



## **SiVEST SA (PTY) LTD**

### **PROPOSED CONSTRUCTION OF THE KLIPKRAAL PHASE 4 WIND ENERGY FACILITY, NEAR FRASERBURG, NORTHERN CAPE PROVINCE, SOUTH AFRICA**

# Heritage Scoping Report

<b>DEFF Reference:</b>	TBA
<b>Report Prepared by:</b>	<b>PGS Heritage Pty Ltd</b>
<b>Issue Date:</b>	13 September 2023
<b>Version No.:</b>	2.0

### Declaration of Independence

- I, Wouter Fourie, declare that –
- General declaration:
- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

### Disclosure of Vested Interest

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

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PGS Heritage (Pty) Ltd

**CONTACT PERSON:**

Wouter Fourie

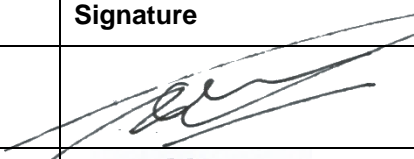
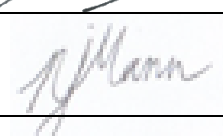
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### ACKNOWLEDGEMENT OF RECEIPT

<b>Report Title</b>	Heritage Scoping Report for the Proposed Construction of Klipkraal Phase 4 Wind Energy Facility, Near Fraserburg, Northern Cape Province, South Africa		
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<b>Date:</b>	13 09 2023
<b>Document Title:</b>	Heritage Scoping Report
<b>Author:</b>	Wouter Fourie
<b>Revision Number:</b>	2.0
<b>Checked by:</b>	
<b>For:</b>	SiVEST Environmental Division

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## PROPOSED CONSTRUCTION OF THE KLIPKRAAL PHASE 4 WIND ENERGY FACILITY, NEAR FRASERBURG, NORTHERN CAPE PROVINCE, SOUTH AFRICA

### Heritage Scoping Report

#### EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) has been appointed by SiVest (PTY) Ltd (hereafter referred to as “SiVEST”), on behalf of Aura Development Company (Pty) Ltd (hereafter referred to as ‘Aura’), to undertake a Heritage Scoping Report that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed construction of the Klipkraal Wind Energy Facility (WEF) near the towns of Beaufort West and Fraserburg in the Northern Cape Province of South Africa.

The proposed wind farms make up a larger wind energy facility (WEF) (with associated BESS) which will be referred to as the Klipkraal WEF, consisting of up to seven (7) phases, with a combined generation capacity of up to approximately 1 400 MW, as follows:

- Klipkraal Phase 1 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal Phase 2 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal Phase 3 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal Phase 4 Wind Farm: up to 200MW + BESS (**this application**)
- Klipkraal Phase 5 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal Phase 6 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal Phase 7 Wind Farm: up to 200MW + BESS (part of a separate EIA process which forms part of separate application)
- Klipkraal On-site Switching / Collector Substation and associated 132kV/400kV Power Line (part of a separate BA application).

## 1. SITE NAME

The Klipkraal Phase 4 WEF

## 2. LOCATION

The proposed WEF is located approximately 36km south-east of Fraserburg, in the Northern Cape Province and is within the Karoo Hoogland Municipality (**Figure 1**).

The WEF application site incorporates the following farm portions:

- Remainder of the Farm Matjiesfontein No. 409 (RE/409)
- Remainder of the Farm Klipfontein No. 447 (RE/447)
- Portion 1 of the Farm Klipfontein No. 447 (1/447)



**Figure 1: Regional Context Map.**



### 3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

It is anticipated that the proposed Klipkraal Phase 4 WEF will comprise thirty (30) wind turbines with a maximum total energy generation capacity of up to approximately 200MW (**Figure 2**). The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV/400kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.



**Figure 2: Klipkraal Phase 4 WEF Site Locality.**

### 4. HERITAGE RESOURCES IDENTIFIED

A selective field survey and site visit of the study area was conducted between 22-27 September 2021. Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

No heritage resources were identified within the Klipkraal Phase 4 WEF area during the site visit. However, further fieldwork will be conducted in the Phase 4 study area during the Impact Assessment Phase to complete the HIA and assess the proposed WEF layouts.



**NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)**

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page ii of Report-Contact details and company  Section 1.2 and <b>Appendix A</b>
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 2
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8, 9
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 8, 9
g) an identification of any areas to be avoided, including buffers;	Section 7.3 and 8
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 8



Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	Section 8, 9
k) any mitigation measures for inclusion in the EMPr;	Section 8, 10 and 11
l) any conditions for inclusion in the environmental authorisation;	
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8 and 11
n) a reasoned opinion- <ul style="list-style-type: none"> <li data-bbox="336 846 1066 920">i. (as to) whether the proposed activity, activities or portions thereof should be authorised;</li> <li data-bbox="336 954 1066 1028">(iA) regarding the acceptability of the proposed activity or activities; and</li> <li data-bbox="336 1061 1066 1272">ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;</li> </ul>	Section 11
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	
q) any other information requested by the competent authority.	
2) Where a government notice <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NEMA Appendix 6 and GN648

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### Heritage Scoping Report

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**APPENDIX B – Impact Assessment Methodology**

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## **Fossil**

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

## **Heritage**

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

## **Heritage resources**

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

## **Holocene**

The most recent geological time period which commenced 20 000 years ago.

## **Late Stone Age**

The archaeology of the last 30 000 years associated with fully modern people.

## **Late Iron Age (Early Farming Communities)**

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

## **Middle Stone Age**

The archaeology of the Stone Age between 20 000-300 000 years ago, associated with early modern humans.

## **Site**

Site in this context refers to an area place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

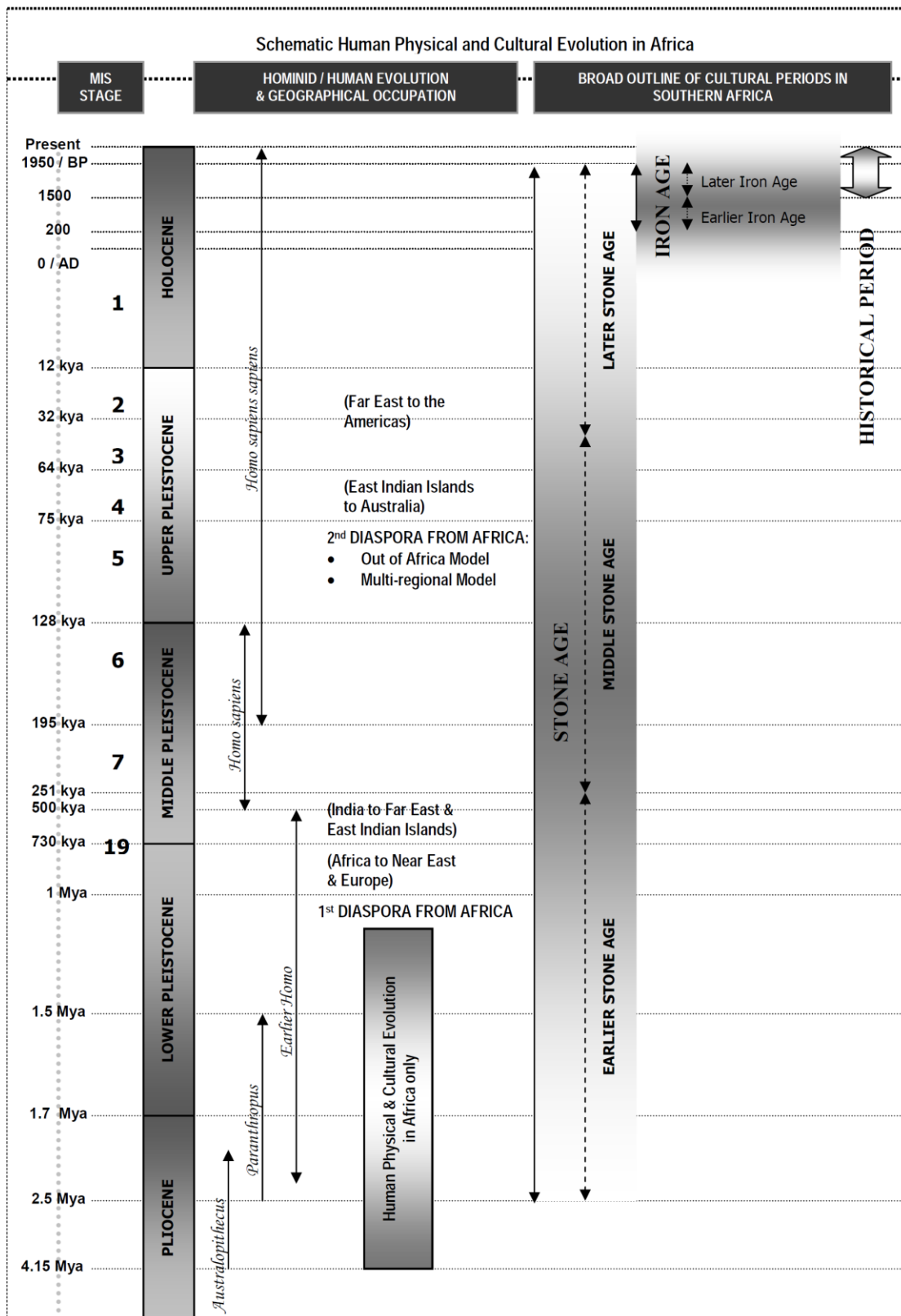


Figure 3: Human and Cultural Timeline in Africa (Morris, 2008).

### List of Abbreviations

Abbreviations	Description
AIA	Archaeological Impact Assessment
Aura	Aura Development Company (Pty) Ltd
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DEFF	Department of Environment, Forestry and Fisheries
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
MTS	Main Transmission Substations
NCW	Not Conservation Worthy
NEMA	National Environmental Management Act
Ngwao-Boswa	Ngwao-Boswa Jwa Kapa Bokone
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SiVEST	SiVest (PTY) Ltd
WEF	Wind Energy Facility





The overall objective of the development is to generate electricity by means of renewable energy technology capturing wind energy to feed into the National Grid.

It is anticipated that the proposed Klipkraal Phase 4 WEF will comprise thirty (30) wind turbines with a maximum total energy generation capacity of up to approximately 200MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV/400kV overhead power line. A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 [GNR 982, 983, 984 and 985) and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 which may have an impact on the environment and therefore require authorisation from the National Competent Authority (CA), namely the Department of Environment, Forestry and Fisheries (DEFF), prior to the commencement of such activities. Specialist studies have been commissioned to assess and verify the project under the new Gazetted specialist protocols.

