposed powerline route
Landscapes and natural features of cultural significance	None
Archaeological and palaeontological sites	LIA sites occur in the general project area but not within the study area
Graves and burial grounds	None exists or are identifiable on the basis of a surface survey
Movable objects	None
Overall comment	The surveyed area has no identifiable heritage resources on the

Archaeology

Several LIA stone walled settlements were previously recorded in the general project area. The area north west of Tshwane is known for its archaeological stone walled sites especially to the mountains in the south of the study area. Although the project area is heavily degraded from previous and current land use such as NECSA infrastructure, there is a possibility of encountering archaeological remains buried beneath the ground. It is the considered opinion of the author that the chances of recovering significant archaeological materials is low to medium on the project site.

Based on the field study results and field observations, the receiving environment for the proposed powerline development has low to medium potential to yield previously unidentified archaeological sites during subsurface excavations and construction work associated with the proposed development. Literature review also revealed that no Stone Age sites are shown on a map contained in a historical atlas of this area. This however should rather be seen as a lack of research in the area and not as an indication that such features do not occur.

Burial grounds and graves

Human remains and burials are commonly found close to archaeological sites; they may be found in abandoned and neglected burial sites, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Human remains are usually identified when they are exposed through erosion. In some instances, packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work, then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial, they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500).

The field survey did not record any burial site along the proposed powerline route. It should however be noted that burial grounds and gravesites are accorded the highest social significance threshold (see Appendix 3). They have both historical and social significance and are considered sacred. In addition, graves are very critical proving footprint of communities seeking land restitution. Wherever they exist or not, they may not be tempered with or interfered with during any proposed development. It is also important to note that the possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. Although the possibility of encountering previously unidentified burial sites is low along the project site, should such sites be

identified during subsurface construction work, they are still protected by applicable legislations and they should be protected.

Public Monuments and Memorials

No public memorials and monuments were recorded along the proposed powerline route.

Historical Buildings and Structures

There are no confirmable historical buildings and structures within the project site. As such the proposed powerline project does not trigger Section 34 of the NHRA which protects buildings and structures that are older than 60 years old.

Palaeontology

The proposed powerline development is located within an area that is considered to have a High Palaeontological Sensitivity due to the probability of finding stromatolites in this region (Durand 2022). There is a possibility of encountering stromatolites during construction. As such a Chance Find Procedure has been appended to this report and the Palaeontology report (see Durand 2022 for detailed recommendations).

10. ASSESSMENT OF SIGNIFICANCE

Assessment Criteria

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to the proposed development under study for meeting a project need. The significance of the impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be determined through a synthesis of the criteria below:

Table 4: Criteria Used for Rating of Impacts

Nature of the impact (N)		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.

Magnitude(M)		
Minor	2	Negligible effects on heritage or social functions / processes. Includes areas / environmental aspects which have already been altered significantly and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on heritage or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).
Moderate	6	Notable effects on heritage or social functions / processes. Includes areas / environmental aspects which have already been moderately modified and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on heritage or social functions / processes. Includes areas / environmental aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent (E)		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration (D)		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence (P)		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

$$\text{Significance Points (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

The significance of the ecological impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown in the below.

Table 5: Criteria for Rating of Classified Impacts

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will definitely have an influence on the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

The significance of each activity should be rated without mitigation measures (WOM) and with mitigation (WM) measures for both construction, operational and closure phases of the proposed development.

Table 6: Impact Assessment Matrix for proposed development

Impacts and Mitigation measures relating to the construction during Operational Phase														
Activity/Aspect	Impact /	Aspect	Nature	Magnitude	Extent	Duration	Probability	Significance before mitigation	Mitigation measures	Magnitude	Extent	Duration	Probability	Significance after mitigation
Clearing and construction	Destruction of archaeological remains	Cultural heritage	-	6	2	2	2	20	<ul style="list-style-type: none"> None required because no archaeological remains were recorded Use chance find procedure to cater for accidental finds 	2	1	1	1	4
	Disturbance of graves	Cultural heritage	-	2	1	1	1	4	<ul style="list-style-type: none"> None required 	2	1	1	1	4
	Disturbance of buildings and structures older than 60 years old	Operational	-	2	1	1	1	4	<ul style="list-style-type: none"> None required 	2	1	1	1	4
Movement of equipment	Destruction public monuments and plaques	Operational	-	2	1	1	1	4	<ul style="list-style-type: none"> Mitigation is not required because there are no public monuments within the proposed development site 	2	1	1	1	4

Cumulative Impacts

The European Union Guidelines define cumulative impacts as: "Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. Therefore, the assessment of cumulative impacts for the proposed development is considered the total impact associated with the proposed development when combined with other past, present, and reasonably foreseeable future developments projects. An examination of the potential for other projects to contribute cumulatively to the impacts on heritage resources from this proposed development was undertaken during the preparation of this report. The total impact arising from the proposed project (under the control of the applicant), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The impacts of the proposed development were assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation, this provides a good method of assessing a project's impact. However, in this case there are several infrastructure developments, including residential, agricultural activities where baselines have already been affected, the proposed powerline construction will continue to add to the impacts in the region, it was deemed appropriate to consider the cumulative effects of proposed development. As such increased development in the project area will have a number of cumulative impacts on heritage resource whether known or covered in the ground. For example, during construction phase they will be increase in human activity and movement of heavy construction equipment and vehicles that could change, alter or destroy heritage resources within and outside the development sites given that archaeological remains occur on the surface. Cumulative impacts that could result from a combination of the proposed development and other actual or proposed future developments in the broader study area include site clearance and the removal of topsoil could result in damage to or the destruction of heritage resources that have not previously been recorded for example abandoned and unmarked graves.

Heritage resources such as burial grounds and graves and archaeological as well as historical sites are common occurrences within the greater study area. These sites are often not visible and as a result, can be easily affected or lost. Furthermore, many heritage resources in the greater study area are informal, unmarked and may not be visible, particularly during the wet season when grass cover is dense. As such, construction workers may not see these resources, which results in increased risk of resource damage and/or loss. Vibrations and earth moving activities associated with drilling and excavation have the potential to crack/damage rock art covered surfaces, which are known to occur in the greater study area. In addition, vibration from traffic has the potential to impact buildings and features of architectural and

cultural significance. Earth moving and extraction of gravel have the potential to interact with archaeology, architectural and cultural heritage.

No specific paleontological resources were found in the project area during the time of this study; however, this does not preclude the fact that paleontological resources may exist within the greater study area. As such, the proposed development has the potential to impact on possible paleontological resources in the area. sites of archaeological, paleontological, or architectural significance were not specifically identified and cumulative effects are not applicable. the nature and severity of the possible cumulative effects may differ from site to site depending on the characteristics of the sites and variables. Cumulative impacts that need attention are related to the impacts of access roads and impacts to buried heritage resources. Allowing the impact of the proposed development to go beyond the surveyed area would result in a significant negative cumulative impact on sites outside the surveyed area. A significant cumulative impact that needs attention is related to stamping by especially construction vehicles during clearance and excavation within the development sites. Movement of heavy construction vehicles must be monitored to ensure they do not drive beyond the approved sites. No significant cumulative impacts, over and above those already considered in the impact assessment, are foreseen at this stage of the assessment process. Cumulative impacts can be significant, if construction vehicles are not monitored to avoid driving through undetected heritage resources.

Mitigation

Mitigation is not required for the proposed powerline development. Work may be allowed to commence without any further studies and monitoring.

11. STATEMENT OF SIGNIFICANCE

Aesthetic Value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture, and material of the fabric; sense of place, the smells and sounds associated with the place and its use.

