



**PHASE 1**

**HERITAGE IMPACT ASSESSMENT RELATING TO THE PROPOSED  
VENETIA MINE SOLAR PHOTO VOLTAIC (PV) FACILITY AND  
ASSOCIATED POWERLINE, MUSINA LOCAL MUNICIPALITY OF THE  
VHEMBE DISTRICT, LIMPOPO PROVINCE, SOUTH AFRICA.**



*Compiled by: Millenium Heritage Group (PTY) LTD*

*for:*

*Zutari Consultant, Environment and Planning*

41 Matroosberg Road, Newlands,

Pretoria

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**i. Technical and Executive Summaries**

<b>Property details</b>	
Province	Limpopo
Magisterial District	Vhembe District
Topo-cadastral map	2230
Coordinates	S22.28. 19. 04 and E 29.16.37.01
Closest town	Alldays and Musina
Farm name	Farms Drumsheugh and Regina

<b>Development criteria in terms of Section 38 (1) of the NHR Act 25 of 1999</b>	<b>Yes</b>	<b>No</b>
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 sqm	Yes	
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 sqm		No
Any other development category, public open space, squares, parks, recreation grounds		No

<b>Development</b>	
Description of development	Proposed Venetia Mine Solar PV Plant and associated infrastructure
Project name	Venetia Mine Solar Photo- Voltaic (PV) Plant and associated infrastructure
Developer	SPV
Heritage consultant	Dr. Eric. N Mathoho, Millennium Heritage Pty Ltd
Internal Reviewer	Professor Shadreck Chirikure
Purpose of the study	Heritage Impact Assessment to identify and assess significance of sites (if any) to be impacted by the proposed Solar Photovoltaic (PV) establishment and associated infrastructure

<b>Land use</b>	
Previous land use	Venetia Mine Nature Reserve
Current land use	Same as above

## **(ii) Executive Summary**

SPV seeks to generate solar photovoltaic (PV) electricity created from a proposed Solar Energy Facility (SEF) near the south-western corner of the Venetia Limpopo Nature Reserve (VLNR). The preferred site is situated on the Farm Drumsheugh, while the alternative site is located on the Farm Regina. The study area is about 40 km northeast of Alldays and approximately 80 kilometers west of Musina Central Business District (CBD) (Siyathembana 2012; 2017). Because Venetia Mine is 22 km due south of Mapungubwe National Park and World Heritage Site, this assessment also considered the ICOMOS Guidelines for Assessing Impact near World Heritage properties. The Mapungubwe cultural landscape hosts abundant natural and cultural heritage sites dating to diverse periods and with various levels of significance. They are comprised of natural, archaeological, colonial, sacred and paleontological sites.

Venetia Mine is within the basket of a thriving biodiversity sanctuary (Venetia Limpopo Nature Reserve) governed by a very strict code of conduct to sustainably protect cultural and natural heritage as part of the Diamond Route (Davies-Mostert 2012). In keeping with best practice, De Beers has been conducting heritage impact assessments since feasibility studies that ultimately resulted in the commissioning of the mine in the early 1990s. These impact assessments identified low significance sites (Grade 3b: Low local significance and Grade 3c: Negligible significance) within the mine precinct and the Nature Reserves corridors. To ensure that the proposed SEF and associated infrastructure meets the environmental requirements in line with the National Environmental Management Act 107 of 1998 as well as the National Heritage Resources Act 25 of 1999, SPV appointed Zutari, who in turn appointed Millennium Heritage Group (PTY) LTD as an independent heritage specialist to undertake a Heritage Impact Assessment (HIA) of the proposed project.

In line with these statutory requirements, this report provides an assessment for the proposed SEF and associated infrastructure. As required by the SAHRA minimum standards, it integrates assessment of different heritage including palaeontology. Nationally, the study was conditioned by the provisions of the National Heritage Resources Act (Act 25 of 1999) and supporting regulations such as the South African Heritage Resources Agency Minimum Standards for Impact Assessment. The assessment was also informed by the international standards such as the ICOMOS

Guidelines on Impact Assessment near World Heritage places, and ICOMOS Australia's Burra Charter. Furthermore, the Technical workshop hosted by UNESCO and Mining Companies held in Cairns in 2000 published standards that mining companies must adhere to ensure that they safeguard heritage and the environment. When combined, these standards of best practice motivate for robust impact assessment processes and a cautious approach to the management of sites. They set out firmly that the cultural significance of heritage places must guide all decisions, developmental and otherwise.

Other than these regulatory instruments, United Nations established the Sustainable Development Goals, which target among other things to end poverty, protection of the planet and prosperity for all by the year 2030. In addition, the Africa Union developed Agenda 2063 "*The Africa We Want*", which is the continent's 50-year development blueprint which aims to utilize the continent's natural and cultural heritage resources to improve the standard of living for the continent's inhabitants. Taken together, the SDGs and Agenda 2063 have established sustainable development as an international agenda and a common vision for African countries.

A multi-stepped methodology was used to address the terms of reference. To begin with, a desktop study was carried out to identify known heritage sites and their significance in the surrounding environment. This involved consulting contract archaeology and paleontological reports filed on the SA Heritage Resource Information System (SAHRIS), research and academic publications. Finally, the study was guided by the National Heritage Resources Act of 1999 and SAHRA Minimum Standards for impact assessment.

Based on this study, the following conclusions were reached :

- The proposed development is scheduled to take place on deep sand area currently dominated by grass and *Colophospermum mopane* *Bushveld Complex*, the area is subdivided into sections by crisscrossing non-perennial streams.
- Ground-truthing of the proposed area for the establishment of the SEF found no significant cultural heritage resources, archaeological materials, or graves. The desktop studies identified an Iron Age site positioned on the southeastern boundary of the Farm Drumsheugh, outside the study area.

- Furthermore, the survey of the proposed powerlines identified remains of a damaged concrete reservoir south of the Kalope non-perennial stream. This infrastructure dates to the 19<sup>th</sup> century. It is older than sixty years and is protected by the National Heritage Resources Act 25 of 1999, and may not be (demolished, altered, renovated or removed) without the permit from South African Heritage resources Agency. The site could be avoided by shifting the powerline further towards the western section of the identified concrete reservoir.
- Ground truthing for the Battery Energy Storage System facility (BESS) site identified a historical burial ground outside the proposed development footprint. The burial ground will not be disturbed by the proposed infrastructure development. The area must be regarded as a no go area by the construction crew.
- The northeastern part of the Farm Drumsheugh hosts rocks with fossil bearing potential.

#### Recommendations

Although no archaeological and palaeontological remains were found within the powerline corridor, the preferred site, the alternative site and the BESS site, it is possible that some significant features may be buried beneath the ground. Therefore, monitoring of ground clearance during the construction phase is strongly recommended, to document chance archaeological (including burials) and palaeontological resources.

Based on this assessment which found no archaeological and palaeontological resources in this area we recommend that the heritage authorities approve the project as planned, subject to there being construction phase monitoring.

**iii. ACKNOWLEDGEMENTS:**

**CLIENT NAME:** Zutari Consultant, Environment and Planning

**CONTACT PERSON:** Noluyolo Xorile.

Email: [Noluyolo.Xorile@zutari.com](mailto:Noluyolo.Xorile@zutari.com)

Cell: 0603799357

.....  
**CONSULTANT:** Millennium Heritage Group (PTY) LTD

**REPORT AUTHOR:** Dr. Eric. N. Mathoho

**INTERNAL REVIEW:** Prof Shadreck Chirikure

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**Declaration of Independence and CV**

I Eric Ndivhuho Mathoho declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development, application or appeal in respect of which I am appointed other than fair remuneration for work performed about the activity, application or appeal. There are no circumstances that compromise the objectivity of me performing such work.