## **1.1 Scope of the Study**

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development areas. The report aims to inform the EIA in the development of a comprehensive EMP to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

## **1.2 Specialist Credentials**

This study was compiled by PGS.

The staff at PGS has a combined experience of nearly 70 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Ms. Nikki Mann, co-author of this report, graduated with her Master's degree (MSc) in Archaeology and is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

Wouter Fourie, the Project Coordinator, is registered with the ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

## 2. ASSESSMENT METHODOLOGY

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by a qualified archaeologist and field assistant (22-27 September 2021), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites was based on four 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)
  - Low - <10/50m<sup>2</sup>
  - Medium – 10-50/50m<sup>2</sup>
  - High - >50/50m<sup>2</sup>
- Uniqueness; and
- Potential to answer present research questions.

Impacts on these sites by the development will be evaluated as follows:

### Site Significance classification standards

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 1** and **Table 2**).

**Table 1: Rating system for archaeological resources**

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by Ngwao-Boswa Jwa Kapa Bokone is the Provincial Heritage Resources Authority of the Northern Cape Province (Ngwao-Boswa). Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

**Table 2: Rating system for built environment resources**

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil	May be declared as a Provincial Heritage Site managed by Ngwao-Boswa.	Exceptionally High Significance



Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	the criteria for Grade I status. Current examples: St George's Cathedral, Community House		
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

### 3. ASSUMPTIONS AND LIMITATIONS

The aim of the scoping document is to identify the possible types of heritage resources that might be present in the study area.

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the mountainous terrain of the farms which made access and thus coverage of the farms difficult. The size of the survey areas also meant that we were unable to assess every proposed wind turbine. It was decided to place more focus on specific sensitive areas (incl. ridges, pans, river valleys) which were considered more likely to contain archaeological sites.

As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out in **Section 5**.

## 4. TECHNICAL DESCRIPTION

### 4.1 Project Location

The proposed WEF is located approximately 36km south-east of Fraserburg, in the Northern Cape Province and is within the Karoo Hoogland Municipality (**Figure 4**).

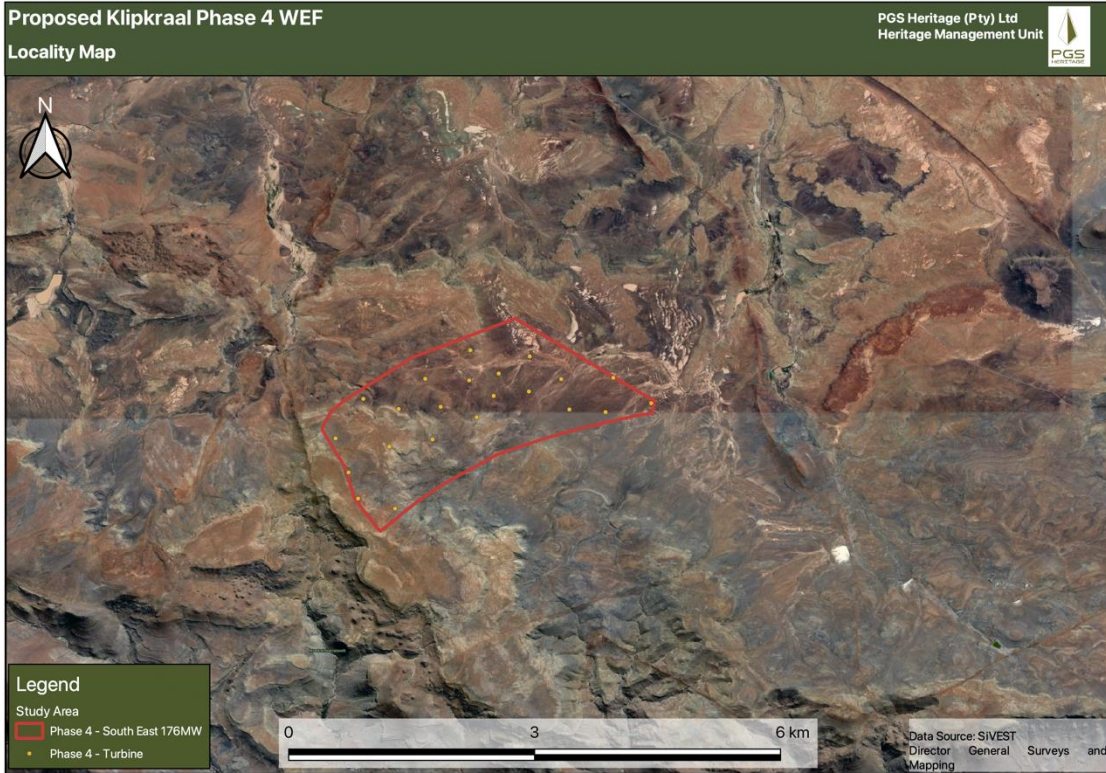


**Figure 4: Regional Context Map.**

#### 4.1.1 WEF

The WEF application site as shown on the locality map below (**Figure 5**) incorporates the following farm portions:

- Remainder of the Farm Matjiesfontein No. 409 (RE/409)
- Remainder of the Farm Klipfontein No. 447 (RE/447)
- Portion 1 of the Farm Klipfontein No. 447 (1/447)



**Figure 5: Klipkraal Phase 4 WEF Site Locality.**

## 4.2 Project Description

It is anticipated that the proposed Klipkraal Phase 4 WEF will comprise thirty (30) wind turbines with a maximum total energy generation capacity of up to approximately 200MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. A BESS will be located next to the onsite 33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.

### 4.2.1 Wind Farm Components

The proposed wind farm projects which form part of the larger Klipkraal WEF will each include the following components:



#### 4.2.1.1 Wind Turbines

Phase	Capacity	No. of turbines
Phase 1	208 MW	30
Phase 2	176 MW	30
Phase 3	176 MW	30
<b>Phase 4</b>	<b>176 MW</b>	<b>30</b>
Phase 5	160 MW	30
Phase 6	160 MW	30
Phase 7	160 MW	30

- Between approximately 30 turbines per wind farm, each between 5MW and 8MW, with a maximum export capacity of up to approximately 200MW for each wind farm. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or any other program.
- Each wind turbine will have a maximum hub height of up to approximately 140m;
- Each wind turbine will have a maximum rotor diameter of up to approximately 130m;
- Permanent compacted hard standing areas / platforms (also known as crane pads) of approximately
- 90m x 50m (total footprint of approx. 4 500m<sup>2</sup>) per wind turbine during construction and for on-going maintenance purposes for the lifetime of the proposed wind farm projects. This will however depend on the physical size of the wind turbine;
- Each wind turbine will consist of a foundation (i.e. foundation rings) which may vary in depth, from approximately 3m and up to 5m or greater, depending on the physical size of each wind turbine. It should be noted that the foundation can be up to as much as approximately 600m<sup>3</sup>;

#### 4.2.1.2 Electrical Transformers

- Electrical transformers will be constructed near the foot of each respective wind turbine in order to step up the voltage to 33kV.
- The typical footprint of the electrical transformers is up to approximately 10m x 10m, but can be up to 20m x 20m at certain locations;

#### 4.2.1.3 Step-up/Collector Substations

- New 33/132kV step-up / collector substations, each occupying an area of up to approximately 1.5ha, for each wind farm being proposed [i.e. one (1) substation per phase].
- The proposed substations will include an Eskom portion and an Independent Power Producer (IPP) portion, hence the substations have been included in each respective wind farm EIA and in the grid connection infrastructure BA (substations, switching stations and power lines) to allow for handover to Eskom.

- Following construction, the substations will be owned and managed by Eskom. The current applicant will retain control of the medium voltage components (i.e. 33kV components) of the substations, while the high voltage components (i.e. 132kV components) of these substations will likely be ceded to Eskom shortly after the completion of construction;

#### 4.2.1.4 *Main Transmission Substations (MTS)*

- Two (2) new 132/400kV Main Transmission Substations (MTS) are being proposed, occupying an area of up to approximately 16ha each.
- Each proposed MTS will include an Eskom portion and an IPP portion. However, a separate substation has also been included in each respective wind farm EIA and in the grid connection infrastructure BA to allow for handover to Eskom.
- Following construction, the substations will be owned and managed by Eskom. The current applicant will retain control of the 132kV and lower voltage components of each MTS, while the 132/400kV voltage components of each MTS will likely be ceded to Eskom shortly after the completion of construction;

#### 4.2.1.5 *Electrical Infrastructure*

- The wind turbines will be connected to the proposed substations via medium voltage (i.e. 33kV) cables.
- These cables will be buried along access roads wherever technically feasible, however, the cables can also be overhead (if required);

#### 4.2.1.6 *Battery Energy Storage Systems (BESS)*

- A Battery Energy Storage System (BESS) will be constructed for each respective wind farm [i.e. one (1) BESS per phase] and will be located next to the 33/132kV step-up / collector substations which form part of the respective wind farms, or in between the wind turbines.
- It is anticipated that the type of technology will be either Lithium Ion or Sodium-Sulphur.
- The Applicant's preferred BESS technology will be confirmed as part of the EIA phase, however, it
- is anticipated that this would be Lithium Ion.
- It is also anticipated at this stage that the batteries to be used in the BESS will already be assembled
- prior to delivery and come as 'plug and play' modular units.
- These batteries are not considered hazardous goods as they will be storing 'energy'.
- The size, storage capacity and type of technology will be determined / confirmed during the EIA processes, including the applicant's preferred technology type.

#### 4.2.1.7 *Roads*

- Internal roads with a width of up to approximately 5m will provide access to each wind turbine.
- Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- Existing site roads may also be upgraded using temporary concrete stones in order to accommodate for the heavy loads.
- Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions.

