



SiVEST SA (PTY) LTD

**PROPOSED CONSTRUCTION OF THE KAREE WIND  
ENERGY FACILITY AND ASSOCIATED GRID  
INFRASTRUCTURE NEAR CERES, WESTERN CAPE  
PROVINCE, SOUTH AFRICA**

## Archaeological Impact Assessment

|                            |                             |
|----------------------------|-----------------------------|
| <b>DFFE Reference:</b>     | TBA                         |
| <b>Report Prepared by:</b> | <b>PGS Heritage Pty Ltd</b> |
| <b>Issue Date:</b>         | 23 November 2022            |
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| <b>HWC reference:</b>      | HWC22111811                 |

### **Declaration of Independence**

- I, Nikki Mann, 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;

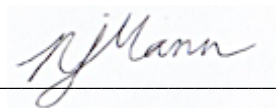
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## ACKNOWLEDGEMENT OF RECEIPT

|                     |   |  |                                      |
|---------------------|---|--|--------------------------------------|
| <b>Report Title</b> | PROPOSED CONSTRUCTION OF THE KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR CERES, WESTERN CAPE PROVINCE, SOUTH AFRICA |  |                                      |
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| <b>For:</b>             | SiVEST Environmental Division |

*PGS confirms that this HIA report is done in accordance with the QMS implemented by PGS Heritage. The report structure and format followed is that of SiVEST Environmental as per the appointment scope and deliverable of SiVEST. The authors did implement the PGS HIA SOP and requirements*

# **SiVEST SA (PTY) LTD**

## **PROPOSED CONSTRUCTION OF THE KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR CERES, WESTERN CAPE PROVINCE, SOUTH AFRICA**

### **ARCHAEOLOGICAL IMPACT ASSESSMENT**

#### **EXECUTIVE SUMMARY**

PGS Heritage (Pty) Ltd (PGS) was appointed by SiVest (PTY) Ltd (hereafter referred to as “SiVEST”), on behalf of South African Mainstream Power Developments (Pty) Ltd (hereafter referred to as “Mainstream”), to undertake the assessment of the proposed construction of the 200MW Karee Wind Energy Facility (WEF) and associated grid connection infrastructure near Touws River in the Western Cape Province of South Africa.

#### **1. SITE NAME**

The Karee WEF and grid infrastructure.

#### **2. LOCATION**

The proposed WEF and associated grid connection infrastructure is located approximately 12 km and 20km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality in the Cape Winelands District Municipality (**Figure 1**).

The WEF application site is approximately 11 841 hectares (ha) in extent and incorporates the following farm portions:

- Farm Sadawa No 239
- Farm Tierberg No 258; and
- Farm Voetpads Kloof No 253.

A smaller buildable area (1753.1 ha) has, however been identified as a result of a preliminary suitability assessment undertaken by Mainstream and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the BA process.