Signed:

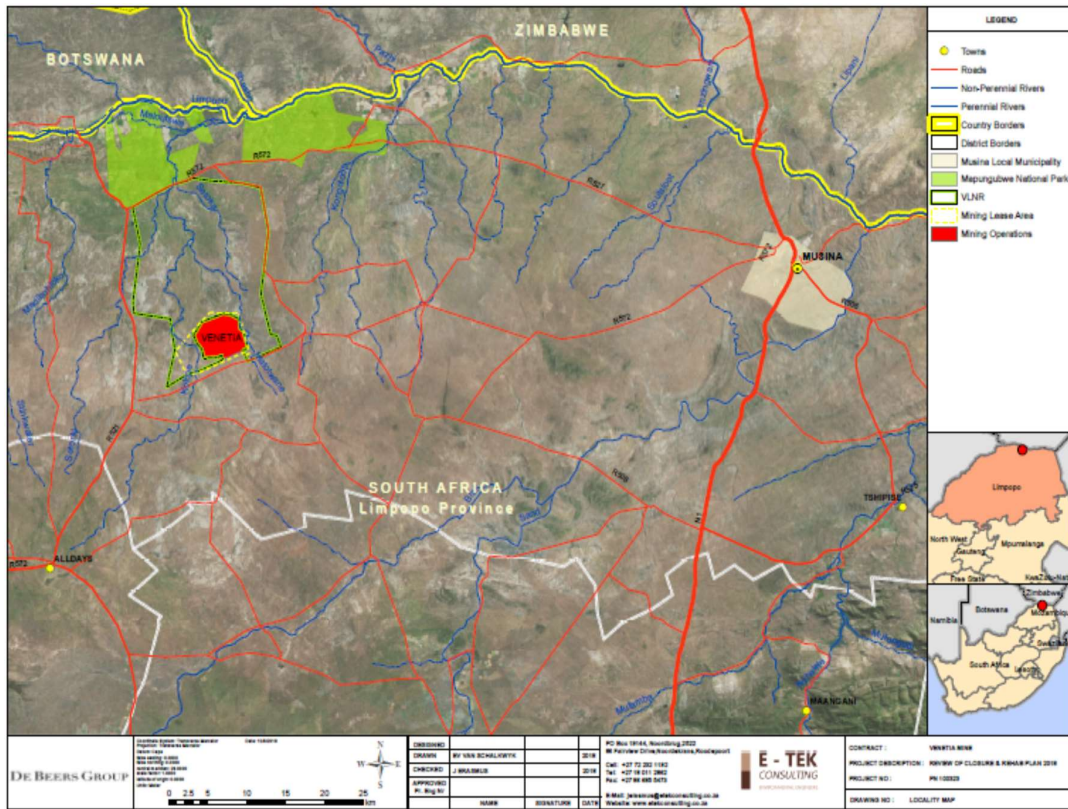


Dr. Eric. N. Mathoho, Doctor of Philosophy in Archaeology. Master of Philosophy in Archaeology (UCT) BA (Hons) in Archaeology (Univen) ASAPA Member, Archaeologist and Heritage Expert.



## 1. Introduction

Established in 1992, Venetia Mine on the farm Venetia 103MS, approximately 80 kilometres west of Musina, Limpopo Province and approximately 40 kilometres to the east of Alldays (Fig 1). The mine is a major economic hub in Musina, employing thousands of people. The northern corner of South Africa where the mine is located, is part of the wider Mapungubwe Cultural Landscape. The core of this landscape is the UNESCO listed Mapungubwe Cultural Landscape and World Heritage site situated 22 kilometres north of Venetia. The concept of OUV underpins the whole World Heritage Convention and all activities associated with properties inscribed on the World Heritage List. The World Heritage Convention (1972) recognizes properties of ‘Outstanding Universal Value’ which are part of the “*world heritage of mankind as a whole*” and deserve “*protection and transmission to future generations*”. The Mapungubwe Cultural Landscape hosted layers of human occupation from Early Stone Age (ESA) (2.6 million – 200 000 BP) through the Middle Stone Age (MSA) (300 000 – 20 000 BP) and the Later Stone Age (LSA) (20 000 – 2000) to the farming communities and recent settlements (last 2000 years) (Sampson 1974; 1984; Huffman 2007; Sadr 2008; Barham & Mitchell 2008). The material signatures for all these cultural periods have been identified in the Mapungubwe cultural landscape and collectively convey its significance (Siyathembana 2012). The area is also rich in palaeontological heritage (Durand 2005)



**Figure 1:** Venetia Mine and Mapungubwe National Park

Archival evidence shows that Venetia Mine has since 1989 performed heritage impact assessments as per the legislation (e.g., Hanisch 1989; Pistorius 2011). In addition, the mine sponsored academic archaeological research in the area (see Huffman 2010). This resulted in the identification of palaeontological and archaeological sites in the area. Although the area is 22 kilometres south of the Mapungubwe Cultural Landscape and World Heritage site, it is in the buffer zone. Adequate attention must be paid to the ICOMOS Guidance on Impact Assessment near World Heritage places. Given this sensitivity, adequate care is necessary to ensure that the SEF and associated infrastructure avoid direct or indirect impact on the known and unknown sites. The objective of the current study is to confirm the presence of archaeological, historical and palaeontological sites within the proposed development footprints. The results will inform and provide guidance on the proposed development of the SEF and associated infrastructure activities.

## **2. Background to the archaeology and palaeontology of the research area**

### **2.1. The archaeology of the area**

Cumulative research efforts exposed the very long history of human occupation in and around Venetia Mine and the Venetia Nature Reserve. However, most of the research was performed in the Mapungubwe National Park, itself a World Heritage site. Traces of human culture can be followed back to the Stone Age which was further divided into three groups as follows: Early Stone Age (ESA) (3.5 million and 250 000 BP), the Middle Stone Age (MSA) (250 000 – 25000 BP) and the Later Stone Age (25000 – 2000 BP) (Phillipson 2005). Stone tools belonging to the Stone Age are known in Limpopo and surrounding areas and they correspond to the different periods (Wadley, 2007; Sharon, 2009). Early tools such as the Oldowan types were very large compared to microliths typical of the Later Stone Age. (Deacon and Deacon 1999; Phillipson 2005).

In the first millennium AD, farming and metal using communities established themselves alongside hunters and gatherers. There were groups that lived during a period archaeologically known as the Early Iron Age, and these were followed by those that lived during the Middle Iron Age, followed by Later Iron Age and recent historical communities (Deacon and Norton, 2003). The ancestors of the modern Venda and Sotho-Tswana groups also lived in this area. The remains of groups that lived at places such as Mapungubwe Hill, Schroda, and K2 are some of the attributes that convey the Outstanding Universal Value of the Mapungubwe Cultural Landscape World Heritage site. This landscape is therefore associated with historical, cultural, scientific, and aesthetic values. Because the Venetia Limpopo Nature Reserve is part of the Buffer Zone of the Mapungubwe World Heritage site, it is associated with Outstanding Universal Value.