The proposed development site will be situated within an environment and associated cultural landscape, which, although developed by existing settlements and ad infrastructure developments, remains

representative of the original historical environment and cultural landscape of this part of North West Province. The local communities consider the project area a cultural landscape linked to their ancestors and history. However, the proposed development will not alter this aesthetic value in any radical way since it will add to the constantly changing and developing settlements.

Historic Value

Historic value encompasses the history of aesthetics, science, and society, and therefore to a large extent underlies all the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase, or activity. It may also have historic value as the site of an important event. For any given place, the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

Scientific value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality, or representativeness, and on the degree to which the place may contribute further substantial information. Scientific value is also enshrined in natural resources that have significant social value. For example, pockets of forests and bushvelds have high ethnobotany value.

Social Value

Social value embraces the qualities for which a place has become a focus of spiritual, religious, political, local, national, or other cultural sentiment to a majority or minority group. Social value also extends to natural resources such as bushes, trees and herbs that are collected and harvested from nature for herbal and medicinal purposes.

12. DISCUSSION

Various specialists conducted several Phase 1 Archaeological/ Heritage studies for various infrastructure developments in the project area since 2006. The current study should be read in conjunction with previous Phase 1 Impact Studies conducted in the proposed project area. Although these studies recorded sites of significance for example the studies include powerline, substation and mining projects completed by Pelsler (2007), Van Sschalkwyk (2007, 2008, 2013, 2014), Pistorius, J.C.C. & Miller, S. (2011), Tomose (2015), the recorded sites are far from the current proposed site. The lack of confirmable archaeological sites recorded during the current survey is thought to be a result of:

1. Due to the altered nature of the proposed development site which is approximately 65% built up, archaeological remains may have been destroyed during construction of power generation and distribution infrastructure. It should borne in mind that the absence of confirmable and significant archaeological cultural heritage site is not evidence in itself that such sites did not exist within the proposed project site.

Based on the significance assessment criterion employed for this report, the proposed powerline route was rated **low** from an archaeological perspective, However, it should be noted that significance of the site of Interest is not limited to presence or absence of physical archaeological sites. Significant archaeological remains may be unearthed during construction. (see appended chance find procedure).

13. RECOMMENDATIONS

5. From a heritage perspective supported by the findings of this study, the proposed Lomond Safari 88 KV powerline is feasible. However, the proposed powerline development should be approved to proceed as planned under observation that the development dimensions do not extend beyond the surveyed route.
6. The foot print impact of the proposed Lomond Safari 88 KV powerline construction development and associated infrastructure should be kept to minimal to limit the possibility of encountering chance finds.
7. Should chance archaeological materials or human remains be exposed during subsurface construction work on any section of the proposed powerline servitude, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where

remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations.

8. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no significant cultural heritage resources barriers to the proposed development. The Heritage authority may approve the proposed Safari-Lomond 88 kV powerline construction to proceed as planned with the view to implement the recommendations here in made

14. CONCLUSION

MuTingati & Project Consulting was appointed by Eskom Holdings SOC Ltd to conduct a Phase 1 AIA/HIA for the proposed Lomond-Safari 88 KV Powerline construction within the Madibeng Local Municipality of the North West Province. The proposed powerline distribution development is within a heavily disturbed landscape that is situated within an agriculture, industrial and residential area. Desktop research revealed that the general project area is rich in LIA sites (Kusel 2003) and Pelsler (2007). In terms of the archaeology and heritage in respect of the proposed power distribution development, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, still remains and the developer and contractors are advised to be diligent and observant during construction of the proposed development site. The procedure for reporting chance finds has clearly been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the proposed powerline construction cannot proceed.

15. BIBLIOGRAPHY

Australia ICOMOS (1999) The Burra Charter: The Australia ICOMOS charter for places of cultural significance. Burwood.

Bergh, J.S., (ed.) Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies. Pretoria: J. L. van Schaik Uitgewers. 1999.

Bickford, A. and Sullivan, S. 1977. "Assessing the research significance of historic sites" in S Sullivan and S Bowdler (eds) Site Surveys and Significance assessment in Australian Archaeology. Canberra: ANU.

Birkholtz, P. 2007. Phase 1 Heritage Impact Assessment for the Proposed development of the Madibeng Manor Township on certain portions of the farm Hartebeespoort C 419 JQ in the vicinity of Brits, North West Province

Burke, H. and Smith, C. 2004. The archaeologist's field handbook. Australia. Allen and Unwin.

Cooper, M. A; Firth, A, Carman, J. & Wheatley, D. (eds.) 1995: Managing Archaeology. London: Routledge.

Deacon, J. 1996. Archaeology for Planners, Developers and Local Authorities. National Monuments Council. Publication no. P02IE.

Deacon, J. 1997. Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology. In: Newsletter No. 49, SepU998. South African Association of Archaeology.

Deacon, H. J. and Deacon J. 1999. Human beginnings in South Africa. Cape Town: David Philips Publishers.

Evers, T.M. 1983. Oori or Moloko? The origins of the Sotho!Swana on the evidence of the Iron Age of the Transvaal. S. Afr. 1. Sci. 79(7): 261-264.

Fourie, W. 2008. A Phase I Heritage Impact Assessment for Bushveld View Estate x14 on Portion 67 and 66 of the Farm Hartebeesfontein 445 JQ, District of Madibeng, North West Province

Glazewski, J., 2000: Environmental Law in South Africa. Durban: Butterworths.

- Hall, S.L. 1981. Iron Age sequence and settlement in the Rooiberg, Thabazimbi area. Unpublished MA thesis, University of the Witwatersrand.
- Hammond-Tooke, D.1993. The roots of Black South African. Johannesburg: WUP.
- Huffman, T.N. 2008 Lenasia South Impact Assessment, Gauteng National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- Huffman, T.N. 2007. Handbook for the Iron Age. Pietermaritzburg: UKZN Press.
- Hamilton, C. (ed.). 1995. The Mfecane Aftermath: Reconstructive debates in Southern African History. Johannesburg: WUP.
- Kusel, U.S. 2008. Cultural Heritage Resources Impact Assessment of Hartbeessfontein 445 JQ, R14, R51 and 48 (Ingwenys) Flower Farm (Pty) Ltd, Brits North West Province
- Kusel, U.S. 2009. Cultural Heritage Resources Impact Assessment of Portion 41, 239, (Portions 29, 69, 78, 86, 89, 92, 93, 235, 77, 112 and 238 known as Ingwenys Flower Farm (Pty) Ltd, Madibeng, North West
- Kusel, U.S. 2011. Cultural Heritage Resources Impact Assessment of portions of portion 3 of the farm Buffelskloof 511 IQ, North West Province
- Kusel, U.S. 2012. Cultural Heritage Resources Impact Assessment of proposed new powerline 132kv at the Bakfontein Substation, Madibeng, North West Province
- Maggs, T. 1984a. Ndongondwane: a preliminary report on an Early Iron Age site on the lower Tugela River. *Annals of the Natal Museum* 26: 71-93.
- Maggs, T.M., Ward, V. 1984b. Early Iron Age sites in the Muden area of Natal. *Annals of the Natal Museum* 26: 105-140.
- Major Jackson, H. M. 1904. Potchefstroom. Drawn in the Surveyor-Generals Office and photolithographed at the Government Printing Works, Pretoria. Pretoria: Government Printing Works.
- Pelser, A.J and Van Vollenhoven. 2008. A report on a heritage impact Assessment for proposed Sky Chrome mining in the Mooinoi, Brits District, North West Province.
- Pelser, A.J and Van Vollenhoven. 2008. A report on a heritage impact Assessment for proposed development on the remaining extent of Portion 1 of the farm Doornhoek 329 JQ and Plumani Ranch 595 JQ, Hekpoort, Gauteng.