#### 4.2.1.8 *Site Access*

- The proposed wind farm application sites will be accessed via existing gravel roads from the R353 Regional Route;

#### 4.2.1.9 *Temporary Staging Areas*

- Temporary staging areas will be required for each wind farm and will be located at the foot of each wind turbine (i.e. turbine development area) to allow for working requirements.
- One (1) temporary staging area per wind turbine / range of wind turbines will be required for each wind farm (i.e. for each phase).
- Temporary staging areas will cover an area of up to approximately 100m x 100m (10 000m<sup>2</sup> / 1ha) each;

#### 4.2.1.10 *Temporary Construction Camps*

- Temporary construction camps will be required during the construction phase. One (1) temporary construction camp per wind farm is being proposed [i.e. one (1) per phase].
- This area will be used as a permanent maintenance area during the operational phase. One (1) permanent Maintenance Area will be required per wind farm [i.e. one (1) per phase].
- Each combined Temporary Construction Camp / Permanent Maintenance Area will cover an area of up to approximately 2.25ha.
- A cement batching plant as well as a chemical storage area will fall within each Temporary Construction Camp and Permanent Maintenance Area.
- Each Temporary Construction Camp and Permanent Maintenance Area will be strategically placed around the proposed wind farm sites and will avoid all high sensitivity and/or 'no-go' areas;

#### 4.2.1.11 *Offices, Accommodation, a Visitors' Centre and Operation & Maintenance (O&M) Buildings*

- Offices, Accommodation, a Visitors' Centre and Operation & Maintenance (O&M) buildings will be required and will occupy areas of up to approximately 100m x 100m (i.e. 1ha).

- Each wind farm (i.e. each phase) will have its own O&M building and Office, however, the Accommodation and Visitors' Centre will be centralised locations which will be shared between certain wind farm projects (i.e. shared between certain phases which will be confirmed at a later stage);

#### 4.2.1.12 *Septic Tank and Soak-Away Systems*

- Each wind farm will consist of septic tank and soak-away systems.
- This will be required for construction as well as long term use.
- Septic tanks and soak-away systems will be placed 100m or more from water resource (which includes boreholes);

#### 4.2.1.13 *Wind Measuring Lattice Masts*

- Two (2) wind measuring lattice masts (approximately 120m in height) have already been strategically placed within the wind farm application sites in order to collect data on wind conditions.
- Two (2) additional wind measuring lattice masts may be installed within the wind farm application sites. This will be confirmed at a later stage, prior to the respective application forms being submitted;

#### 4.2.1.14 *Fencing*

- Fencing will be required and will surround each respective wind farm.
- The maximum height of the fencing as well as the area which the fencing will cover will be confirmed during the detailed design phase, prior to construction commencing.
- Fences will however be constructed according to specifications recommended by the Ecologist and Avifauna specialist (as per the EMPr);

#### 4.2.1.15 *Temporary Infrastructure to Obtain Water from Available Local Sources*

- Temporary infrastructure to obtain water from available local sources will be required.
- New or existing boreholes, including a potential temporary above ground pipeline (approximately 50cm in diameter) for each wind farm, to feed water to the sites are being proposed.
- Water will potentially be stored in temporary water storage tanks.

#### 4.2.1.16 *Temporary Containers*

- Temporary containers of up to approximately 80m<sup>3</sup> will be required for the storage of fuel on-site during the construction phase of each wind farm.

- As mentioned, a chemical storage area will fall within the Temporary Construction Camp and permanent Maintenance Area.

## **4.3 Layout Alternatives**

### *4.3.1 Wind Energy Facility*

Design and layout alternatives will be considered and assessed as part of the EIA. These include alternatives for the Substation locations and also for the construction / laydown area.

### *4.3.2 No-go Alternative*

The 'no-go' alternative is the option of not undertaking the proposed WEF project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

## 5. LEGAL REQUIREMENT AND GUIDELINES

### 5.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage scoping study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the impact assessment phase of the HIA process.

#### 5.1.1 Section 35 – Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, PIAs and AIAs are required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

#### 5.1.2 Section 36 – Burial Grounds & Graves

A section 36 permit application is made to the Heritage Western Cape (HWC) or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and 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. HWC must also 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 these graves and must maintain such memorials. A permit is required under the following conditions:

Permitting requirements for burial grounds and graves older than 60 years (prehistoric) and historic burials to the HWC:

- 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.

d) 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.

### 5.1.3 Section 38 HIA as a Specialist Study within the EIA in Terms of Section 38(8)

A NHRA Section 38 (Heritage Impact Assessments) application to HWC is required when the proposed development triggers one or more of the following activities:

Permitting requirements for demolition of built environment features:

- a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site,
  - i. exceeding 5 000 m<sup>2</sup> in extent; or
  - ii. involving three or more existing erven or subdivisions thereof; or
  - iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- e) any other category of development provided for in regulations by HWC or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken as a component of the BA for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

This is an HIA submitted to the relevant authority in terms of Section 38(8) of the National Heritage Resources Act. The commenting authority is the HWC.

An HIA report is required to identify, and assess archaeological resources as defined by the Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected
- The assessment of the significance of such resources
- The assessment of the impact of the development on the heritage resources
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development
- Consideration of alternatives
- Plans for mitigation in the future

#### 5.1.4 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments<sup>1</sup> were published by SAHRA and Heritage Western Cape<sup>23</sup>, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 3** and the applicable section in this report noted. The screening tool indicated a low archaeological and cultural heritage significance (**Figure 6**).

**Table 3 : Reporting requirements for GN648**

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desktop analysis, using satellite imagery;	Section 7	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 6	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web- based environmental screening tool;	Section 6	-

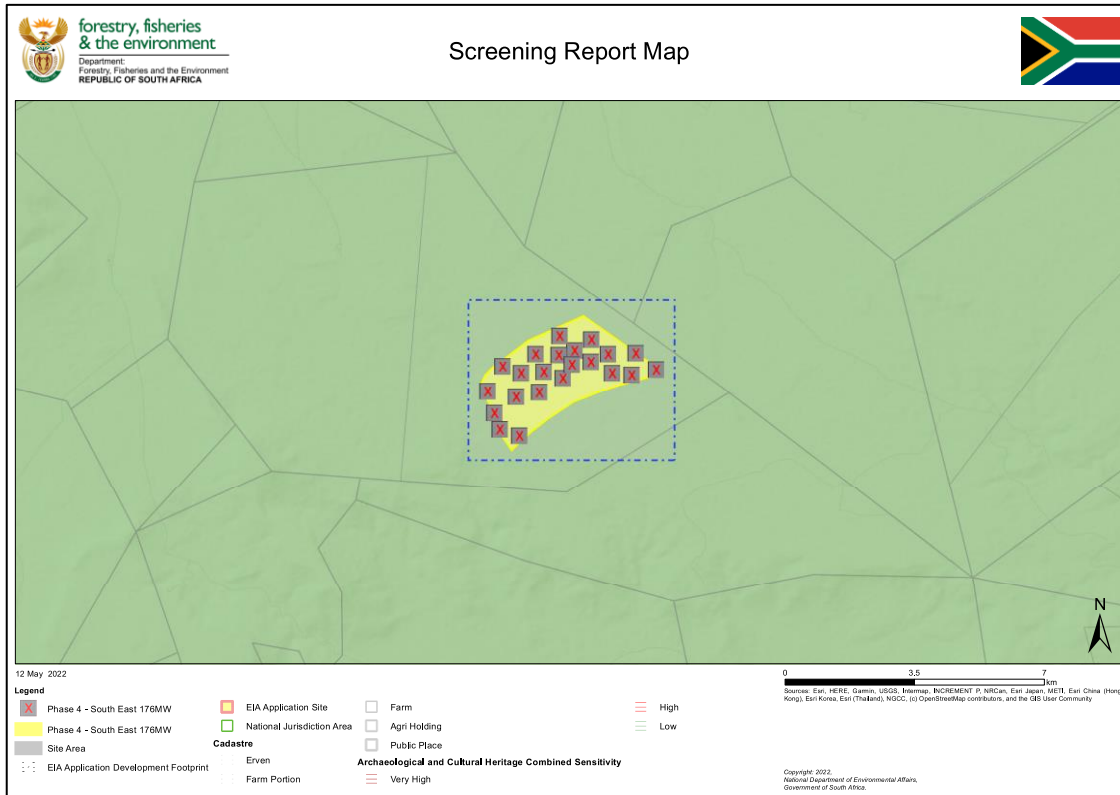
<sup>1</sup> South African Heritage Resources Agency. 2007. *Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports*. May 2007.

<sup>2</sup> Heritage Western Cape. 2016. *Guide for Minimum Standards for Archaeology and Palaeontology Reports Submitted to Heritage Western Cape*. June 2016.

<sup>3</sup> Heritage Western Cape 2016. *Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)*.



2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 6 provides a description of the current use and confirms/doesn't confirm the status in the screening report.	-
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**Figure 6: DEFF Screening tool outcome indicating low significance for the Klipkraal Phase 4 WEF.**

### 5.1.5 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) Appendix 6 requirements for specialist reports as indicated in the table on page vi and vii of this report.





**Figure 7: Typical Karroo landscape of low-lying plains with flat topped hills and mountains (facing south).**



**Figure 8: Hill and mountainous region with flat-lying stratigraphy (facing south).**



**Figure 9: General view from southern portion of the additional proposed wind farm, showing a deflation zone in the distance with sparsely vegetated stony and sandy soils.**



**Figure 10: Scree slope developed at the base of a hill with numerous angular rock fragments.**



**Figure 11: Common rock pavement found in the region.**



**Figure 12: Ephemeral stream developed at base of hill.**



**Figure 13: Typical ephemeral stream in low-lying area with coarse grained sands.**



**Figure 14: Rocky slope comprising sandstone-mudstone rock fragments.**





**Figure 15: Flat lying Karroo sediments with gabbro-dolerite sill at the top of Klipkraal se Berg (near southwestern farm boundary).**



**Figure 16: Resistant gabbro outcrop at top of hill with commonly occurring rounded boulders in the northern portion of the additional proposed wind farm area.**



**Figure 17: Aeolian orange-brown sands on low-lying plain.**



**Figure 18: Deflation zone commonly observed within low-lying plains in the study area.**



**Figure 19: Large dry dam observed in the study area.**



**Figure 20: Deflation zone with typical mud cracks.**





**Figure 21: Typical erosion of orange-brown soils at base of hill (near western farm boundary).**



**Figure 22: One of numerous borrow pit in the study area.**



**Figure 23: Typical bioturbation occurring in the region.**



**Figure 24: Dry stone walling observed within the study area.**



**Figure 25: Farm track observed on the property (facing north).**



**Figure 26: Fencing demarking farm grazing areas.**

## 7. BACKGROUND RESEARCH

The previous section provided a topographical description of the proposed development area. This section seeks to describe the historical origins of the receiving environment. The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore, an internet literature search was conducted, and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied.