### **2.2 Palaeontological Heritage**

Research by Francois Durand and others has shown that the Limpopo province in general, and the area around Mapungubwe and the Venetia Limpopo Nature Reserve in particular, is rich in fossils (Durand 2021). Fossils are significant because they allow us to understand the development of dinosaurs, mammals and humans. The geology of Mapungubwe and surrounds is mainly of the Karoo type. Some of the fossil bearing

layers are known in the Venetia Nature Reserve. In adjacent regions of Botswana and Zimbabwe, fossils are also known (Durand 2021; Van den Berg, 1980; Brandl, 2002; Durand, 2005). These fossils fall mainly into two groups: firstly, the plant leaf imprints, stem fossils and coal from the lower part of the Karoo-age sedimentary succession (Middle Permian) and secondly, the dinosaur and thecodont fossils from the upper part (Late Triassic to Early Jurassic) of the Karoo-age sedimentary succession (Durand 2021). Fossil leaf imprints were found in the Tuli Basin sedimentary rocks on the Venetia mine grounds, to the east of the study area in the Tshipise Basin, and to the north of the study area in southern Zimbabwe. Together with the archaeology, the palaeontology conveys the heritage significance of the Mapungubwe Cultural Landscape.

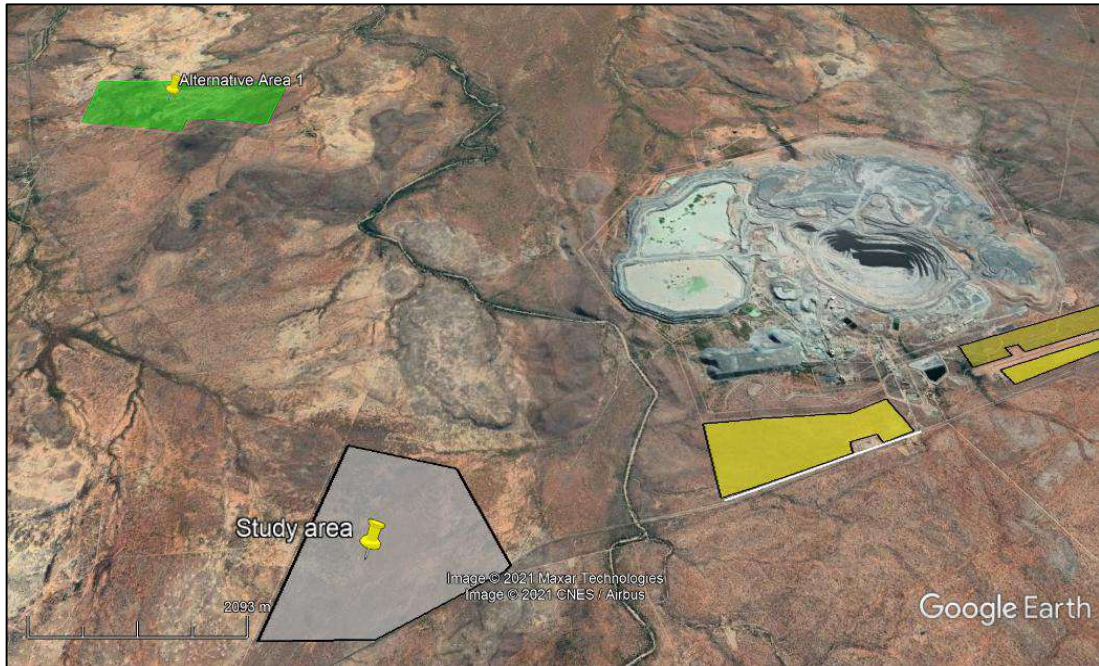
### 3. Project Description

The proposed 120kV SEF facility comprises of a 100MW Plant, 5.5 km powerlines which will feed power into an existing Eskom Substation and associated infrastructures including a containerized Lithium-ion-based, Batter Energy Storage Supply (BESS).

Table 1 provides a description of the project details.

No.	Project aspect	Description
1	Description of the activity	<p>SPV proposes to construct an alternating current photovoltaic (PV) Solar Energy Facility (SEF), for Venetia Diamond Mine in Musina region of Limpopo Province. The proposed PV facility would consist of the following:</p> <ol style="list-style-type: none"> <li>1. <b>A solar farm</b>, comprising of numerous rows of PV modules mounted on steel tracking mounts and footings (concrete or driven into the ground) with associated support infrastructure, including inverters, to generate up to 100 MWac;</li> <li>2. <b>Internal access roads for servicing and maintenance of the site;</b></li> <li>3. Temporary equipment <b>laydown areas</b> for use during construction;</li> <li>4. <b>Buildings</b>, including a connection building, control building, guard cabin;</li> <li>5. <b>Weather stations</b> within the fenced perimeter of the site; and</li> <li>6. <b>Perimeter fencing</b></li> <li>7. <b>Substation and/or switchyard located at the solar farm</b>, to convert the power from solar farm voltage to transmission voltage</li> </ol>

No.	Project aspect	Description
		<p>8. <b>Overhead transmission line/s</b>, to transmit power from the solar farm to the mine (described in more detail below)</p> <ul style="list-style-type: none"> <li>· <b>An existing substation and/or switch yard located at the mine</b>, to convert the power from transmission voltage to mine voltage (33 kV)</li> </ul>
2	<b>Municipality</b>	Musina Local Municipality of the Vhembe District Municipality.
3	<b>Applicant</b>	De Beers Group
	<b>Property details</b>	Farm Drumsheugh MS (Remainder of Portion 99)  (Surveyor General 21 Digit Code: T0MS0000000009900000)
4	<b>Size of the site</b>	Approximately 897 ha
5	<b>Development footprint</b>	Estimated maximum 250 ha
6	<b>Capacity of the facility (in MW<sub>ac</sub>)</b>	100MW
7	<b>Type of technology</b>	A renewable energy facility comprising of numerous rows of single axis tracking PV modules with associated support infrastructure to generate up to 100 MW electricity.
8	<b>Structure heights</b>	<ul style="list-style-type: none"> <li>· Solar PV panels: ≤ 2.5 m height</li> <li>· On-site substation ≤ 10 m in height</li> <li>· Control building: ≤ 5 m in height</li> <li>· Weather stations: ≤ 4 m in height</li> <li>· On-site transmission line/s approximately 21 m above ground level</li> </ul>
10	<b>Power line/s (e.g. number of overhead power line/s required, route/s, voltage, height, servitude width, etc.)</b>	<ul style="list-style-type: none"> <li>· There will be two overhead power line routes, containing:               <ol style="list-style-type: none"> <li>1. 33kV powerlines and/or;</li> <li>2. 132kV powerlines</li> </ol> </li> </ul>
11	<b>Other infrastructure (e.g. additional infrastructure, details of access roads, extent of areas required for laydown of materials and equipment, etc.)</b>	Other associated infrastructure will include the following: <ul style="list-style-type: none"> <li>· Internal roads for servicing and maintaining of the facility;</li> <li>· Storm water infrastructure;</li> <li>· Buildings, including a substation building, control room, maintenance building / storeroom, security hut;</li> <li>· Weather stations within the fenced perimeter of the site;</li> <li>· Perimeter fencing; and</li> <li>· Laydown area and construction yard.</li> </ul>



**Figure 2:** Location of project area in relation to Venetia Mine

#### **4. Terms of reference**

Undertake a Phase 1 Heritage Impact Assessment for the proposed SEF and associated infrastructure within the VLNR and submit a specialist report, which addresses the following:

- Executive summary;
- Scope of work undertaken, assumptions and limitations;
- Methodology used to obtain supporting information;
- Overview of relevant legislation and international best practice;
- Results of all investigations;
- Interpretation of information;
- Assessment of impacts (including cumulative impacts) associated with all the stages of the project (construction, operation, closure and post closure);
- Recommendations on other management measures;
- References.