Pistorius, J.C.C. 1997a. The Matabele village which eluded History, Part I. South African Journal of Ethnology. 20(1), 26-38.

Pistorius, J.C.C. 1998. eMhlalandlela, a Matabele settlement in the Bankeveld. South African Journal of Ethnology. 21(2), 55-65.

Pistorius, J.C.C. 1999. Archaeological survey and assessment of Norite mines on the farms Tweedepoort (283JQ) and Boschpoort (284JQ) in the Rustenburg district. Incorporating the Taylor mining area, the Bekker mining area, the Transvaal mining area and the Springbok mining area. Addendum to the Environmental Management Programme Reports done for Marlin and Kelgran Norite. Report prepared for Marlin and Kelgran Norite Mines.

Pistorius, J.C.C. 2000. A Phase I archaeological survey of portions of the farm Middelkraal 466JQ in the Central Bankeveld for Western Platinum Mine's proposed tailings dam. Unpublished report prepared for C. van der Westhuizen (Private geohydrologist) and for Western Platinum Mine.

Pistorius, J.C.C. 2004. A Heritage Impact Assessment (HIA) study for the Vodacom Makolokwe Base Station Selfbuild B 13057 in the North-West Province of South Africa. Unpublished report for Eskom.

Pistorius, J.C.C. 2005. A preliminary investigation of a settlement unit (kgoro) in the Tlhôgôkgôlô (Wolhuterskop) motse of the Bakwena Bamogale (Bapô) with the aim of developing this Late Iron Age stone walled complex into an archaeo-tourism destination. Unpublished report for Madibeng Town Council.

Pistorius, J.C.C. 2006a. A Phase I Heritage Impact Assessment (HIA) study for Boynton Platinum's new proposed mining areas near the Pilanesberg in the North-West Province of South Africa. Unpublished report prepared for Metago Environmental Engineers.

Pistorius, J.C.C. 2006b. An extended Phase I Heritage Impact Assessment (HIA) study for Pilanesberg Platinum Mines (PPM) new proposed mining areas near the Pilanesberg in the North-West Province of South Africa. Unpublished report prepared for Metago Environmental Engineers.

Pistorius, J.C.C. 2006c. A Phase I Heritage Impact Assessment (HIA) study for Boynton Platinum's new proposed mining areas near the Pilanesberg in the North-West Province of South Africa. Unpublished report prepared for Metago Environmental Engineers (combination of first two studies).

Pistorius, J.C.C. 2007a. Report on monitoring a seismic survey for heritage resources on parts of various farms in the Madibeng (Brits) district in the North-West Province of South Africa. Unpublished report prepared for Lonmin and SAHRA.

Pistorius, J.C.C. 2007b. A Phase I Heritage Impact Assessment (HIA) study for the proposed new Sedibelo Platinum Mine near the Pilanesberg in the 13 North-West Province of South Africa. Unpublished report prepared for Barrick Platinum.

Pistorius, J.C.C. 2009. A Phase I Heritage Impact Assessment (HIA) study for Pilanesberg Platinum Mine's (PPM) proposed rock waste dump extension near the Pilanesberg in the North-West Province of South Africa. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2010. Brief report on heritage matters at Pilanesberg Platinum Mine. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2010. A Phase I Heritage Impact Assessment for the farm Magazynskraal 2JQ near the Pilanesberg in the North-West Province. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2011. A Phase I Heritage Impact Assessment (HIA) study for Pilanesberg Platinum Mine's (PPM) proposed amendment of the closure objectives of the Tuschenkomst Open Pit and community water supply scheme near the Pilanesberg in the North-West Province. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2011. Follow-up report on Lonmin's exploration activities on Vlaktefontein 207JP and Diamand 206JP near the Pilanesberg in the North-West Province: completion of exploration activities during 2011. Unpublished report prepared for Lonmin Platinum.

Pistorius, J.C.C. 2011. A Phase I Heritage Impact Assessment (HIA) study for Pilanesberg Platinum Mine's (PPM) proposed amendment of the closure objectives of the Tuschenkomst Open Pit and community water supply scheme near the Pilanesberg in the North-West Province. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2011. A Phase I Heritage Impact Assessment (HIA) study for a combined platinum mining operation near Pilanesberg in the North-West Province: the extension of the Tuschenkomst open cast pit for Pilanesberg Platinum Mine. Unpublished report prepared for LSR Consulting (Africa) (Pty) Ltd.

Pistorius, J.C.C. & Miller, S. 2011. A Phase 2 Archaeological study of a Late Iron Age stone walled site on Middelkraal 466JQ near Marikana in the North-West Province. Unpublished report for Lonmin and the South African Heritage Resources Agency.

Pistorius, J.C.C. 2012. A Phase I Heritage Impact Assessment (HIA) study for a combined Platinum Mining operation near the Pilanesberg in the North-West Province: the extension of the Tuschenkomst open cast pit for Pilanesberg Platinum Mine. Unpublished report prepared for Pilanesberg Platinum Mine.

Pistorius, J.C.C. 2012 (a). A Phase I heritage impact assessment for the extension of Lonmin Platinum's Tailings Dam (site D6) on the farm Middelkraal 466JQ in the Central Bankeveld in the North-West Province. Unpublished report prepared for Lonmin Platinum.

Pistorius, J.C.C. 2012 (b). A Phase I heritage impact assessment for the extension of Lonmin Platinum's Tailings Dam (site D6) to incorporate Tailings Dam 8 (T8) and Tailings Dam 9 (T 9) on the farm Middelkraal 466JQ in the Central Bankeveld in the North-West Province. Unpublished report prepared for Lonmin Platinum.

Pistorius, J.C.C. 2013. An updated 1 Phase I heritage impact assessment for the Pilanesburg Platinum mine near Pilanesberg in the North West Province.

Pistorius, J.C.C. 2013. A Phase I heritage impact assessment study for the extension of Lonmin for the Platinum mine tailing dam on the farm Middelkraal 466 JQ near Madibeng in the Central Bankveld in the North West Province.

Plug, I, and Baderhorst, S. 2006. Notes on the Fauna from Three Late Iron Age Mega-Sites, Boitsemagano, Molokwane and Mabjanamatshwana, North West Province,

Rasmussen, R.K. 1978. Migrant Kingdom: Mzilikazi's Ndebele in South Africa. David Philip: Cape Town.

Roodt, F. 2005. Phase I Heritage Resources Impact Assessment. Lonmin Platinum Surface rights (WPL & EPL) and Tribal Land Marikana: North-West Province. Unpublished report prepared by R and R Cultural Resource Consultants.

Roodt, F & Roodt, H. 2006 (updated 2011). Report: rescue recovery of skeletal remains. Lonmin Smelter, Marikana North-West Province. Unpublished report prepared for Lonmin and the South African Heritage Resources Authority.

Senne, M. 2016. Phase 1 Heritage Impact Assessment for proposed Township Development on remains of the Farm Tyne 250 JQ within the jurisdiction of the Madibeng Local Municipality, North West Province

South Africa. The South African Archaeological Bulletin 61 (183): 57-67.

Rasmussen, R.K. 1978 Migrant kingdom: Mzilikaqzi"s Ndebele in South Africa. London: Rex Collings

Ross, R. 1999. A concise history of South Africa. Cambridge University Press. Cambridge.

South Africa, 1983. Human Tissue Act. Government Gazette.

South Africa 1999. National Heritage Resources Act (No 25 of 1999), Government Gazette. Cape Town.

SAHRA APMHOB. 2004. Policy for the management of Archaeology, Palaeontology, Meteorites and Heritage Object. SAHRA: Cape Town.