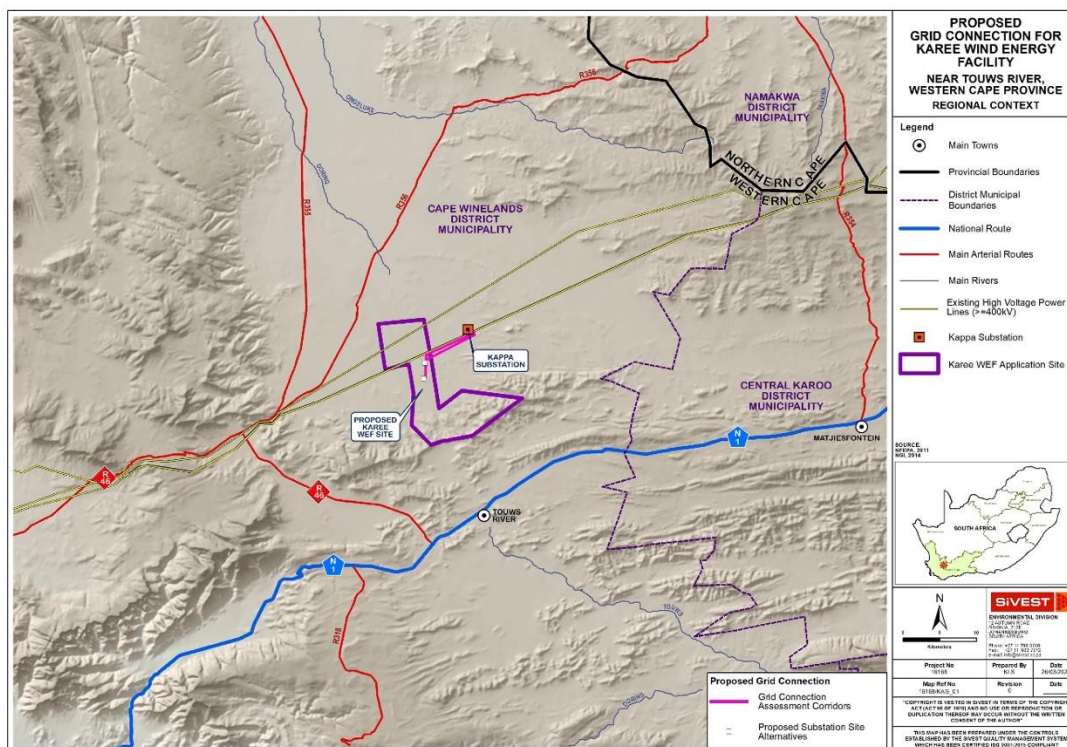


Figure 1: Locality of Karee study area.

### 3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

It is anticipated that the proposed Karee WEF will comprise thirty-five (35) 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 overhead power line. The 132kV overhead power line will require a separate EA and is subject to a Basic Assessment (BA) process, which is currently being undertaken in parallel to the WEF BA process (**Figure 3**). A BESS will be located next to the onsite 33/132kV substation.

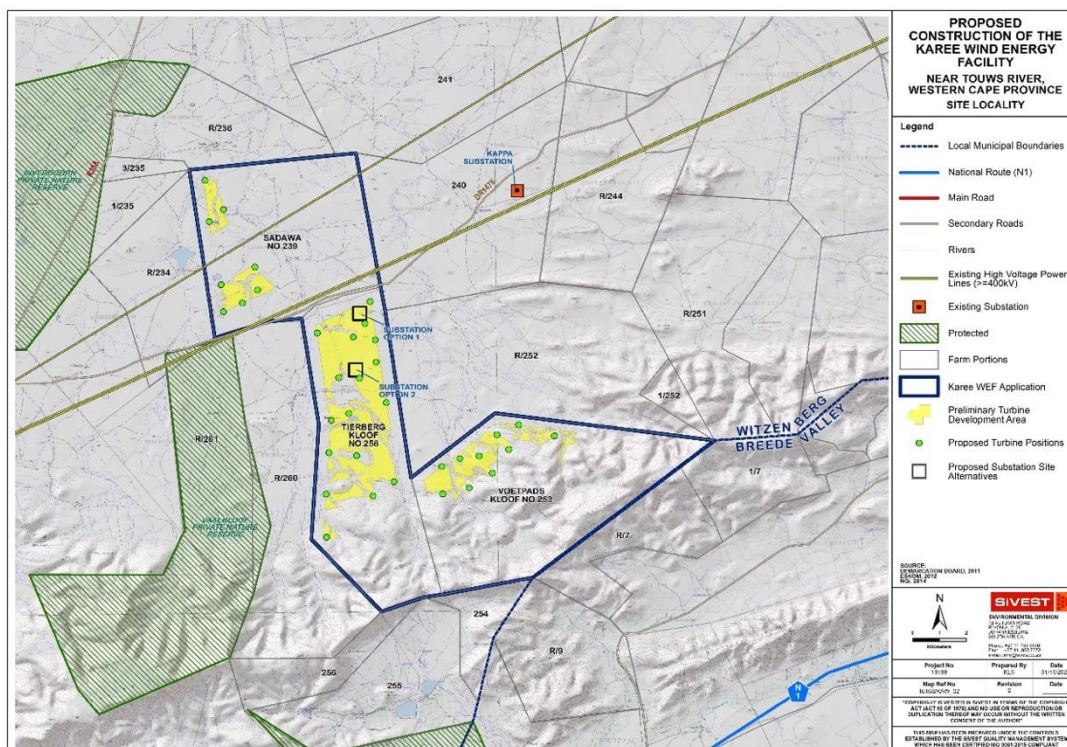


Figure 2: Karee WEF Site Locality.