## **5. Legal Requirements for the Treatment of Cultural Resources**

Venetia Mine, owing to its proximity to the Mapungubwe Cultural Landscape World Heritage Site (MCLWHS) buffer zones qualifies to be legally protected through the National Heritage Resources Act (Act No 25 of 1999), Section 34-36 (protection of heritage resources) and Section 38 (heritage resources management). The area is also protected in term of the World Heritage Convention Act (No 43 of 1999) and the National Environmental Management Act (Act No 107 of 1998) Section (23) (2)(d), Basic Assessment (BA), Section 29(1)(d) Scoping Report, section (32) (2)(d) that controls environmental impacts assessments. This MCLWHS is recognized as a protected area in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003). The state Party represented by the Department of Forestry, Fisheries and Environment (DFFE) manages World Heritage Sites and its buffer zones. The DFFE and the South African Heritage Resources Agency (SAHRA) provide overall management involving coordinating government efforts to conserve cultural and natural resources. The summary below is from the foundation of the National Heritage Resources Act (Act 25 of 1999).

### **5.A. The National Heritage Resources Act (Act No. 25 of 1999) (NHRA)**

This Act established the South African Heritage Resource Agency (SAHRA) as the prime custodian of the heritage resources and makes provision for the undertaking of heritage resources impact assessment for various categories of development as determined by (Section 38). It also provides for the grading of heritage resources (Section, 7) and the implementation of a three-tier level of responsibly and functions from heritage resources to be undertaken by national, provincial and local authorities, depending on the grade of heritage resources (Section, 8)

In terms of the National Heritage Resource Act 25, (1999) the following is of relevance:

#### **Historical remains**

**Section 34 (1)** No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant Provincial Heritage Resources Authority.

#### **Archaeological remains**

**Section 35(3)** Any person who discovers archaeological and paleontological materials and meteorites during development or agricultural activity must immediately report the find to the responsible heritage resource authority or the nearest local authority or museum.

**Section 35(4)** No person may, without a permit issued by the responsible heritage resources authority-

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- trade in, sell for private gain, export or attempt to export from republic any category of archaeological or paleontological material or object or any meteorite; or
- bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment which assist with the detection or recovery of metal or archaeological material or object or such equipment for the recovery of meteorites.

**Section 35(5)** When the responsible heritage resource authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or paleontological site is underway, and where no application for a permit has been submitted and no heritage resource management procedures in terms of section 38 has been followed, it may

- serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order
- carry out an investigation for obtaining information on whether an archaeological or paleontological site exists and whether mitigation is necessary;
- 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



- recover the cost of such investigation from the owner or occupier of the land on which it is believed an archaeological or paleontological 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.

**Subsection 35(6)** the responsible heritage resource authority may, after consultation with the owner of the land on which an archaeological or paleontological site or meteorite is situated; serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

### **Burial grounds and graves**

**Section 36 (3)** No person may, without a permit issued by SAHRA or a provincial heritage resources authority:

- (i) 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
- (ii) bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.

**Subsection 36 (6)** Subject to the provision of any person who during development or any other activity discover 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 resource authority which must, in co-operation with the South African Police service and in accordance with regulation of the responsible heritage resource authority-

- (I) carry out an investigation for obtaining information on whether such grave is protected in terms of this act or is of significance to any community; and if such grave is protected or is of significance, assist any person who or community which is a direct descendant to decide for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

## **5.B. The South African World Heritage Act of 1999**

- The World Heritage Convention Act 49 of 1999 provides for the following: incorporation of the World Heritage Convention into South African law;
- the enforcement and implementation of the World Heritage Convention in South Africa;
- the recognition and establishment of World Heritage Sites;
- the establishment of Authorities and the granting of additional powers to existing organs of state;
- the powers and duties of such Authorities, especially those safeguarding the integrity of World Heritage Sites;
- where appropriate, the establishment of Boards and Executive Staff Components of the Authorities;
- integrated management plans over World Heritage Sites;
- land matters in relation to World Heritage Sites;

Chapter V provides for integrated management planning including assessment of potential impacts on attributes conveying Outstanding Universal Value.

### **5.C. The ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011) and ICOMOS Australia Burra Charter**

The International Council of Monuments and Sites (ICOMOS) has established guidelines for carrying out impact assessments near World Heritage Sites. However, the principles that underwrite the guidelines apply to all categories of heritage. In conjunction with these guidelines, ICOMOS Australia published the Burra Charter, which argues that the cultural significance of places must guide decisions made on heritage places. Taken together, the ICOMOS Guidelines and the Burra Charter make a strong case for cumulative impact assessment, which focuses on the direct and indirect impact caused by any proposed development on heritage places. These guidelines define impacts as follows:

- Direct impacts are those which result in the destruction or altering of attributes of a heritage place.
- Indirect impacts are those whose impact is not clearly visible and quantifiable.

- Cumulative impacts refer to the sum of direct and indirect impacts in the short- and medium- to long-term (ICOMOS 2011).

In addition, community engagement is essential in making decisions relating to heritage places. Hence, Zutari, as environmental assessment practitioner, shall embark on a robust community engagement program to build rapport with interested and affected parties, including surrounding landowners. In so doing, the recommendations of the 2000 Technical Meeting between UNESCO and the world's mining companies will be implemented. The recommendations of the committee make it explicit that communities must benefit from projects while their heritage and environment must be safeguarded. In a way, this also has deep synergies with the SDGs and the African Union's Agenda 2063. In summary, international best practice mandates that cultural significance of heritage places must determine all decisions and that heritage conservation interests must be balanced with development as the two are not mutually exclusive. This report combines this logic with the provisions of the NHRA to ensure that the proposed development balances the interests of conservation (in situ or by record) as well as development to promote poverty alleviation within a framework provided by compliance requirements and good corporate citizenship.

## **6. Assumption and Limitations**

The archaeological and palaeontological records are made up of remains that lie either on or beneath the ground. While those above ground may be visible, that underneath may not be easily visible unless the ground is exposed. The major limitation encountered in this study was that assessment was only limited to what was observable above the ground. It is possible that sub-surface material may exist and which may be uncovered during development. However, should this happen, the chance discovery must immediately be reported to the nearest heritage authority. One of the limitations encountered is that elephants and lions occurs in VLNR, which limited access to certain areas.

## **7. Data sources and methodology**

The study relied on published and unpublished sources of information including online databases such as Google Earth and Google Scholar. Previous impact assessment

reports were also consulted together with academic literature such as Hanisch (1979) Huffman (2007) and among others Pistorius (2011) and Siyathembana (2012; 2017). Subsequent to the desktop study, fieldwalking was performed on the properties where the preferred and alternatives, IPP Tie-in substation and the BESS sites are located, resulting in total coverage by checking sites, distribution maps and features that were observable against written descriptions from various reports. This process resulted in the confirmation of sites and an understanding of their significance based on density of material culture, period, and the nature of the context of the materials. Photography formed an important part of the documentation together with the mapping of the distribution of sites within the VLNR in relation to proposed development activities. The palaeontological sensitivity of the study area was based on desktop studies. It was performed by Dr. Francois Durand (see Appendix 1). In summary, the study adopted a mixed approach that combined desktop studies with field observations and interviews.

## **8. Assessment criteria**

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The significance of archaeological and heritage sites was determined based on the following criteria:

- The unique nature of a site.
- The amount/depth of the archaeological deposit and the range of features (stone walls, activity areas etc.).
- The wider historic, archaeological and geographic context of the site.
- The preservation condition and integrity of the site.
- The potential to generate new knowledge

### ***8.1. Site Significance***

The site significance classification standards as prescribed in the guidelines and endorsed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used in determining the site significance for this report.