### 7.1 Archival and Historical Maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Historical topographic maps (1:50 000) for various years (1972, 1986, 2005) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures, ruins and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

The relevant topographical maps include:

- Extract from Cape of Good Hope, **1836. (Figure 27)**
- Extract from South Africa (with) Environs of the Cape, **1883 (Figure 28)**
- Beaufort West, **1901 (Figure 29)**
- Beaufort West, **1901. 3<sup>rd</sup> ed (Figure 30)**
- First Edition- 3221BB Topographical Sheet was based on aerial photography undertaken in 1965, was surveyed in **1972** and was drawn in 1973 by the Director – General of Surveys.
- Second Edition- 3221BB Topographical Sheet Published by the Chief Director of Surveys and Mapping, Mowbray, **1986**

Furthermore, from the Chief Surveyor-General database (<http://csg.dla.gov.za/>) the following Farm was surveyed:

- Farm Klipfontein 447 was surveyed by (Sgd.) Capt. Bird in June 1830 for the Widow of Johan George Seiberhagen (**Figure 31**)





Figure 27: Extract from the Topographical map Cape of Good Hope dating 1836. The approximate location of the *Klipkraal WEF* study area is indicated (orange polygon). (Publisher: John Arrowsmith)<sup>4</sup>

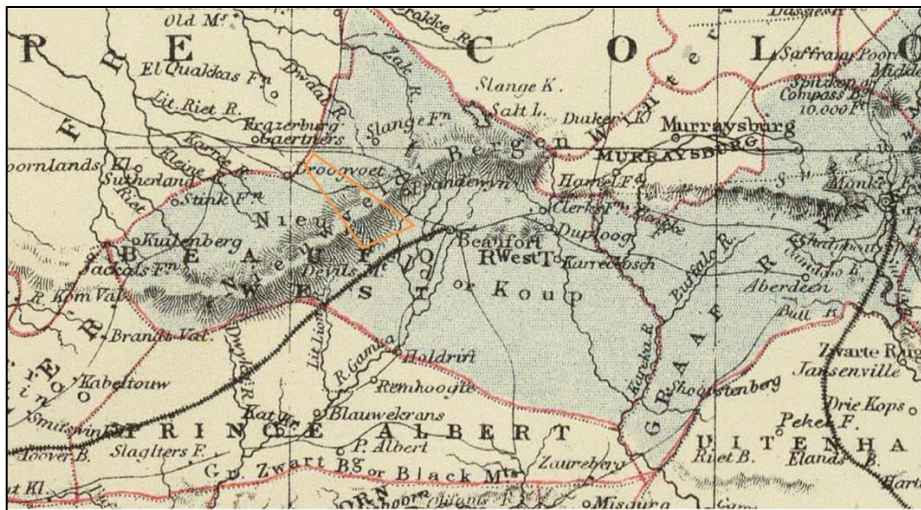


Figure 28: Extract from South Africa (with) Environs of the Cape Topographical map dating to 1883. The approximate location of the study area is indicated (orange polygon). (Publisher: Letts, Son & Co.)<sup>5</sup>

<sup>4</sup> [https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33872~1170024:Cape-of-GoodHope-?sort=Pub\\_Date%2CPub\\_List\\_No\\_InitialSort&qvq=w4s:/where%2FAfrica%25252C%2BSouthern%2FSouth%2BAfrica;q:%22%20;sort:Pub\\_Date%2CPub\\_List\\_No\\_InitialSort;lc:RUMSEY~8~1&mi=6&trs=34](https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~33872~1170024:Cape-of-GoodHope-?sort=Pub_Date%2CPub_List_No_InitialSort&qvq=w4s:/where%2FAfrica%25252C%2BSouthern%2FSouth%2BAfrica;q:%22%20;sort:Pub_Date%2CPub_List_No_InitialSort;lc:RUMSEY~8~1&mi=6&trs=34)

<sup>5</sup> [https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31457~1150413:South-Africa-?sort=Pub\\_Date%2CPub\\_List\\_No\\_InitialSort&qvq=w4s:/where%2FAfrica%25252C%2BSouthern%2FSouth%2BAfrica;a;q:%22%20;sort:Pub\\_Date%2CPub\\_List\\_No\\_InitialSort;lc:RUMSEY~8~1&mi=21&trs=34](https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~31457~1150413:South-Africa-?sort=Pub_Date%2CPub_List_No_InitialSort&qvq=w4s:/where%2FAfrica%25252C%2BSouthern%2FSouth%2BAfrica;a;q:%22%20;sort:Pub_Date%2CPub_List_No_InitialSort;lc:RUMSEY~8~1&mi=21&trs=34)



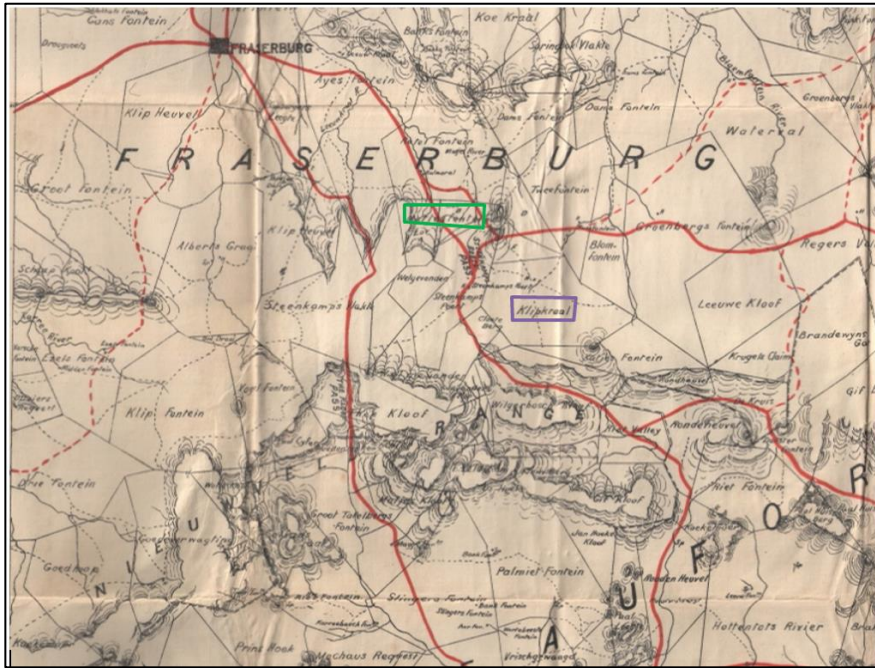


Figure 29: Extract from the Topographic map Beaufort West, dating to 1901 showing several farm names in the project area (Matjes Fontein: green polygon; Klipkraal: purple polygon)<sup>6</sup>.

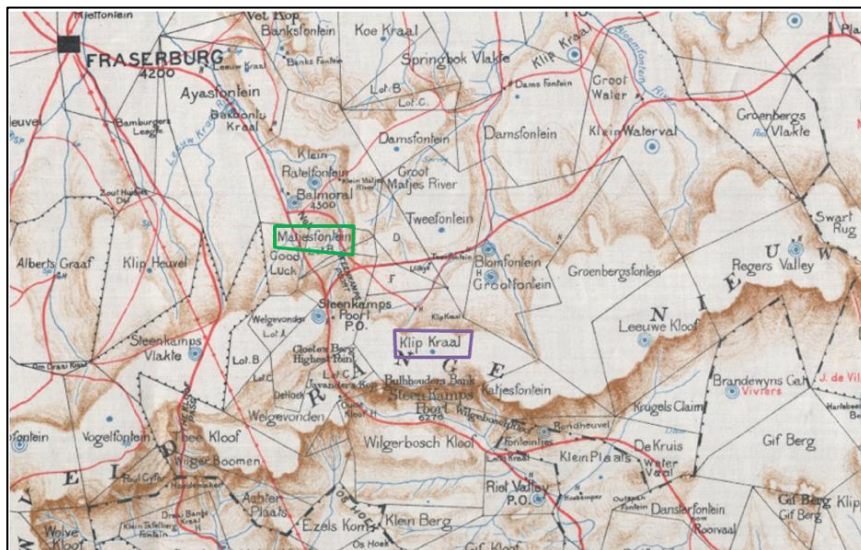
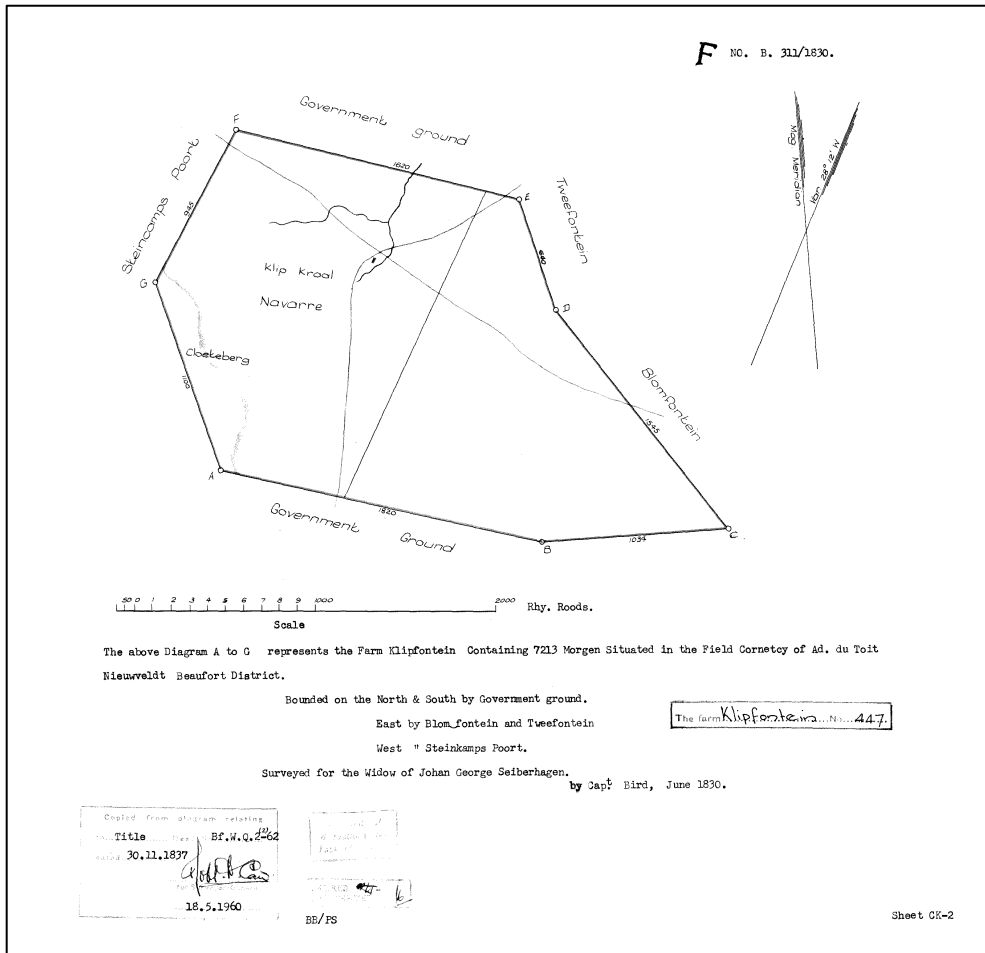


Figure 30: Extract from the 3<sup>rd</sup> edition Topographic map Beaufort West, dating to 1901 showing several farm names in the project area (Matjes Fontein: green polygon; Klipkraal: purple polygon) (University of Cape Town Libraries).