SAHRA APM. 2006. Guidelines: Minimum standards for the archaeological and palaeontological Component of Impact Assessment Reports. SAHRA: Cape Town.

SAHRA APMHOB 2002. General Introduction to surveys, impact assessments and management plans. SAHRA: CT.

SAHRA. 2002. General guidelines to Archaeological Permitting Policy. SAHRA: Cape Town.

SAHRA. 2002. General Introduction to surveys, impact assessments and management plans.

SAHRA. What to do when Graves are uncovered accidentally.

SAHRA Report Mapping Project Version 1.0, 2009

SAHRIS (Cited 16 February 2016)

Tomose, G. N. 2015. A Heritage Impact Assessment of Ngwedi Turnings Eskom deviations as part of Ngwedi Turn ins Transmission powerlines, North West Province, South Africa

Van Schalkwyk, J.A. 2003. Document and sampling of LIA Tswana sites impacted upon by Seismic exploration for mining development at Farm Beestkraal 290 JQ near Thekwane near Rustenburg District, North West Province

Van Schalkwyk, J.A. 2011. Heritage Assessment report for the proposed Mountain View Estate development on Portions of the Farms Simon'sview, Kalkheveuwel, Rhenostterspruit and Riverside, North West Province

Van Schalkwyk. 2013. Basic Heritage Assessment report for the proposed Winterveld 132kv powerline, Garankuwa Region, North West and Gauteng Province

Van Schalkwyk, J. A. 2014. Cultural Heritage Assessment for the proposed Rhombus 88kv Distribution powerline and substation west of Brits, North West Province

Van Vollenhoven. 2011. A report on a Phase 1 Heritage Impact Assessment for proposed Rietfontein Manor x20 Retirement Centere on the farm Rietfontein 485 JQ, North West Province.

Van Vollenhoven, A.C. 2013. A report on a Cultural Heritage Phase 1 Heritage Impact Assessment for proposed Eskom Lethabong Project Close to Brits North West Province

Van der Walt. 2012. A report on a Phase 1 Heritage Impact Assessment for proposed Kgabalatsane PVC Solar facility near Brits, North West Province

Van der Walt. 2013. Archaeological Scoping Report for the proposed Kgabalatsane Solar facility, North West Province

Wilson, M. 1969. Changes in social structure in southern Africa: the relevance of kinship studies to the historian. In: L. Thompson, (ed)., African societies in southern Africa. London: Heinemann, pp. 71–85.

APPENDIX 1: LEGAL BACK GROUND AND PRINCIPLES OF HERITAGE RESOURCES MANAGEMENT IN SOUTH AFRICA

Extracts relevant to this report from the National Heritage Resources Act No. 25 of 1999, (Sections 5, 36 and 47):

General principles for heritage resources management

5. (1) All authorities, bodies and persons performing functions and exercising powers in terms of this Act for the management of heritage resources must recognise the following principles:

(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;

(b) every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans;

(c) heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and

(d) heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

(2) To ensure that heritage resources are effectively managed—

(a) the skills and capacities of persons and communities involved in heritage resources management must be developed; and

(b) provision must be made for the ongoing education and training of existing and new heritage resources management workers.

(3) Laws, procedures and administrative practices must—

(a) be clear and generally available to those affected thereby;

(b) in addition to serving as regulatory measures, also provide guidance and information to those affected thereby; and

(c) give further content to the fundamental rights set out in the Constitution.

(4) Heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.

(5) Heritage resources contribute significantly to research, education and tourism and they must be developed and presented for these purposes in a way that ensures dignity and respect for cultural values.

(6) Policy, administrative practice and legislation must promote the integration of heritage resources conservation in urban and rural planning and social and economic development.

(7) The identification, assessment and management of the heritage resources of South Africa must—

(a) take account of all relevant cultural values and indigenous knowledge systems;

(b) take account of material or cultural heritage value and involve the least possible alteration or loss of it;

(c) promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;

(d) contribute to social and economic development;

(e) safeguard the options of present and future generations; and

(f) be fully researched, documented and recorded.

Burial grounds and graves

36. (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or

damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

(7) (a) SAHRA must, over a period of five years from the commencement of this Act, submit to the Minister for his or her approval lists of graves and burial grounds of persons connected with the liberation struggle and who died in exile or as a result of the action of State security forces or agents provocateur and which, after a process of public consultation, it believes should be included among those protected under this section.

(b) The Minister must publish such lists as he or she approves in the Gazette.

(8) Subject to section 56(2), SAHRA has the power, with respect to the graves of victims of conflict outside the Republic, to perform any function of a provincial heritage resources authority in terms of this section.

(9) SAHRA must assist other State Departments in identifying graves in a foreign country of victims of conflict connected with the liberation struggle and, following negotiations with the next of kin, or

relevant authorities, it may re-inter the remains of that person in a prominent place in the capital of the Republic.

General policy

47. (1) SAHRA and a provincial heritage resources authority—

(a) must, within three years after the commencement of this Act, adopt statements of general policy for the management of all heritage resources owned or controlled by it or vested in it; and

(b) may from time to time amend such statements so that they are adapted to changing circumstances or in accordance with increased knowledge; and

(c) must review any such statement within 10 years after its adoption.

(2) Each heritage resources authority must adopt for any place which is protected in terms of this Act and is owned or controlled by it or vested in it, a plan for the management of such place in accordance with the best environmental, heritage conservation, scientific and educational principles that can reasonably be applied taking into account the location, size and nature of the place and the resources of the authority concerned, and may from time to time review any such plan.

(3) A conservation management plan may at the discretion of the heritage resources authority concerned and for a period not exceeding 10 years, be operated either solely by the heritage resources authority or in conjunction with an environmental or tourism authority or under contractual arrangements, on such terms and conditions as the heritage resources authority may determine.

(4) Regulations by the heritage resources authority concerned must provide for a process whereby, prior to the adoption or amendment of any statement of general policy or any conservation management plan, the public and interested organisations are notified of the availability of a draft statement or plan for inspection, and comment is invited and considered by the heritage resources authority concerned.

(5) A heritage resources authority may not act in any manner inconsistent with any statement of general policy or conservation management plan.

(6) All current statements of general policy and conservation management plans adopted by a heritage resources authority must be available for public inspection on request.

APPENDIX 2: CHANCE FIND PROCEDURE FOR THE PROPOSED THE
PROPOSED LOMOND-SAFARI 88 KV POWERLINE CONSTRUCTION WITHIN
MADIBENG LOCAL MUNICIPALITY UNDER BOJANALA DISTRICT
MUNICIPALITY IN THE NORTH-WEST PROVINCE

December 2021

ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
ECO	Environmental Control Officer
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

16. CHANCE FIND PROCEDURE

Introduction

An Archaeological Chance Find Procedure (CFP) is a tool for the protection of previously unidentified cultural heritage resources during construction. The main purpose of a CFP is to raise awareness of all construction, construction workers and management on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources. Chance Finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Chance Finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the site manager must ensure that all personnel on the proposed powerline route understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance find procedure details the necessary steps to be taken if any culturally significant artefacts are found during construction.

Definitions

In short, the term 'heritage resource' includes structures, archaeology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 37. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as this require the implementation of separate criteria for CFPs.

Background

Eskom Holdings SOC Ltd proposes to construct Lomond-Safari 88 kv powerline construction within Madibeng Local Municipality under Bojanala District Municipality in the North-West Province, the development site is subject to heritage survey and assessment at planning stage in accordance with the NHRA. These surveys are based on surface indications alone and it is therefore possible that sites or significant archaeological remains can be missed during surveys because they occur beneath the surface. These are often accidentally exposed in the course of construction or any associated construction work and hence the need for a Chance Find Procedure to deal with accidental finds. In this case an extensive Archaeological Impact Assessment was completed by Mlilo (2021) along the 88kV powerline pathway. The AIA/HIA conducted was very comprehensive covering the entire site.