The classification index is represented in the table below shows grading and rating systems of heritage resources in South Africa alongside that by ICOMOS.

ICOMOS Field Ranking	South African Legislation Field Ranking (National Heritage Resources Act Ranking)
Very high (World Heritage Sites)	National Heritage Sites (Grade 1)
High (Nationally significant sites)	National Heritage Sites (Grade 1), Grade 2 (Provincial Heritage Sites), burials
Medium (regionally significant sites)	Grade 3a (Conservation, mitigation, based on situation)
Low (locally significant sites)	Grade 3b (Conservation, mitigation, based on local situation)
Negligible	Grade 3c (mitigation)
Unknown	Grade 3a (mitigation)

## ***8.2. Impact Rating***

### **POSITIVE AND NEGATIVE VERY HIGH**

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or cultural) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

**Example:** The loss of a highly significant site would be viewed by the community as being of negative VERY HIGH impact.

**Example:** The establishment of a mine in a rural area, which previously had very few employment opportunities would be regarded by the affected parties as resulting in benefits with positive VERY HIGH significance.

### **POSITIVE AND NEGATIVE HIGH**

These impacts will usually result in long term effects on the social and /or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long-term change to the (natural and/or social) environment. Society would view these impacts in a serious light.

**Example:** The loss of a heritage site, which is sacred, would have a significance rating of NEGATIVE HIGH.

**Example:** If development contributes to the conservation of a site then the impact will be POSITIVE HIGH.

## **MODERATE**

These impacts will usually result in medium- to long-term effects (both negative and positive) on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by the public or the specialist as constituting an unimportant and usually short-term change to the (natural and/or social) environment. These impacts are real, but not substantial.

**Example:** The loss of a site with thin scatters of material may be regarded as MODERATELY significant.

**Example:** The provision of a clinic in a rural area would result in a benefit of MODERATE significance.

## **LOW**

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by society as constituting an important and usually medium-term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.

**Example:** The alteration of a site of low significance will represent a minor loss.

**Example:** The increased earning potential of people employed because of a development would only result in benefits of LOW significance to people living some distance away.

## **NO SIGNIFICANCE**

There are no primary or secondary effects at all that are important to scientists or the public.

**Example:** A change to the geology of a certain formation may be regarded as severe from a geological perspective but is of NO SIGNIFICANCE in the overall context.

## **DIRECT, INDIRECT & CUMULATIVE IMPACT**

Positive and negative impacts on heritage resources take many forms: they may be direct or indirect; cumulative, short-term or long-term, reversible or irreversible, visual, and physical. For these impacts to be relevant to the HIA study, they must be triggered by the proposed development (ICOMOS 2011).

Direct impacts are those that arise as a primary consequence of the proposed development or change of use. They can result in the physical loss of part or all of an attribute, and/or changes to its setting - the surroundings in which a place is experienced, its local context, embracing present and past relationships to the adjacent landscape (ICOMOS 2011). In the process of identifying direct impacts, effort must be invested in considering cumulative impact, because a little impact on a few sites may cause extensive damage on a large scale. By their nature, direct impacts are associated with the development footprint and result in physical loss such that they constitute a major threat to Outstanding Universal Value (OUV). Direct impacts resulting in physical loss are usually permanent and irreversible.

Indirect impacts occur as a secondary consequence of construction or operation of the development, and can result in physical loss or changes to the setting of an asset beyond the development footprint.

The scale or severity of impacts or changes can be judged considering their direct and indirect effects and whether they are short or long term, reversible or irreversible. The cumulative effect of separate impacts should also be considered.

International best practice indicates that every reasonable effort should be made to avoid, eliminate or minimise adverse impacts on heritage resources and other significant places. Ultimately, however, it may be necessary to balance the public

benefit of the proposed change against the harm to the place (ICOMOS 2011; UNESCO et al. 2010). In the case of developing countries such as South Africa, maintaining such international standard is of greater important.

### ***Certainty***

*DEFINITE:* More than 90% probability of an impact happening.

*PROBABLE:* Over 70% probability of an impact occurring.

*POSSIBLE:* Only over 40% probability of an impact occurring.

*UNSURE:* Less than 40% probability of an impact occurring.

### ***Duration***

*SHORT TERM:* 0 – 5 years

*MEDIUM:* 6 – 20 years

*LONG TERM:* more than 20 years

*DEMOLISHED:* heritage resource will be demolished or has already been demolished

### ***Mitigation***

Management actions and interventions which will result in a reduction in the impact on the sites. The recommendation for mitigation will be as follows:

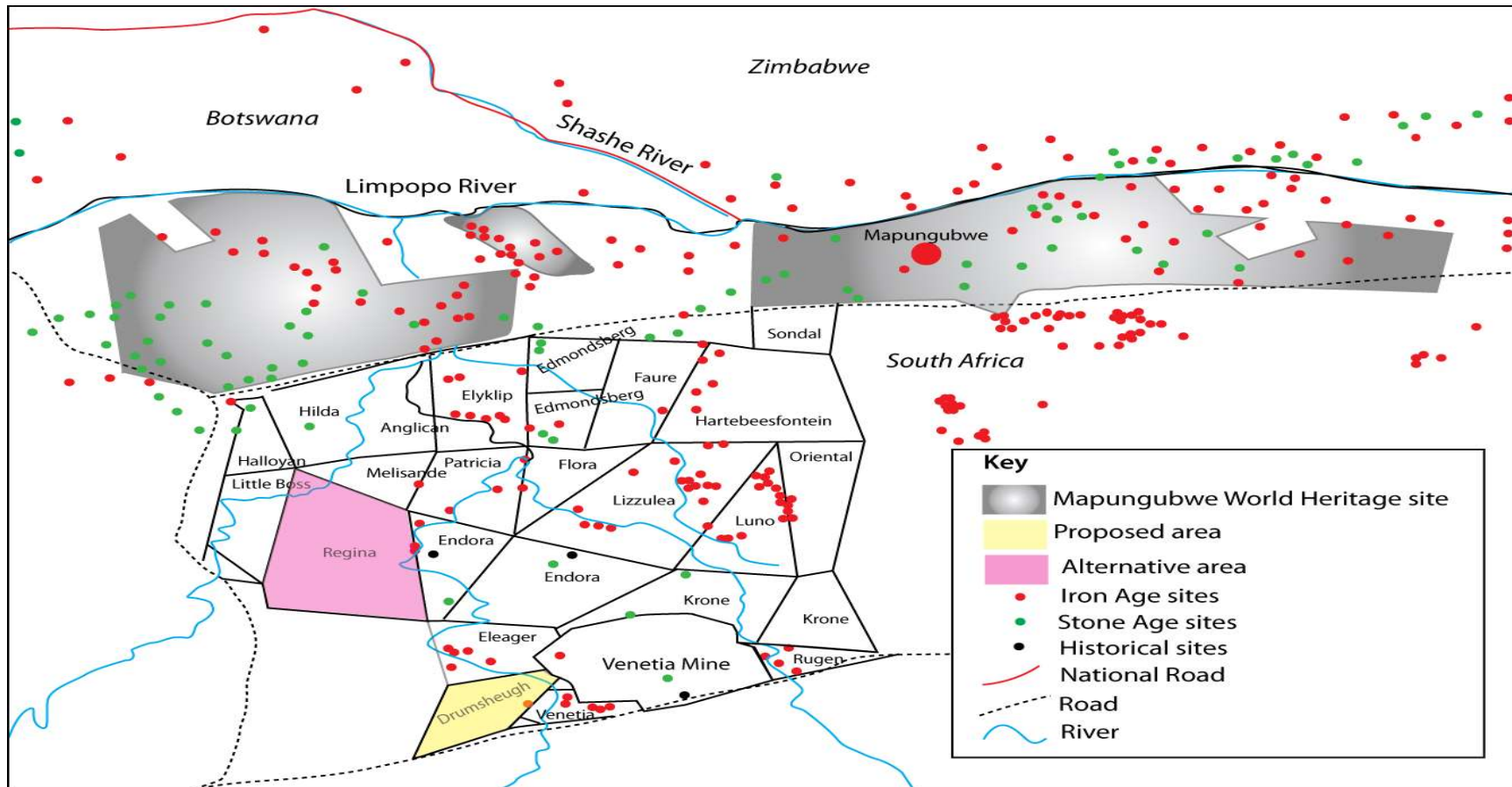
- ✓ **A** – No further action necessary
- ✓ **B** – Mapping of the site and controlled sampling required
- ✓ **C** – Preserve site, or extensive data collection and mapping required; and
- ✓ **D** – Preserve site