<sup>6</sup> Board, C. "Certainly better than nothing at all" : a re-examination of the Imperial map of South Africa 1899-1902. Proceedings of the 21<sup>st</sup> International Cartographic Conference, Durban, 2003. Available online: [http://icaci.org/files/documents/ICC\\_proceedings/ICC2003/Papers/109.pdf](http://icaci.org/files/documents/ICC_proceedings/ICC2003/Papers/109.pdf) (accessed 15 Sept. 2021)., "This map is not to be considered as absolutely accurate."



**Figure 31 SG-Diagram from the Chief Surveyor-General database for Farm Klipfontein 447 was surveyed by (Sgd.) Capt. Bird in June 1830 for the Widow of Johan George Seiberhagen.**

**7.1.1 1: 50 000 Topographical Map 3221BB - First Edition 1972**

The First Edition of the 3221BB Topographical Sheet was compiled from aerial photography undertaken in 1965, was surveyed in 1972 and was drawn in 1973 by the Director – General of Surveys.

**No potential heritage features were identified within the areas proposed for wind turbines.**

## 7.2 Aspects of the area's history

### 7.2.1 Previous Heritage Studies in the area

It is well known that the Karoo contains a long and rich archaeological record dating from the ESA to the historic period. However, vast areas of the region, including the immediate vicinity of the study area, have yet to be subjected to systematic analytical research. As a result, the discussion below is based on research undertaken in areas which are further afield.

Scatters of ESA through to LSA artefacts have been widely reported in the general vicinity of Beaufort West. This is a result of the erosional nature of the environment, which tends to leave artefacts exposed on the surface rather than buried beneath layers of sediment. To date, heritage studies in this region have shown that these artefacts have occurred in secondary contexts, often associated with gravel deposits, having been subjected to erosion of the soils in which they were once deposited (Dreyer 2005; Halkett 2009; Kaplan 2006, 2007; Orton 2010; Webley & Hart 2010a, 2010b; Webley & Lanham 2011). Although context is generally poor, the Karoo is still regarded as a region that is very rich in archaeological and historical heritage.

More intensive occupation of the Karoo started around 13 000 years ago during the LSA (Webley and Hart, 2010c). Distinctive stone tool assemblages, referred to as the Lockshoek have been identified in the region and characteristic of this period is large knife-like tools with natural backing. Large scrapers are also common. The Lockshoek industry disappears abruptly around 9000 years ago (Webley & Hart, 2010c). The Karoo seems to have been largely unoccupied until 4500 BP, presumably as a result of drier conditions.

Historical resources, such as farmsteads, kraals and graves, are also observed within the Beaufort West region (Halkett 2009; Webley & Hart 2010b). To the northeast of Beaufort West, rock engravings have been identified on dolerite boulders that are characteristic of parts of the Karoo (Orton, 2010; Parkington *et al.*, 2008). The lack of caves and rock shelters in the Karoo region, results in the majority of archaeological sites in the area being classified as open-air sites (which may contain stone artefacts, ostrich eggshell fragments and ceramics). As such, the artefacts are generally not *in-situ* and organic remains are rarely preserved.

A review of SAHRIS has revealed that a very limited number of other archaeological studies have been performed within close proximity to the study area:

- ***Dreyer, C. 2004. Archaeological and historical investigation of the proposed developments at the sewerage dams, Fraserburg, Northern Cape. The study area is located approximately 20km northwest of the current study area. No archaeological or historical material was found in the inspected area.***



- **Vidamemoria Heritage Consultants. 2012. Heritage Impact Assessment: DR 2308 Central Karoo, Beaufort West – Central Karoo District Municipality, Western Cape.** Vidamemoria was appointed by Aurecon South Africa (Pty) Ltd to conduct a HIA for a proposed borrow pit. The study area was located approximately 40km southwest of Beaufort West (40km south-southeast of the current study area). Low density scatters of mixed MSA and LSA artefacts were observed in a secondary context and were of low archaeological heritage significance.
- **Dreyer, C. 2005. Archaeological and historical investigation of the proposed residential developments at the farms Grootfontein 180 & Bushmanskop 302, Beaufort West, south-western Cape.** The study area is located approximately 20km west of Beaufort West (50km southeast of the current study area). Scattered and isolated lithics were found in the area. A trihedra, Acheulian or Victoria West I hand axe, a bifacial worked Oldowan chopper with minimal retouch, a number of isolated flakes and core flakes and several small assemblages of LSA scrapers were identified. On the flood plain near the Sand River, fragments of ostrich eggshell and one single ostrich eggshell bead were also identified.
- **Nilssen, P. 2010. Archaeological Impact Assessment: Proposed upgrade of Merweville Water Treatment Works, Merweville, Beaufort West Municipality, Central Karoo.** Nilssen was appointed by Aurecon South Africa (Pty) Ltd to conduct an AIA. The study area was within Merweville (65km south-southwest of the current study area). Apart from an old cemetery, no tangible heritage resources were recorded in the study area.
- **Deacon, H.J. 2005. Archaeological/Palaeontological Assessment: Merweville-Prince Albert Road ‘Far North’ Quarry Site.** Deacon was appointed by the client Site Plan Consulting. The study site was located 10km from Merweville (70km south-southwest of current study area). A stone slab with engravings of three female figures was known to occur on the property. There were isolated occurrences of stone artefacts but none in a context that would warrant further investigation.
- **Orton, J. 2011. Heritage Impact Assessment for a proposed Photo-Voltaic Facility on Steenrots Fontein 168/1, Beaufort West Magisterial District, Western Cape. University of Cape Town: Archaeology Contracts Office.** The UCT Archaeological Contracts Office was appointed by the Council for Scientific and Industrial Research (CSIR) to conduct a HIA. The study area was approximately 5km south of Beaufort West (70km southeast of the current study area). Most of the archaeological material was likely MSA (background scatters) and the artefacts were generally weathered. Historical material included fragments of a bottle and fragments of an annular ware bowl. All of the finds were recorded as low significance.
- **Webley, L. & Halkett, D. 2015. Archaeological Impact Assessment: Proposed Uranium Mining and Associated Infrastructure on Portions of the Farms Quaggasfontein and Rystkuil\* near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape.** Webley and Halkett were appointed by Ferret Mining & Environmental Services (Pty) Ltd, on behalf of a client, to conduct an AIA report. Archaeological material

comprised small numbers of ESA artefacts, scatters of MSA and occasional LSA. The study area was approximately 5km east of Beaufort West (75km southeast of the current study area). The majority were manufactured on indurated shales (hornfels) and some artefacts were manufactured from a chert band. Artefact numbers were very low and of low significance. One LSA site, Site D009, was located on the banks of a little stream. Amongst the identified lithics, was a characteristic LSA drill and thumbnail scraper.

- **Nilssen, P. 2011. Archaeological Impact Assessment. Proposed Beaufort West Photovoltaic (Solar) Park: southern portion of properties; 2/158 Lemoenkloof, RE 9/161 Kuilspoor, RE 162 Suid-lemoensfontein and RE 1/163 Bulskop, Beaufort West, Western Province.** The study area was approximately 8km south east of Beaufort West (80km southeast of the current study area). The finds included numerous isolated and very low-density scatters of Stone Age artefacts ranging in age from the ESA to the LSA. Due to their temporally mixed nature and the absence of other faunal/cultural remains, these finds were considered to be of low heritage significance. There were also several archaeological occurrences that represented isolated events that were recorded as medium to high heritage significance.
- **Cape Archaeological Survey (CAS) cc and Associates. 2016. Heritage Impact Assessment: Proposed Construction of Two Power Lines & Three Substations for the Mainstream Wind Energy Facility. Land Parcel Beaufort West, Remainder of Farm Trakaskuilen No 15, Portion 1 Trakaskuilen No 15, Portion 1 of Witpoortje No 16.** CAS was appointed by SiVest Environmental Division on behalf of their client Mainstream Renewable Power South Africa (Pty) Ltd to conduct an AIA report. The study area was situated on the N12 between Beaufort West and Klaarstroom (approximately 100km southeast of the current study area). Several MSA open sites, positioned on the summit areas of low ridges and koppies, were identified. There was also a general background presence of MSA with occasional flakes or cores observed in the open. There was little evidence of LSA activity in the area. Most of the raw material used was a fine-grained chert with a reddish outer patina (grey when flaked). In terms of colonial period archaeology, there were several farm complexes with buildings, historic dumps and derelict structures. The area hadn't been systematically studied or researched, so the archaeological sensitivity of the proposed wind farm on archaeological features was seen as high.
- **Fourie, W. 2018. AIA: Proposed Construction of a Linking Station, two (2) Power Lines and two (2) On-site Substations for the Beaufort West and Trakas Wind Farms, near Beaufort West in the Western Cape Province.** PGS Heritage (Pty) Ltd (PGS) was appointed by SiVEST to undertake an Archaeological Impact Assessment (AIA). The study area was located approximately 50km south of Beaufort West (100km southeast of the current study area). Two archaeological sites and seven findspots were identified. The archaeological resources identified during the fieldwork comprised a large number of Stone Age surface artefact scatters. These were primarily from the MSA, although both LSA and earlier ESA material was identified. All of these artefact assemblages occurred in heavily

deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.