Purpose

The purpose of this Chance Find Procedure is to ensure the protection of previously unrecorded heritage resources along the proposed project site. This Chance Find Procedure intends to provide the applicant and contractors with appropriate response in accordance with the NHRA and international best practice. The aim of this CFP is to avoid or reduce project risks that may occur as a result of accidental finds whilst considering international best practice. In addition, this document seeks to address the probability of archaeological remains finds and features becoming accidentally exposed during digging of foundations and movement of construction equipment. The proposed construction activities have the potential to cause severe impacts on significant tangible and intangible cultural heritage resources buried beneath the surface or concealed by tall grass cover. Mutingati Consultants developed this Chance Find Procedure to define the process which govern the management of Chance Finds during construction. This ensures that appropriate treatment of chance finds while also minimizing disruption of the construction schedule. It also enables compliance with the NHRA and all relevant regulations. Archaeological Chance Find Procedures are to promote preservation of archaeological remains while minimizing disruption of construction scheduling. It is recommended that due to the low to moderate archaeological potential of the project area, all site personnel and contractors be informed of the Archaeological Chance Find procedure and have access to a copy while on site. This document has been prepared to define the avoidance, minimization and mitigation measures necessary to ensure that negative impacts to known and unknown archaeological remains

as a result of project activities and are prevented or where this is not possible, reduced to as low as reasonably practical during construction and mining.

Thus, this Chance Finds Procedure covers the actions to be taken from the discovering of a heritage site or item to its investigation and assessment by a professional archaeologist or other appropriately qualified person to its rescue or salvage.

CHANCE FIND PROCEDURE

General

The following procedure is to be executed in the event that archaeological material is discovered:

- All construction/clearance activities in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the find site.
- Briefly note the type of archaeological materials you think you have encountered, and their location, including, if possible, the depth below surface of the find
- Report your discovery to your supervisor or if they are unavailable, report to the project ECO who will provide further instructions.
- If the supervisor is not available, notify the Environmental Control Officer immediately. The Environmental Control Officer will then report the find to the Site Manager who will promptly notify the project archaeologist and SAHRA.
- Delineate the discovered find/ feature/ site and provide 25m buffer zone from all sides of the find.
- Record the find GPS location, if able.
- All remains are to be stabilised *in situ*.
- Secure the area to prevent any damage or loss of removable objects.
- Photograph the exposed materials, preferably with a scale (a yellow plastic field binder will suffice).
- The project archaeologist will undertake the inspection process in accordance with all project health and safety protocols under direction of the Health and Safety Officer.
- **Finds rescue strategy:** All investigation of archaeological soils will be undertaken by hand, all finds, remains and samples will be kept and submitted to a Museum as required by the

heritage legislation. In the event that any artefacts need to be conserved, the relevant permit will be sought from the SAHRA.

- An on-site office and finds storage area will be provided, allowing storage of any artefacts or other archaeological material recovered during the monitoring process.
- In the case of human remains, in addition to the above, the SAHRA Burial Ground Unit will be contacted and the guidelines for the treatment of human remains will be adhered to. If skeletal remains are identified, an archaeological will be available to examine the remains.
- The project archaeologist will complete a report on the findings as part of the permit application process.
- Once authorisation has been given by SAHRA, the Applicant will be informed when construction activities can resume.

Management of chance finds

Should the Heritage specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), ISS will notify SAHRA and/or PHRA on behalf of the applicant. SAHRA/PHRA may require that a search and rescue exercise be conducted in terms of NHRA Section 38, this may include rescue excavations, for which ISS will submit a rescue permit application having fulfilled all requirements of the permit application process.

In the event that human remains are accidentally exposed, SAHRA Burial Ground Unit or ISS Heritage Specialist must immediately be notified of the discovery in order to take the required further steps:

- a. Heritage Specialist to inspect, evaluate and document the exposed burial or skeletal remains and determine further action in consultation with the SAPS and Traditional authorities:
- b. Heritage specialist will investigate the age of the accidental exposure in order to determine whether the find is a burial older than 60 years under the jurisdiction of SAHRA or that the exposed burial is younger than 60 years under the jurisdiction of the Department of Health in terms of the Human Tissue Act.

- c. The local SAPS will be notified to inspect the accidental exposure in order to determine where the site is a scene of crime or not.
- d. Having inspected and evaluated the accidental exposure of human remains, the project Archaeologist will then track and consult the potential descendants or custodians of the affected burial.
- e. The project archaeologist will consult with the traditional authorities, local municipality, and SAPS to seek endorsement for the rescue of the remains. Consultation must be done in terms of NHRA (1999) Regulations 39, 40, 42.
- f. Having obtained consent from affected families and stakeholders, the project archaeologist will then compile a Rescue Permit application and submit to SAHRA Burial Ground and Graves Unit.
- g. As soon as the project archaeologist receives the rescue permit from SAHRA he will in collaboration with the company/contractor arrange for the relocation in terms of logistics and appointing of an experienced undertaker to conduct the relocation process.
- h. The rescue process will be done under the supervision of the archaeologist, the site representative and affected family members. Retrieval of the remains shall be undertaken in such a manner as to reveal the stratigraphic and spatial relationship of the human skeletal remains with other archaeological features in the excavation (e.g., grave goods, hearths, burial pits, etc.). A catalogue and bagging system shall be utilised that will allow ready reassembly and relational analysis of all elements in a laboratory. The remains will not be touched with the naked hand; all Contractor personnel working on the excavation must wear clean cotton or non-powdered latex gloves when handling remains in order to minimise contamination of the remains with modern human DNA. The project archaeologist will document the process from exhumation to reburial.
- i. Having fulfilled the requirements of the rescue/burial permit, the project archaeologist will compile a mitigation report which details the whole process from discovery to relocation. The report will be submitted to SAHRA and to the company.

Note that the relocation process will be informed by SAHRA Regulations and the wishes of the descendants of the affected burial

**17. PALAEOLOGICAL DESKTOP
STUDY FOR THE PROPOSED
CONSTRUCTION OF ESKOM LOMOND
SAFARI 88KV POWERLINE,
NORTHWEST PROVINCE**

PALAEOLOGICAL DESKTOP ASSESSMENT

Integrated Specialist Services (Pty) Ltd

Tel: +27 11 037 1565

Mobile: +27 71 685 9247

Email: trust.mlilo@gmail.com

Web: www.issolutions.co.za

9 January 2022

DECLARATION OF INDEPENDENCE

I, Jacobus Francois Durand declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



Palaeontological specialist:

Dr JF Durand (Sci. Nat.)