## **9. Results of desktop studies**

This cultural landscape is richly endowed with the Paleontological heritage, dominated by fossils located in the Ecca group of the Karoo super group (Durand 2009). The landscape hosts significant tangible and intangible heritage encompassing Stone Age, Iron Age (Zhizo, Leopard Kopje, Khami and Vha-Venda ancestral homes) (see,



Siyathembana 2012; 2017, Lebaron, Kuman and Grab 2010; Forsman, 2016; Pollarolo and Kuman 2009; Van Doornum,2005; Wilkins, Pollarolo and Kuman 2010, Huffman 2007, Manyanga 2007, Hanisch 1979). The desktop studies also involved a review of HIA reports (Huffman 2010; Pistorius 2011, Siyathembana 2012, 2017) and monitoring reports within and around Venetia Mine and the VLNR and in Mapungubwe National Park (Siyathembana 2017, Mathoho & Chirikure 2020). Stone Age, Iron Age and historical sites were acknowledged by Hanisch (1979), Huffman (2010), Pistorius (2011), and Siyathembana (2012). Based on a desktop study only one iron age site has been identified south of the Farm Drumheugh farm towards the Kalope River bank. Based on the physical site demarcation, this site will not be disturbed by the proposed SEF within the VLNR.



**Figure 3:** Archaeological and historical sites distribution map within the study area and the Limpopo Valley (after Siyathembana reports, 2012; 2017)

## 10. Field Survey and results

### 10.1. Preferred Site

The study area and development site is located roughly 3.6 km west of the main Venetia Mine main gate, the area is west of the Kalope non-perennial stream (GPS S22°.28', 19.04" & E 29°.16'.37.01") (see figure 2). In general, the topography of the site is dominated by slightly flat plains with undulating hills and rocky outcrops towards the north of the preferred site. The study area forms the western corner of the VLNR, located adjacent to the main arterial access tarred road (R572) which connect Alldays and Musina. The area has not been disturbed by any form of development except roads that transverse the area. The vast site is dominated by open patches with exposed deep sandy soils and dense ground cover dominated by grass and *Colophospermum mopane* bushveld complex. Generally, this type of bushveld complex extends from Baines Drift towards Alldays in the west, covering the remaining north of the Soutpansberg. Normally, the region is dominated by undulating and very irregular plains with some hills in the western section dominated by open woodland to moderately closed shrubveld subjugated by *Colophospermum mopane* and *Terminalia prunoides* on clayey bottom lands with scattered *Combretum apiculatum* which are commonly associated with hilly areas (Mucina & Rutherford, 2003). Ground truthing of the preferred area found no important cultural heritage resource (archaeological materials or graves). Geologically, the area is underlain by the Archean Beit Bridge complex, which consist of gneisses and metasediments with variable soils from deep heavy clay soils to free drained sandy soils (Acocks 1975, Mucina & Rutherford, 2003). The dominant plant taxa include, *Colophospermum mopane*, *Terminalia prunoides*, *Combretum apiculatum*, *Dichrostachys cineria*, *Acacia tortilis*, *Acacia nigrescens*, *Grewia flava*, *G. flavescens*, *Schlerocarya birrea*, *Lannea schweinfurthii*, and *Acacia karroo*.



**Figure 2:** Study area dominated by grass cover, *Colophospermum mopane* and *Terminalia prunoides*.



**Figure 3:** Mopane bushveld complex



**Figure 4:** Site demarcation indicated by white cross



**Figure 5:** View of the study area



**Figure 6:** Access road alongside the VLNR boundary fence

### ***10. 2. Alternative Site***

Alternative site is situated approximately 1.4 km south east of Evangelina farm and the main access tarred road (R571) which connect Alldays and Mapungubwe National Park (GPS S22°.24', 26. 05" & E 29°.12'.37.00") (see figure 2). The proposed site stretches from the VLNR's Regina main gate towards the southern section of the reserve, with the main access gravel road leading to mopane bush lodge on the western boundary. At Regina gate, the area is dominated by sparsely distributed *Colophospermum mopane* bushveld.



**Figure 7:** Alternative site



**Figure 8:** Mopane Bush camp lodge



**Figure 9:** Powerline transverse the site



**Figure 10:** View of the site dominated by sparsely vegetational distribution



### ***10. 3. Proposed power line route***

The proposed powerline route starts from the proposed SEF in an easterly direction parallel to the public road towards the Venetia Mine Substation (5,5kilometres powerline route). The route has been demarcated roughly 50m from the Venetia Nature Reserve fence, alongside an existing VLNR patrol road, which traverses the Kalope River and existing borrow pits within the VLNR.



**Figure 11:** The sandy river bed of the Kalope River, which is crossed by the transmission corridor



**Figure 12:** A concrete reservoir on the southern section of the Kalope River bank



**Figure 13:** Existing borrow pit where gravel material has been extracted along the transmission corridor

#### **10. 4. Proposed IPP-Tie- In substation (Option 1)**

The proposed IPP- Tie In- substation site is located west of the existing Eskom Substation (GPS S22°27', 21. 01" & E 29°.19'.16.02") (see figure 15). The proposed area covers 0,49 ha of slightly undulating site. Part of the area has been disturbed by access gravel road around the substation. The area is characterised by loose quartz stones, shallow sandy soils and exposed rocky outcrops, dominated by *Terminalia prunoides*, *Acacia tortilis* and *Colophospermum mopane*. Ground truthing of the preferred area found no important cultural heritage resource (archaeological materials or graves).



**Figure 14:** View of the Substations



**Figure 15:** Vegetation on site

#### ***10. 5. Proposed IPP-Tie- In substation (Option 2)***

The proposed IPP- Tie In-substation site is situated further west of the proposed IPP-Tie in substation Option 1(GPS S22°.27', 24. 07" & E 29°.19'.20.01") (see figures 16&17). The proposed site is located west of the existing Venetia substation. It covers 0,17 ha of slightly undulating site. Further west there exist the Venetia mine fence and main access tarred road that connecting Musina and Venetia Mine. The area is characterised by loose quartz stones, shallow sandy soils and exposed rocky outcrops, dominant vegetation include *Terminalia prunoides*, *Acacia tortilis* and *Colophospermum mopane bushveld complex*. Ground truthing of this area found no important cultural heritage resources.