- **Halkett, D. 2009. An archaeological assessment of uranium prospecting on portions 1, 3 and 4 of the farm Eerste Water 349, and remainder of the farm Ryst Kuil 351, Beaufort West.** ACO Associates was appointed by Ferret Mining and Environmental Services (Pty) Ltd to undertake a scoping survey. The study area was located approximately 110km southeast of the current study area. Heritage sites were quite sparse in the area. Pre-colonial stone age sites (ESA, MSA and LSA) and colonial sites related to farming and settlement (incl. cemeteries, small ruined dwellings, stone kraal, fragments of annular ware and transfer printed refined earthenware ceramics) were identified. There were patinated and polished ESA/MSA artefacts made of hornfels and siltstone. LSA material is rarer but one scatter of LSA material was identified in close proximity to a dry river course.
- **Kinahan, J. 2008. Archaeological Baseline Survey of the Proposed Ryst Kuil Uranium Project.** Kinahan was appointed by Turgis Consulting (Pty) Ltd on behalf of UraMin-Mago-Lukisa JV Company (Pty) Ltd to conduct an archaeological baseline survey. The study area was located approximately 45km southeast of Beaufort West. In general, the study area was characterised by a low density of surface material, with much displacement by sheet erosion. None of the ESA material (isolated quartzite artefacts) were in-situ as all showed evidence of fluvial transport. Isolated MSA finds were observed. These finds probably formed part of a continuous surface scatter but lateral disturbance may have greatly exaggerated the distribution and number of these sites. The lack of focal points in the landscape means that there were no major MSA site concentrations. MSA artefacts were dominated by quartzite and hornfels. There was also some evidence of Levallois core production and a few Howieson's Poort segments found at a number of sites. Isolated and local scatters of LSA materials were also apparent. A number of these sites were associated with lithic raw material sources (chert and hornfels outcrops). Late pre-colonial sites included a number of suspected hut circles and short lengths of stone walling, as well as possible burial cairns. Historic stone structures (dry-stone construction and mud-brick construction) along with imported items (crockerly and rifle cartridges) were also noted.

## 7.2.2 Archaeological and Historical Background

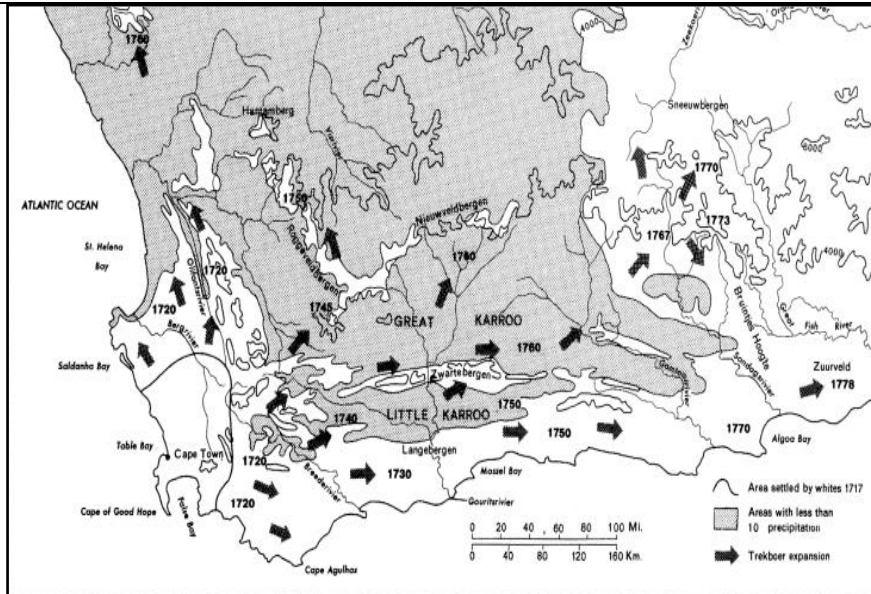
**Table 4: Summary of archival data found on the general area**

DATE	DESCRIPTION
Early Stone Age (2.5 million to 250 000 years ago)	The Earlier Stone Age (ESA) is the first phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago.

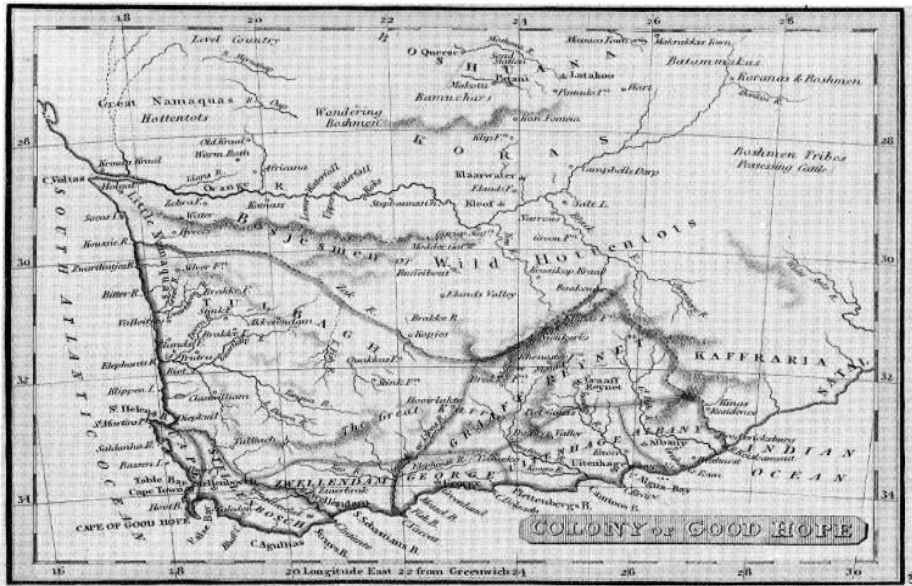


	<p>Isolated ESA lithics, including occasional hand axes have been reported from the area surrounding Beaufort West, but they are generally quite ephemeral. Kinahan (2008) identified 7 ESA sites during an assessment of Ryst Kuil. He recorded isolated quartzite artefacts and commented that “none of the ESA material was considered to be in primary context and therefore of little research value”.</p> <p><i>No Early Stone Age sites are known within the immediate vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.</i></p>
<p>Middle Stone Age (250 000 to 40 000 years ago)</p>	<p>The Middle Stone Age (MSA) is the second oldest phase identified in South Africa’s archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called ‘prepared core’ technique. This phase is further associated with modern humans and complex cognition (Wadley, 2013).</p> <p>Within the region around Beaufort West, heritage reports have shown that MSA artefacts are widespread and occur in isolated as well as relatively dense concentrations over large areas. According to Kinahan (2008), the MSA sites in the area of his assessment (Ryst Kuil) “probably formed part of a continuous surface scatter almost without focal points”. He noted that the MSA artefacts were mainly made from quartzite and hornfels.</p> <p><i>No Middle Stone Age sites are known within the immediate vicinity of the study area. However, this is probably due more to a lack of research on the surroundings of the study area rather than a lack of sites.</i></p>
<p>Later Stone Age (40 000 years ago to the historic past)</p>	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths.</p> <p>According to heritage reports conducted in the Beaufort West region, LSA artefacts are not as common as ESA and MSA stone artefacts in the area. Artefacts are generally made from hornfels and in some cases chert which was most likely sourced from a chert horizon that caps some of the low hills in the area. LSA artefacts are generally located close to dry river courses (Kinahan, 2008; Halkett, 2009). There have also been hut circles and stone kraals identified which have been interpreted as representing pre-colonial pastoralist groups.</p> <p><i>No Later Stone Age sites are known in the vicinity of the study area. However, this is in all likelihood rather due to a lack of research focus on the surroundings of the study area than a lack of sites.</i></p>
<p>18<sup>th</sup> – 19<sup>th</sup> Century</p>	<p>Beaufort West historically was an important centre for sheep farming, trade and transport. This was also an area of interaction between various cultural groups.</p> <p>During the eighteenth and early nineteenth century the Koup was one of the last refuges of the San. A shortage of surface water meant that populations of San hunter-gatherers, and later Khoekhoe pastoralists were confined to areas with springs. During the second half of the 18th century, farmers started moving northward into the Karoo, settling in areas known as the Nuweveld Plateau and the Koup (<i>Figure 32, Figure 33</i>). The first Europeans to arrive in the region were Trekboers who arrived in 1759.</p> <p>This time was characterised by conflict and the dispossession of the San as more trekboere/migrant stock farmers moved onto the San’s traditional hunting lands. The San were forced to move out of the area into what is today known as Bushmanland.</p>





**Figure 32: Trekboer and colonial expansion by 1717-1788 in the study region (Reference: Guelke & Shell 1992: 818).**



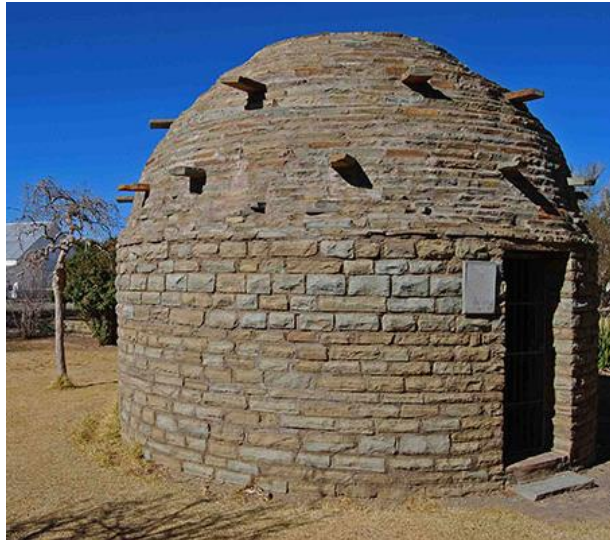
The Cape Colony, 1820

**Figure 33: Early map of the Cape illustrates the expansion of farmers towards the east and north east Karoo (Reference: Watson, R.L. 1990).**