BSc Botany & Zoology (RAU), BSc Zoology (WITS), Museology Dipl. (UP),
Higher Education Diploma (RAU), PhD Palaeontology (WITS)

Table Contents

1. EXECUTIVE SUMMARY	76
2. INTRODUCTION.....	77
3. TERMS OF REFERENCE FOR THE REPORT	78
4. DETAILS OF THE STUDY AREA AND THE TYPE OF ASSESSMENT:.....	82
5. GEOLOGICAL SETTING OF THE STUDY AREA	85
6. PALAEOLOGICAL POTENTIAL OF THE STUDY AREA	87
7. CONCLUSION AND RECOMMENDATIONS:.....	90
8. CHANCE FINDS PROCEDURE	91
9. REFERENCES:	92

List of Figures:

Figure 1: Google Earth photo indicating the study site (red line).....	83
Figure 2: Geological Map of the study area and surroundings (adapted from the 2526 Rustenburg 1:250 000 Geology Map, Geological Survey, 1981) (White line indicates study site).....	85
Figure 3: Palaeontological sensitivity of the region (SAHRA, 2022) (Blackline indicates Study Site)....	87
Figure 4: Stromatolites at Sterkfontein Caves	89
Figure 5: Polished vertical section through stromatolites (from: <a 142="" 252="" 849="" 866"="" data-label="Section-Header" href="https://www.google.co.za/imgres?imgurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fekmps%2Fshops%2Ftherockgallery%2Fimages%2Fstromatolite-large-polished-slice-100-million-years-old-andes-mountains-bolivia-%5B4%5D-1997-p.jpg&imgrefurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fstromatolite-large-polished-slice-100-million-years-old-----andes-mountains-bolivia-1997p.asp&docid=2vFkg_vqTH0I5M&tbnid=FQcixxQGdtBUFM%3A&vet=10ahUKEwinl8rfwqjcAhUGsKQKHf8wBy0QMwgsKAYwBg..i&w=500&h=500&bih=918&biw=1280&q=stromatolites&ved=0ahUKEwinl8rfwqjcAhUGsKQKHf8wBy0QMwgsKAYwBg&iact=mrc&uact=8))</td> <td>89</td> </tr> </table> </div> <div data-bbox="> <h2>List of Tables</h2> 	

Table 1: Geological legend of the study area	86
--	----

Table 2: Palaeontological legend of the Map88

EXECUTIVE SUMMARY

The proposed development will take place in an area that is considered to have a High Palaeontological Sensitivity due to the probability of finding stromatolites in this region. The chances of exposing stromatolites during construction are good and for this reason, a Chance Find Procedure has been included in the Recommendations (pp 19-20).

Even though it is not essential to salvage every piece of stromatolite exposed because of its ubiquitous distribution in the dolomites of South Africa, it will be prudent not to destroy a major stromatolite find for scientific and heritage reasons.

Although the chances of finding an exceptional site that surpasses those already known to science are small, it remains important to alert the palaeontological community and SAHRA if a major fossil find is made and to prevent the destruction of those fossiliferous areas by moving the pylon further away.

INTRODUCTION

The palaeontological heritage of South Africa is unsurpassed and can only be described in superlatives. The South African palaeontological record gives us insight in *i.a.* the origin of life, dinosaurs and humans. Fossils are also used to identify rock strata and determine the geological context of the geological formations and the chronostratigraphy of Southern Africa.

Some of the oldest evidence of life on Earth came from the rocks at Barberton which contain fossilized bacteria. Stromatolites in the dolomitic regions in South Africa were formed by shallow marine mats of cyanobacteria. The cyanobacteria, which were some of the first photosynthesising organisms, provided most of the oxygen in our atmosphere.

The first evidence of tectonic plate movement was discovered after studying the distribution of Karoo-age fossils in South Africa and other continents and subcontinents such as India, Antarctica, South America and Australia. Fossils are also used to study evolutionary relationships, sedimentary processes and palaeoenvironments.

South Africa is probably best known palaeontologically for having more than half of all the hominin specimens in the world, the greatest variety of hominins in a country and the longest record of continuous hominin occupation in the world.

The Heritage Act of South Africa stipulates that fossils and fossil sites may not be altered or destroyed. The purpose of this document is to detail the probability of finding fossils in the study area which may be impacted by the proposed development.

TERMS OF REFERENCE FOR THE REPORT

According to the South African Heritage Resources Act (Act 25 of 1999) (Republic of South Africa, 1999), certain clauses are relevant to palaeontological aspects for a terrain suitability assessment.

- **Subsection 35(4)** 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 with the detection or recovery of metals or archaeological material or objects or use such equipment for the recovery of meteorites.
- **Subsection 35(5)** When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is underway, and where no application for a permit has been submitted and no heritage resources management procedures in terms of section 38 have been followed, it may-
- (a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
- (b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
- (c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and

- (d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

South Africa's unique and non-renewable palaeontological heritage is protected in terms of the NHRA. According to this act, heritage resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and a permit from the relevant heritage resources authority.

As areas are developed and landscapes are modified, heritage resources, including palaeontological resources, are threatened. As such, both the environmental and heritage legislation require that development activities be preceded by assessing the impact undertaken by qualified professionals. Palaeontological Impact Assessments (PIAs) are specialist reports that form part of the wider heritage component of:

- Heritage Impact Assessments (HIAs) are called for in terms of Section 38 of the National Heritage Resources Act, Act No. 25, 1999 by a heritage resources authority.
- Environmental Impact Assessment process as required in terms of other legislation listed in s. 38(8) of NHRA;
- Environmental Management Plans (EMPs) required by the National Department of Forestry, Fisheries and the Environment

HIAs are intended to ensure that all heritage resources are protected, and where it is not possible to preserve them in situ, appropriate mitigation measures are applied. An HIA is a comprehensive study that comprises palaeontological, archaeological, built environment, living heritage, etc specialist studies. Palaeontologists must acknowledge this and ensure that they collaborate with other heritage practitioners. Where palaeontologists are engaged for the entire HIA, they must refer heritage components for which they do not have the expertise to appropriate specialists. Where they are engaged specifically for palaeontology, they must draw the attention of environmental consultants and developers to the need for the assessment of other aspects of heritage. In this sense, Palaeontological Impact Assessments that are part of Heritage Impact Assessments are similar to specialist reports that form part of the EIA reports.

The standards and procedures discussed here are therefore meant to guide the conduct of PIAs and specialists undertaking such studies must adhere to them. The process of assessment for the palaeontological (PIA) specialist components of heritage impact assessments, involves:

Scoping stage is in line with regulation 28 of the National Environmental Management Act (No. 107 of 1998) Regulations on Environmental Impact Assessment. This involves an **initial assessment** where the specialist evaluates the scope of the project (based, for example, on NID/BIDs) and advises on the form and extent of the assessment process. At this stage, the palaeontologist may also decide to compile a **Letter of Recommendation for Exemption from further Palaeontological Studies**. This letter will state that there is little or no likelihood that any significant fossil resources will be impacted by the development. This letter should present a reasoned case for exemption, supported by consultation of the relevant geological maps and key literature.

A **Palaeontological Desktop Study** – the palaeontologist will investigate available resources (geological maps, scientific literature, previous impact assessment reports, institutional fossil collections, satellite images or aerial photos, etc) to inform an assessment of fossil heritage and/or exposure of potentially fossiliferous rocks within the study area. A Desktop studies will conclude whether a further field assessment is warranted or not. Where further studies are required, the desktop study would normally be an integral part of a field assessment of relevant palaeontological resources.

A **Phase 1 Palaeontological Impact Assessment** is generally warranted where rock units of high palaeontological sensitivity are concerned, levels of bedrock exposure within the study area are adequate; large-scale projects with high potential heritage impact are planned, and where the distribution and nature of fossil remains in the proposed project area is unknown. In the recommendations of Phase 1, the specialist will inform whether further monitoring and mitigation are necessary. The Phase 1 should identify the rock units and significant fossil heritage resources present, or by inference likely to be present, within the study area, assess the palaeontological significance of these rock units, fossil sites or other fossil heritage, comment on the impact of the development on palaeontological heritage resources and make recommendations for their mitigation or conservation, or for any further specialist studies that are required in order to adequately assess the nature, distribution and conservation value of palaeontological resources within the study area.

A **Phase 2 Palaeontological Mitigation** involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or the recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and/or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before Phase 2 may be implemented.