**Figure 16:** Recent past surface disturbances.



**Figure 17:** View of the substation

### ***10. 6. Proposed Battery Energy Storage System (BESS)***

The proposed BESS site is situated south of the main access gravel road, further south of both Venetia and Eskom substations (GPS S22°.27', 22. 03" & E 29°.19'.25.00") (see figures 18;19;20). The proposed area is slightly flat dominated by deep sand, covered by natural vegetation. A large section of the proposed area has been disturbed. Part of the site is currently used by Venetia mine as concrete rubble refusal site. The western section of the site is currently used to stockpile electricity power lines poles. There are big excavations nearby which form an earth dam used to harvest rain water run off during raining seasons. No archaeological or palaeontological sites were found in this area.



**Figure 18:** Proposed BESS site, the area has been disturbed by the presence of an Earth dam



**Figure 19:** Abandoned gravel road leading to the earth dam, currently used to pile electrical poles



**Figure 20:** Proposed BESS site with rubbles.

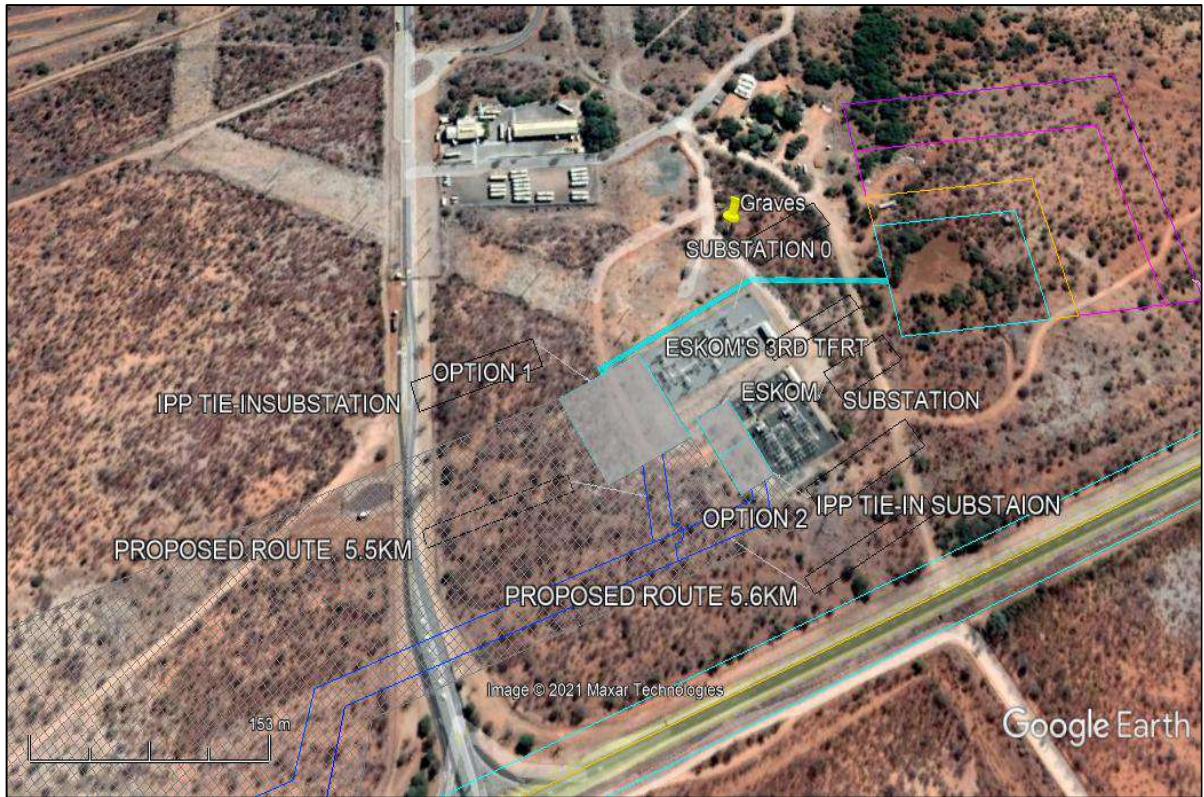
## **Historical burial ground – Venter Family**

Assessment of the BESS site, Options 1 and 2 of the proposed IPP Tie- in substation sites located the Venter Family burial ground outside the proposed development footprint (GPS S22°.27', 17. 01" & E 29°.19'.21.01") (see figure 21). The site is located northeast of both the Venetia and Eskom substations, underneath an *Adonsonia digitata* tree, inside a fenced off area. The area is situated a few meters south of the main access road to the substations. This burial ground is comprised of five graves with granite headstones with inscriptions. Four of the graves have granite outlines while the fifth grave has granite ledges or slabs as grave dressing. One of the graves has a double headrest. A soil depression has formed where topsoil had caved in. This is the most recent burial belonging to Mrs. Catharina Petronella Venter who was buried here late in 2001. These graves are of high significance and are respectively protected by the NHRA (Act 25 of 1999), the Human Tissue Act (Act 65 of 1983) and the Ordinance on exhumation (Ordinance no 12 of 1980) which respectively distinguishes various categories of graves, burial grounds, and exhumation procedures. The NHRA (Act 25 of 1999) applies whenever graves are older than sixty years hence in this study it protects burial ground which is 60 years old. The remaining graves are protected by the HTA Act 65 of 1983, and the Ordinance on exhumation (Ordinance no 12 of 1980) since they are younger than 60 years. Therefore, recorded burial grounds are highly significant and warrant protection. They are already fenced off and protected as part of Venetia Mine's Environmental Management Programme.