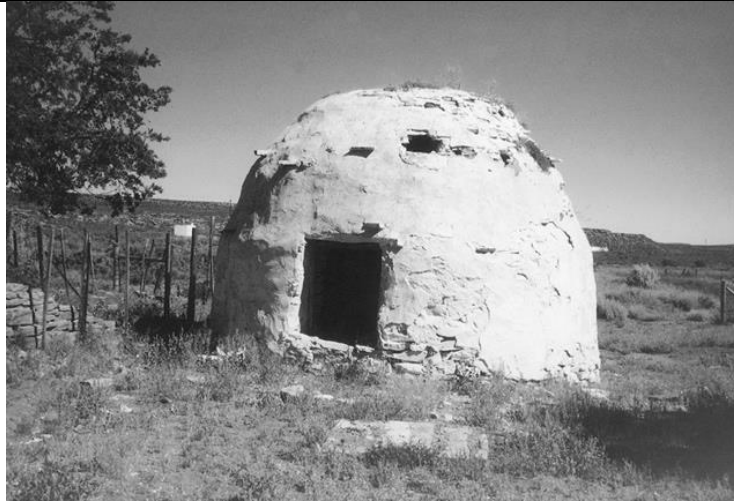
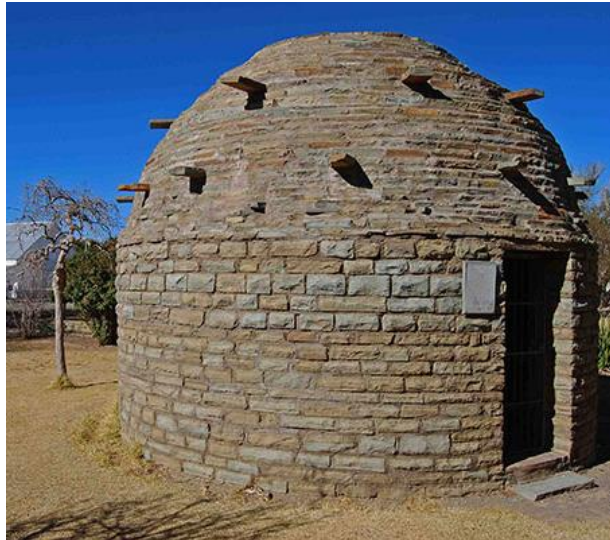
1780	The first Europeans to settle in the Fraserburg area arrived in 1780. The first settler to be recorded as living in this part of the Karoo was Willem Steenkamp. The mountain range, Steenkampsberg, situated south of Fraserburg was named after this early settler.
19 <sup>th</sup> century	The historically significant corbelled houses are unique to the Karoo area (Figure 34). They were built by early trekboers in the early 1800s as dwellings and granaries. The early settlers made use of the only building material abundantly available in the area, which was rock. A replica corbelled house was constructed in front of the Fraserburg town hall in 1991 (Figure 35).





**Figure 34: Historic photograph of a Corbelled house**  
 (<https://fraserburgtourism.co.za/attractions/>).



**Figure 35: Replica Corbelled House outside the Fraserburg Town Hall**  
 (<https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/>)

	 <p><b>Figure 34: Historic photograph of a Corbelled house</b>        (<a href="https://fraserburgtourism.co.za/attractions/">https://fraserburgtourism.co.za/attractions/</a>).</p>  <p><b>Figure 35: Replica Corbelled House outside the Fraserburg Town Hall</b>        (<a href="https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/">https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/</a>)</p>
1803	<p>The remains of the early mission that was established to spread Christianity to the early inhabitants of the district, can be seen just outside Fraserburg at Kerkplaas<sup>7</sup>. The church and home of the Reverend J.J Kicherer was built in 1803 by the London Missionary Society.</p>

<sup>7</sup> <https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/>

	 <p style="text-align: center;"><b>Figure 36: An undated photograph of a structure</b> (<a href="http://www.karoohoogland.gov.za/fraserburg-photo-gallery/">http://www.karoohoogland.gov.za/fraserburg-photo-gallery/</a>)</p>
1825	<p>In 1825, the Scottish cleric Reverent Colin Fraser came to serve the Dutch Reformed congregation in Beaufort West as a minister. When he first arrived in Beaufort West, there was no a church available for his services. For many years, he held his services under a wagon canvas strung between two trees<sup>8</sup>. Five years later a church was finally constructed in Beaufort West.</p>
1851	<p>There was a substantial number of stock farmers in the district west of Beaufort West and in 1851, a parish was established for the Dutch Reformed Church. Fraserburg was founded in West Nuweveld and established on the farm Rietfontein<sup>9</sup>. The village was named after the Scottish cleric Reverent Colin Fraser and a church elder, Meyerburg (Raper, 2004). Fraser was in fact the father of the wife of the President of the Orange Free State, President M.T. Steyn<sup>10</sup>.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><b>Figure 37 : Reverend Colin Fraser</b> (<a href="https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/">https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/</a>)</p>
1856	<p>In 1856, the Old Parsonage (Ou Pastorie) in Fraserburg was built for the Reverend Carl Arnoldus Bamberger. He was the first minister to the newly established congregation<sup>11</sup>. The church house is typical Cape Dutch in appearance, it has a reed roof, yellowwood floorboards, white washed walls and small window panes. The front entrance and discharge pipes are</p>

<sup>8</sup> <https://aridareas.co.za/roses-s-roundup/rev-colin-frasers-rural-ministry/>

<sup>9</sup> <https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/>

<sup>10</sup> <https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/>

<sup>11</sup> <https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/>

elaborate and four of the interior walls are curved. The ceiling boards were also made of yellowwood but they were replaced with pine in the early 1900s due to warping<sup>12</sup>.

At one stage, it was the only formal building in the village. Today, the building houses a museum collection and an fossil exhibit.



**Figure 38: Ou Pastorie museum (<https://fraserburg.co.za/about-fraserburg/>).**



1857-1860	Ostrich farming, in particular, feather 'farming', gained some economic importance in the region and supplemented the merino wool trade. The success of the ostrich feather industry in the Eastern Cape influenced farmers in the Northern Cape. Stone pens were built in order to enclose ostrich nesting habitats which were located along small drainages and rivers (Beyleveld, 1967).
1858	During the 19 <sup>th</sup> century, the only transport in the region was by horse and horse drawn carriage. The post was delivered to Fraserburg by stage coach from Beaufort West and the majority of farmers in the district only visited the town about four times a year for the Church Communion <sup>13</sup> .  In 1858, a post office was established in Fraserburg.
1859	In 1859, a magistrates office was opened in Fraserburg.
1860	A police station was opened in Fraserburg in 1860. The town's first medical doctor also arrived in the same year.
1861	In 1861, a hexagonal stone bell tower was built by a local artisan, Adam Jacobs. The 9m tall bell tower is known as the Peperbus ("Pepperpot"). It was constructed to serve as a market house and the bell was rung for the market. Through time, the tower was also utilised by multiple individuals and groups.  In 1861, it was used as the magistrates private office by Mr Balston. In 1862, it served as a council chamber when the village attained municipal status. In 1866, the tower became the town's first library in 1866. It became the School Board office in 1951 and later it was used as a storeroom <sup>14</sup> . The bell tower was proclaimed a National Monument in 1971 and it's now a Northern Cape provincial heritage site.

<sup>12</sup> <https://fraserburg.co.za/about-fraserburg/>

<sup>13</sup> <https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/>

<sup>14</sup> "THE PEPPERPOT - Businesses in The Karoo". [www.karoo-information.co.za](http://www.karoo-information.co.za). Retrieved 2021-09-13.



	 <p data-bbox="464 752 1246 781"><b>Figure 39: Die Peperbus (<a href="https://fraserburg.co.za/about-fraserburg/">https://fraserburg.co.za/about-fraserburg/</a>).</b></p>
1862	On 6 June 1862, the town was declared a municipality <sup>15</sup> .
1870	<p data-bbox="357 835 1348 947">In 1870, the town's first attorney and noted Afrikaans author, H.W.A. Cooper moved to the town. It was in Fraserburg, that he wrote the "Boerebrievens" (farmers letter) in the Afrikaans newspaper <i>Het Volksblad</i>. Cooper was an Englishman who wrote under the pseudonym Samuel Zwaartman<sup>16</sup>.</p>  <p data-bbox="443 1440 1273 1496"><b>Figure 40: Henry William Alexander Cooper (<a href="https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/">https://www.karoo-southafrica.com/western-upper-karoo/fraserburg/history-of-fraserburg/</a>).</b></p>
1870	<p data-bbox="357 1518 1348 1659">In 1870, a powder magazine was erected by John Findlay. It was used to store ammunition in case war should break out with the neighbouring Korannas under leadership of Kupido Pofadder and Klaas Springbok. It was also used by the British troops during the Anglo-Boer War<sup>17</sup>. The roof is dome-shaped to limit danger from fire. The powder magazine still stands on the edge of the town.</p>

<sup>15</sup> <https://fraserburgtourism.co.za/attractions/>

<sup>16</sup> "Fraserburg". Karoo Hoogland. Retrieved 13 September 2021.

<sup>17</sup> <http://www.karoohoogland.gov.za/fraserburg-tourist-attractions/>



**Figure 41: Historic photograph of the powder magazine (<https://fraserburgtourism.co.za/attractions/>).**



**Figure 42: Powder Magazine (<https://fraserburgtourism.co.za/attractions/>).**

1938

In 1938, Fraserburg's first power station was installed with 7 Lister Blackstone generators. The seven Lister Blackstone engines can still be seen in the town.



**Figure 43: Old Power Station.**

### 7.3 Findings of the historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the broader Klipkraal WEF project area based on the desktop assessment (**Figure 44**).

#### 7.3.1 Heritage Screening

A Heritage Screening Report was compiled using the Department of Environment, Forestry and Fisheries National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the Heritage screening report, the directly affected area has a low sensitivity rating (**Figure 6**).

The low rating as provided by the Environmental Screening Tool is possibly reflects scarcity of heritage reports conducted in the region. The field work that has to date been conducted in the study area did not reveal heritage resources of heritage significance but further fieldwork is required for better coverage of the study area. Therefore, the DFFE screening tool sensitivity map in **Figure 6** cannot be confidently supported or challenged at this time.

#### 7.3.2 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps;
- First edition Topographical Maps dating from the 1960's

This enabled the identification of possible heritage sensitive areas around the proposed development area that included:

- Structures/Buildings
- Archaeological Heritage sites
- Graves/burial ground

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 5**.

**Table 5: Tangible heritage site in the study area**

Name	Description	Legislative protection
Architectural Structures/Dwellings	Possibly older than 60 years	NHRA Sect 3 and 34
Archaeological sites	Artefacts and/or structures/sites	NHRA Sect 3 and 35 and Sect 27







Heritage Sensitivity



Figure 44: Heritage Sensitivity map indicating possible sensitive areas adjacent to the proposed project area.