A **'Phase 3' Palaeontological Site Conservation and Management Plan** may be required in cases where the site is so important that development will not be allowed, or where development is to co-exist with the resource. Developers may be required to enhance the value of the sites retained on their properties with appropriate interpretive material or displays as a way of promoting access to such resources to the public.

The assessment reports will be assessed by the relevant heritage resources authority and depending on which piece of legislation triggered the study, a response will be given in the form of a Review Comment or Environmental Authorization (EA). In the case of PIAs that are part of EIAs or EMPs, the heritage resources authority will issue a comment or a record of decision that may be forwarded to the consultant or developer, relevant government department or heritage practitioner and where feasible to all three.

**DETAILS OF THE STUDY AREA AND THE TYPE OF
ASSESSMENT:**

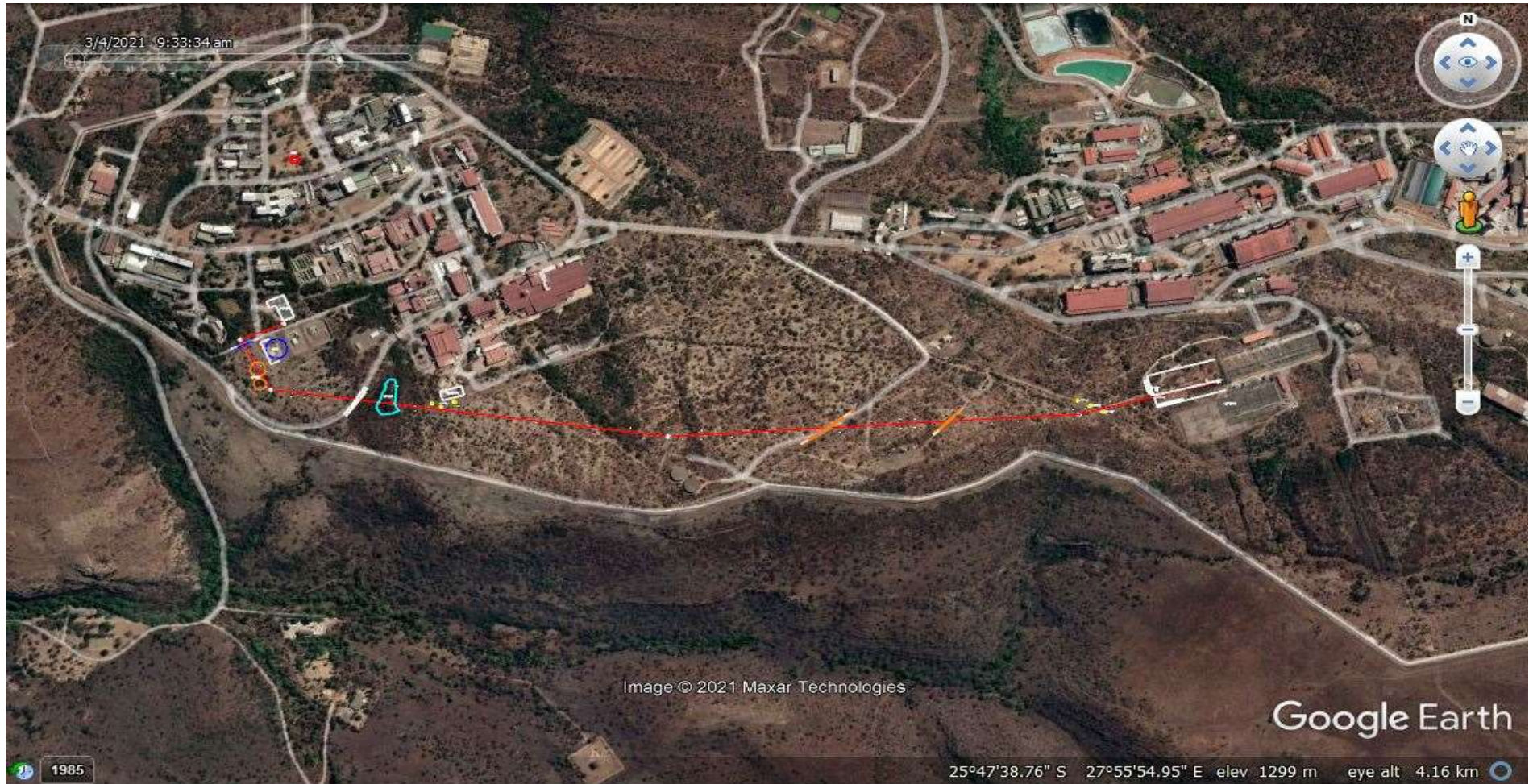


Figure 3: Google Earth photo indicating the study site (red line)

The relevant literature and geological map for the region in which the development is proposed to take place, have been studied for a Palaeontological Desktop Assessment. The study site is on part of the NECSA campus and is mostly covered with natural bush.

GEOLOGICAL SETTING OF THE STUDY AREA

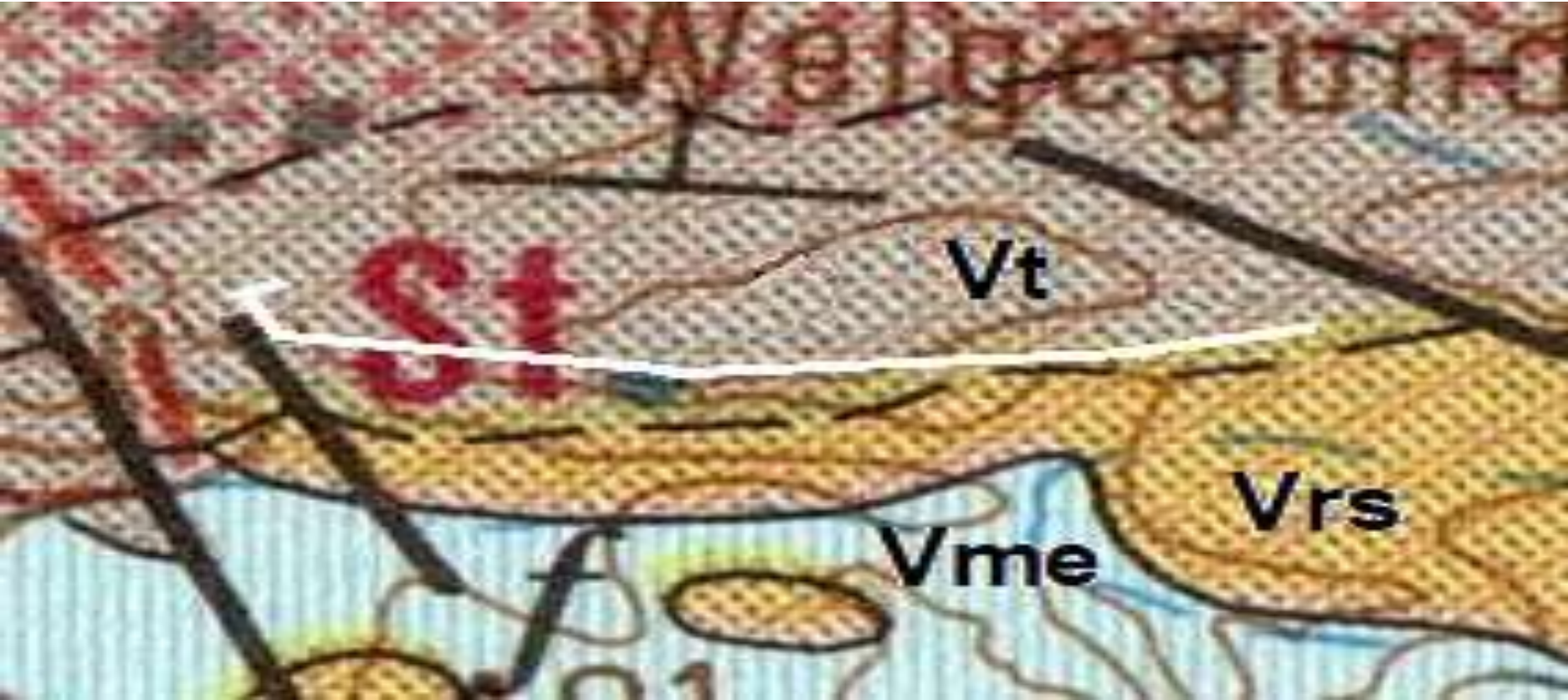


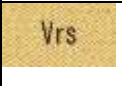
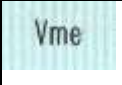