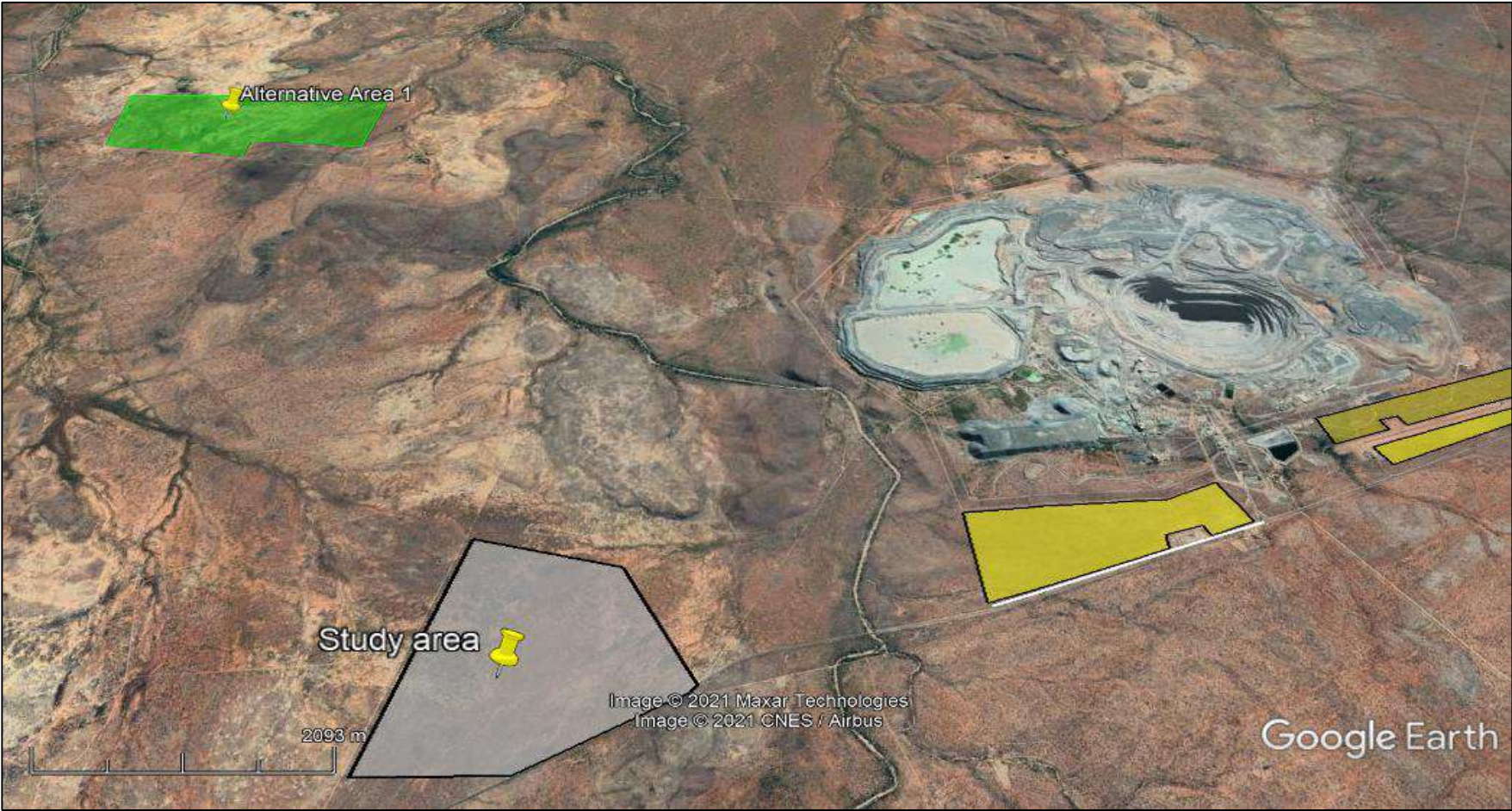


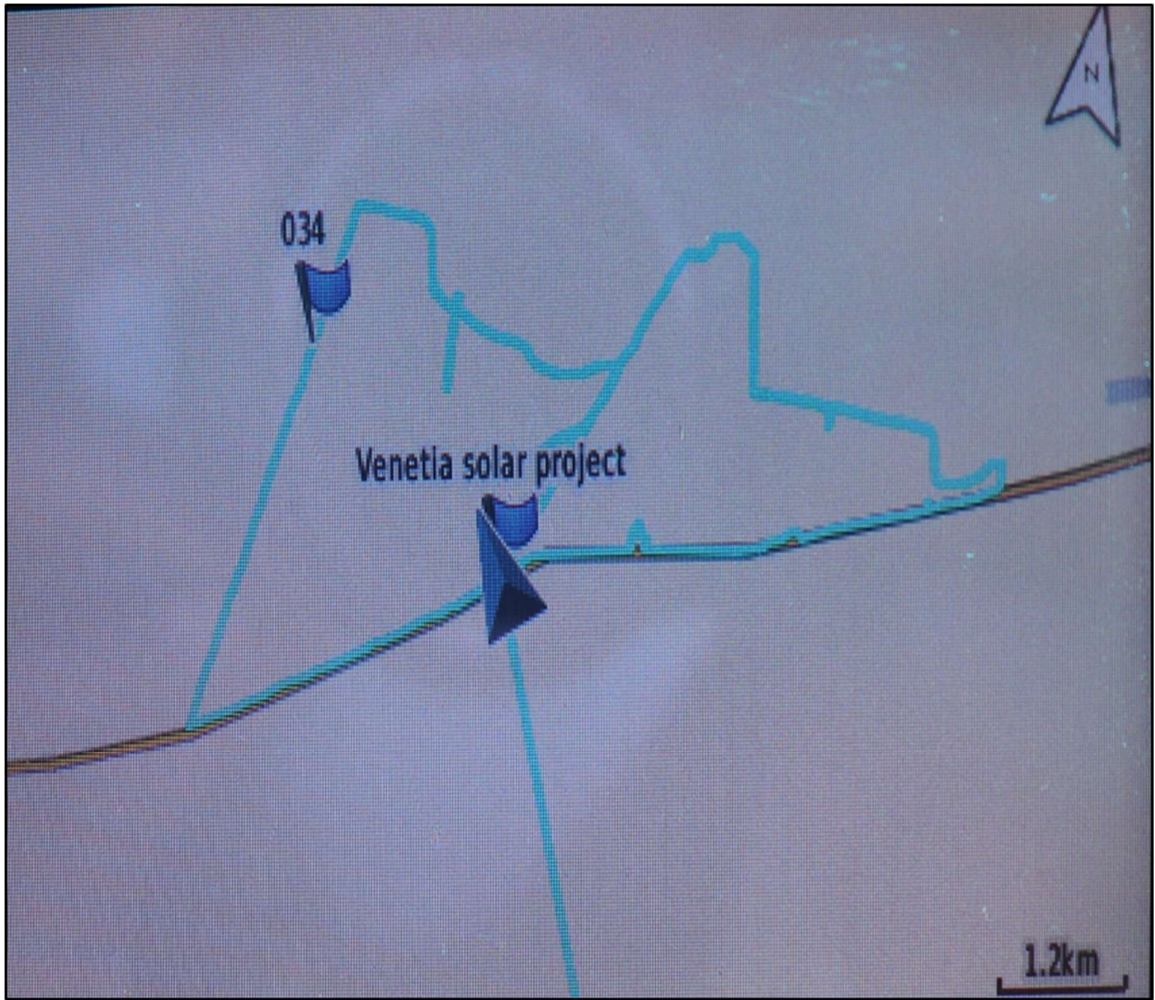
**Figure 21** :Venter burial ground underneath an *Adonsonia digitata*



**Figure 22:** Map showing proposed development sites in relation to the identified grave site adapted from google earth Program.

11. Google Earth Map and GPS snap shot





**Figure 23:** Survey snapshot

## 12. Conclusion and recommendations

In conclusion, and within limitations, the study recognized a concrete reservoir on the southern section of the Kalope non-perennial stream. This site is in proximity to the proposed power line route. There are no known heritage sites (archaeological, historical, and palaeontological) within the proposed SEF development area. The study reached the following conclusions:

The proposed development is scheduled to take place on deep sand area currently dominated by grass and *Colophospermum mopane* Bushveld. The area is subdivided into sections by crisscrossing non-perennial streams. Ground truthing of the proposed area for the establishment of SEF found no important cultural heritage resources, archaeological materials or graves. The desktop studies identified the presence of an Iron Age site positioned south east of the Farm Drumsheugh. Based on the mapped SEF footprint, this Iron Age site is situated outside the study area. Furthermore, the survey of the proposed powerlines identified the remains of a damaged concrete reservoir further south of the Kalope non-perennial stream. This infrastructure represents the historical past (referred to as remains of 19<sup>th</sup> century). This infrastructure is older than sixty years and qualifies to be protected in terms of the National Heritage Resources Act 25 of 1999, and may not be demolished, altered, renovated or removed without a permit from the SAHRA. The site could be avoided by shifting the powerline towards the western section of the identified concrete reservoir. Ground truthing for option 1 option2 and BESS sites identified a historical burial ground (Graves) outside the proposed development footprint. Therefore, the site will not be disturbed by the proposed infrastructure development and the area should be regarded as a no-go area by the construction crew. A desktop palaeontological assessment found the likelihood of fossil hosting rocks on the northeastern part of the farm Dumsheugh (see Appendix 1). Although no heritage resources were found alongside the powerline route, preferred site and alternative site, it is possible that some features may be buried beneath the ground. Therefore, monitoring of ground clearance during the construction phase is strongly recommended, to monitor and document any buried heritage resources. Based on this assessment which found no heritage resources in the areas proposed for development, we recommend that the heritage authorities approve the project as planned, subject to monitoring of ground disturbing activities.

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