## 8. FIELDWORK FINDINGS

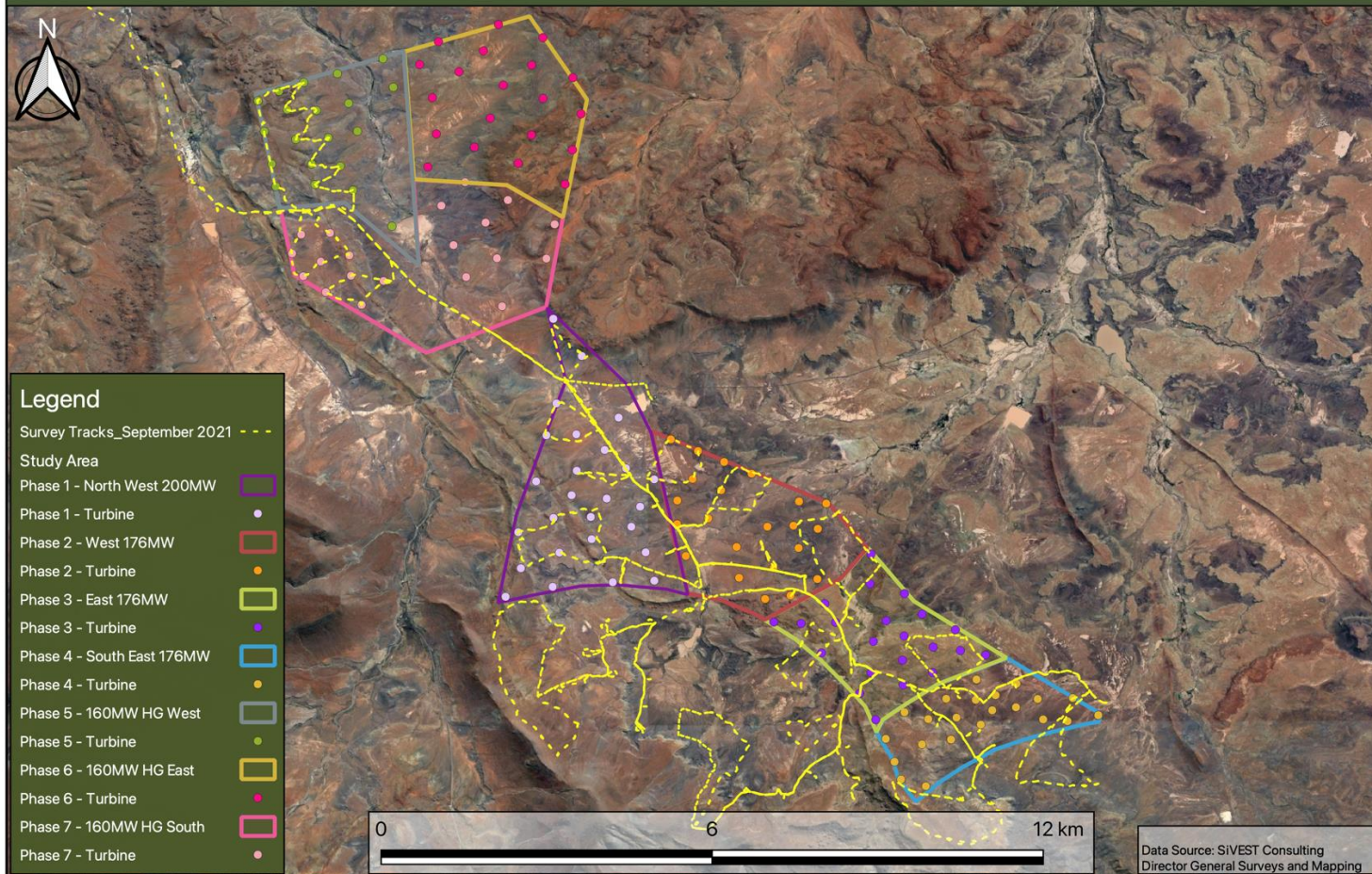
A selective site visit and survey of the study area was conducted from the 22<sup>nd</sup>-27<sup>th</sup> September 2021. Due to the nature of cultural remains, with the majority of artefacts occurring below surface, one archaeologist from PGS and a field assistant conducted a vehicle and foot-survey of the proposed development area. The fieldwork was logged with GPS devices to provide a tracklog of the area covered (**Figure 45**). Approximately 130km of the larger assessment region was traversed.

No heritage resources were identified within the Klipkraal Phase 4 WEF area during the site visit. However, further fieldwork will be conducted in the Phase 4 study area during the Impact Assessment Phase to complete the HIA and assess the proposed WEF layouts. (**Figure 46**).



**Klipkraal WEF  
Survey Tracklogs**

PGS Heritage (Pty) Ltd  
Heritage Management Unit



**Figure 45: Track log recordings from the field surveys conducted in September 2021**





**Figure 46: Heritage resources (findspot: yellow diamond; site: blue square) identified within the larger Klipkraal WEF region.**

## **8.1 Sensitivity assessment outcome**

From the desktop assessment medium to low heritage sensitive areas were identified in the broader region. No heritage resources were identified within the Klipkraal Phase 4 WEF area, but further fieldwork is required for better coverage of the study area.



The following impact rating table is based on the currently proposed WEF development layout within the region.

**Table 7: Assessment of the Impact of Proposed Development on Heritage Sites**

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I/M	TOTAL	STATUS	S	E		P	R	L	D	I/M	TOTAL	STATUS	S		
<b>Pre-Construction Phase</b>																						
Unidentified heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	28	-	Medium	1. A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	1	3	4	2	4	1	14	-	Low		





## **10. General Recommendations and Mitigation Measures for consideration during the HIA**

### **10.1 Construction phase**

The project will encompass a range of activities during the construction phase, including vegetation clearance, excavations and infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

### **10.2 Chance find procedure**

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

### 10.3 Possible finds during construction

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed development activities, could uncover the following:

- High density concentrations of stone artefact
- unmarked graves

### 10.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 8** gives guidelines for lead times on permitting.

**Table 8: Lead times for permitting and mobilisation**

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

## 10.5 Heritage Management Plan for EMPr implementation

**Table 9: Heritage Management Plan for EMPr implementation**

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
<b>General project area</b>	<ul style="list-style-type: none"> <li>Implement a chance find procedures in case where possible heritage finds are uncovered.</li> </ul>	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report



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## APPENDIX A – CV



# NIKKI MANN

Professional Archaeologist

## PROFILE

I have been involved in conducting field work for heritage and archaeological impact studies for the past 5 years. My background is in Stone Age archaeology. Since 2014, I have been involved in numerous archaeological excavation projects, working alongside American, Australian and European academics. I have worked in various countries, including South Africa, Lesotho, Ethiopia, Kenya and Ireland.

I enjoy doing field work and being involved in heritage projects across the country.

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## EDUCATION

### University of Cape Town

2011-2013  
BSc Degree - Majors in Archaeology and Environmental and Geographical Sciences

### University of Cape Town

2014  
BSc Hon Archaeology

### University of Cape Town

2016 - 2017  
MSc Archaeology (phytolith analysis)

## WORK EXPERIENCE

### PGS Heritage (Pty) Ltd - Archaeologist

Present  
Responsible for conducting heritage and archaeological impact studies.

### PGS Heritage (Pty) Ltd Lesotho - Archaeologist

2019-2020  
Responsible for conducting archaeological excavations and general site management.

### CTS Heritage – Contract Archaeologist

2018, 2019, 2020  
Contracted to conduct several heritage and archaeological impact studies. Also involved with digitalization work for local and Kenyan projects.

### Contract Archaeologist

2014, 2015, 2018, 2020  
Archaeological excavations in South Africa (West Coast, Cederberg, Knysna), Ethiopia (Afar Region), Kenya and Ireland.

## PROFESSIONAL AFFILIATION

### Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists  
Since 2017.



# WOUTER FOURIE

Professional Heritage Practitioner

## PROFILE

Project Manager and Principal Heritage Specialist holds a post-graduate degree in Archaeology and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners in South Africa.

My work focuses on heritage management through Heritage Impact Assessments, implementation of recommendations and large-scale heritage mitigation projects. I have worked, completed and implemented heritage projects in South Africa, Botswana, Mozambique, Mauritius, Zambia, Lesotho, and the Democratic Republic of the Congo.

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## EDUCATION

### University of Pretoria

1993-1996

BA Degree - Majors in Archaeology, Anthropology and Geography

### University of Pretoria

1997

BA Hon Archaeology, with further specialisation in environmental management.

### University of Cape Town

2016 - present

MPhil Conservation of the Built Environment

## WORK EXPERIENCE

### PGS Heritage Group of Companies

*(South Africa, Lesotho, Mozambique, and Portugal)*

#### Director – Heritage Specialist

2003- present

I am actively involved in the management of the business and focus on marketing and new business for PGS, specifically the broader SADC region. Acting as heritage specialist in multidisciplinary teams

#### The University of the Witwatersrand - Project Manager – Archaeological Contracts Unit

2007-2008

Responsible for conducting heritage and archaeological impact studies, archaeological excavations and general management of the unit

#### Matakoma Consultants – Director – Heritage Specialist

2000 – 2008

Heritage specialist and Director responsible for heritage and archaeological impact studies

#### Randfontein Estate Gold Mine – Environmental Coordinator

Oct 1998- Feb 2000

Coordinating all environmental Rehabilitation work

#### Department of Minerals and Energy Environmental Officer

Oct 1997 – Sept 1998

## PROFESSIONAL AFFILIATION

### Accredited Professional Heritage Practitioner

Association of Professional Heritage Practitioners

Since 2014

### Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists –

Since 2001



<b>ENVIRONMENTAL PARAMETER</b>		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
<b>ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE</b>		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
<b>EXTENT (E)</b>		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
<b>PROBABILITY (P)</b>		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>REVERSIBILITY (R)</b>		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES (L)</b>		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
<b>DURATION (D)</b>		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		



1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
<b>INTENSITY / MAGNITUDE (I / M)</b>		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
<b>SIGNIFICANCE (S)</b>		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:		
<b>Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.</b>		

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.





area did not reveal heritage resources of heritage significance. This SVR will be updated upon completion of the HIA.

Currently, the DFFE screening tool sensitivity map in **Figure 6** is supported with the data available.

## **5. Conclusion**

The Archaeological and Cultural Heritage sensitivity of the Klipkraal WEF has been evaluated based on desktop studies and a site visit. Currently the DFFE screening tool is supported pending the final HIA.