Figure 4: Geological Map of the study area and surroundings (adapted from the 2526 Rustenburg 1:250 000 Geology Map, Geological Survey, 1981) (White line indicates study site)

Table 7: Geological legend of the study area

	Lithology	Stratigraphy			Age
	Shale, slate and quartzite	Timeball Hill Formation	Pretoria Group	Tansvaal Supergroup	Vaalian
 Vi	Shale, slate, siltstone, conglomerate in places				
 Vrs	Shale	Rooihoogte Formation			
 Vme	Chert-rich dolomite, chert	Eccles Formation of the Malmani Subgroup	Chuniespoort Group		

The study area is underlain by the rocks of the Timeball Hill Formation of the Pretoria Group of the Transvaal Supergroup. It consists of lacustrine and fluvio-deltaic mudrocks with diamictite, conglomerates, quartzite and minor lavas. The Timeball Hill Formation is underlain by the shales of the Rooihoogte Formation of the Pretoria Group which is exposed to the south of the study site. The Pretoria Group is underlain discordantly by the chert-rich dolomite and chert of the Eccles Formation of the Malmani Subgroup of the Chuniespoort Group of the Transvaal Supergroup (Eriksson *et al.*, 2009).

. PALAEOLOGICAL POTENTIAL OF THE STUDY AREA



Figure 5: Palaeontological sensitivity of the region (SAHRA, 2022) (Blackline indicates Study Site)

Table 8: Palaeontological legend of the Map

Colour	Palaeontological Significance	Action
RED	VERY HIGH	Field assessment and protocol for finds are required.
ORANGE	HIGH	A desktop study is required and based on the outcome of the desktop study, a field assessment is likely.
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required.

The lacustrine and fluvio-deltaic deposits of the Timeball Hill Formation are considered to have a very High Palaeontological Sensitivity (see Fig 3) due to the stromatolites that occur in its lower strata (Groenewald & Groenewald, 2014).

From an evolutionary, environmental, ecological and geological perspective stromatolites are very important. Stromatolites were formed approximately 2.2 Ga ago when mats of cyanobacteria covered the seafloor up to a certain depth which allowed them to photosynthesize. The slimy surface caused fine-grained mud and precipitates to adhere to them after which cyanobacterial strands consisting of chains of bacterial cells would continue to extend by means through the sediment in order to get enough light to photosynthesize. Very thin layers of sediments were set down during this process. In time these sedimentary layers were petrified and turned into columns of rock (see Figs 4 & 5). Some of these columns which are stacked closely together are as thin as pencils, while others are formed mushroom-like scallops and others formed bigger domes and even mega domes which are meters across.

These bacteria were amongst the first photosynthesizing organisms and it is thought that the chloroplast found in plants has evolved from a cyanobacterial ancestor. Cyanobacteria released oxygen as a by-product of photosynthesis in such quantities that it irrevocably changed the atmosphere from a reducing to an oxidizing atmosphere which had a devastating effect on most bacteria which were and still are anoxic. On the other hand, higher organisms such as fungi, plants and animals would not have been able to exist without the oxygen in the atmosphere and would therefore not have evolved if it were not for cyanobacteria.



Figure 6: Stromatolites at Sterkfontein Caves



Figure 7: Polished vertical section through stromatolites

(from:https://www.google.co.za/imgres?imgurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fekmps%2Fshops%2Ftherockgallery%2Fimages%2Fstromatolite-large-polished-slice-100-million-years-old-andes-mountains-bolivia-%5B4%5D-1997-p.jpg&imgrefurl=http%3A%2F%2Fwww.therockgallery.co.uk%2Fstromatolite-large-polished-slice----100-million-years-old----andes-mountains-bolivia-1997p.asp&docid=2vFkg_vqTH015M&tbnid=FQcixxQGdtBUFM%3A&vet=10ahUKEwinl8rfwqjAhUGsKQKHf8wBy0QMwgsKAYwBg..i&w=500&h=500&bih=918&biw=1280&q=stromatolites&ved=0ahUKEwinl8rfwqjAhUGsKQKHf8wBy0QMwgsKAYwBg&iact=mr&uact=8)

CONCLUSION AND RECOMMENDATIONS:

The proposed line is underlain by 2.2 Ga lacustrine and fluvio-deltaic deposits of the Timeball Hill Formation of the Pretoria Group of the Transvaal Supergroup. This formation is considered to have a High Palaeontological Sensitivity due to the probability of finding stromatolites in this region. Although stromatolites are considered to be fossils, there are hundreds of square kilometres of stromatolites in South Africa and it is not considered to be so scarce that every stromatolite has to be preserved. In the event of the discovery of an exceptional stromatolite formation, it is advised that it should on principle not be destroyed if an alternative position for the placing of a specific pylon can be found.

In the event of an exceptional fossil site being discovered during construction, the ECO should follow the Chance Find Procedure.

. CHANCE FINDS PROCEDURE

PROCEDURE FOR CHANCE PALAEOLOGICAL FINDS

Extracted and adapted from the National Heritage Resources Act, 1999 Regulations Reg No. 6820, GN: 548.

The following procedure must be considered in the event that previously unknown fossils or fossil sites are exposed or found during the life of the project:

1. Surface excavations should continuously be monitored by the ECO and for any fossil material being unearthed the excavation must be halted.
2. If fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed.
3. The ECO then has to take a GPS reading of the site and take digital pictures of the fossil material and the site from which it came.
4. The ECO then should contact a palaeontologist and supply the palaeontologist with the information (locality and pictures) so that the palaeontologist can assess the importance of the find and make recommendations.
5. If the palaeontologist is convinced that this is a major find an inspection of the site must be scheduled as soon as possible in order to minimise delays to the development.

From the photographs and/or the site visit the palaeontologist will make one of the following recommendations:

- a. The material is of no value so development can proceed, or:
 - b. Fossil material is of some interest and a representative sample should be collected and put aside for further study and to be incorporated into a recognised fossil repository after a permit was obtained from SAHRA for the removal of the fossils, after which the development may proceed, or:
 - c. The fossils are scientifically important, and the palaeontologist must obtain a SAHRA permit to excavate the fossils and take them to a recognised fossil repository, after which the development may proceed.
7. If any fossils are found then a schedule of monitoring will be set up between the developer and palaeontologist in case of further discoveries.

REFERENCES:

Eriksson, PG; Altermann, W. & Hartzler, F.J. (2009) The Transvaal Supergroup and its precursors. In: Johnson, M.R.; Anhaeuser, C.R. & Thomas, R.J. The Geology of South Africa. The Geological Society of South Africa, Johannesburg, pp. 237-260.

Geological Survey (1981) 2526 Rustenburg 1:250 000 Geology Map,

Groenewald, G. & Groenewald, D. (2014) SAHRA Palaeotechnical Report - Palaeontological Heritage of North West, South African Heritage Resources Agency.