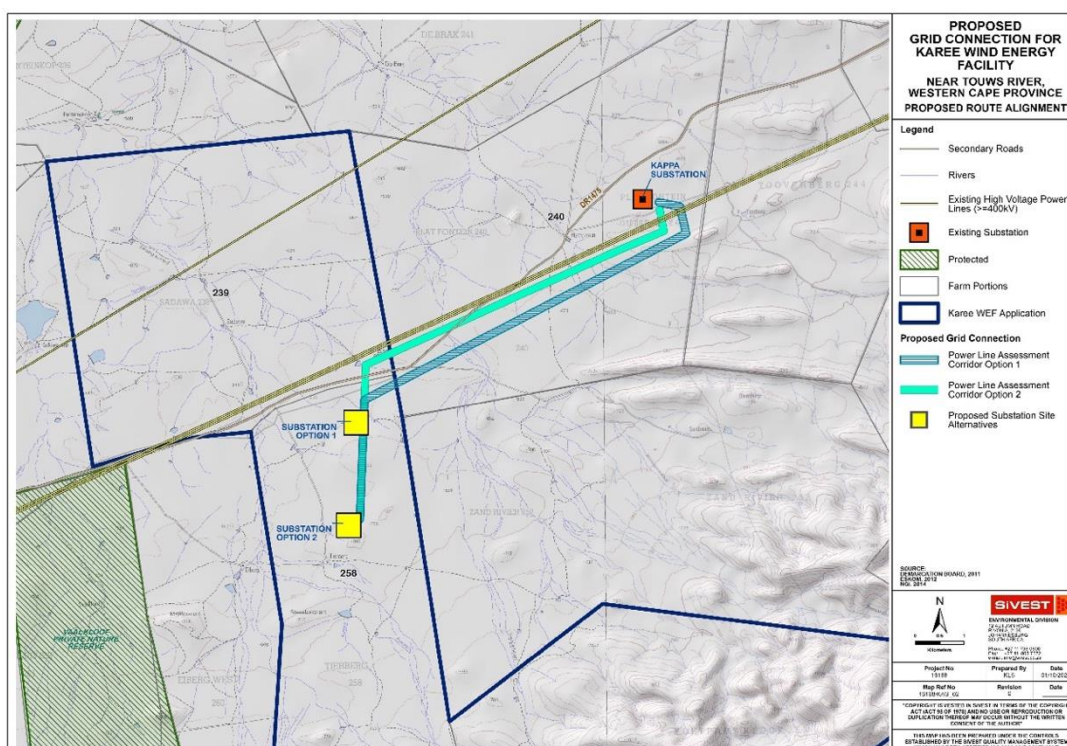


Figure 3: Proposed 132kV Power Line Route Alignment.

## 4. HERITAGE RESOURCES IDENTIFIED

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. Due to the nature of cultural remains, a systematic controlled-exclusive surface survey was conducted on foot over a period of four days by an archaeologist (Wouter Fourie) and field assistant (Xander Fourie) from PGS. The fieldwork was conducted between 9<sup>th</sup>-12<sup>th</sup> March 2021. An additional survey was conducted from 11<sup>th</sup>-12<sup>th</sup> April 2022. This fieldwork team consisted of consisting of three archaeologists (Cherene de Bruyn, Michelle Sachse and Nicolas Fletcher) and a field assistant (Xander Fourie).

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

### **Archaeology, built environment and burial grounds and graves**

The fieldwork conducted for the evaluation of the possible impact of the new Karee WEF and associated grid connection infrastructure has revealed the presence of 16 heritage resources.

#### *Historical structures*

A total of two (2) structures were identified, including one farmstead and a one-roomed stone structure. The farmstead (**Karee\_10**) was rated as having medium heritage significance and the other structure (**Karee\_11**) was rated as having low heritage significance.

#### *Archaeological features*

A total of fourteen (14) archaeological sites were identified, including one (1) site with LSA lithics and OES, one (1) rock shelter with rock art and lithics, one (1) site with LSA lithics and the remains of a stone structure, one (1) site with a pebble deposit with various artefacts, one (1) site with ESA, MSA and LSA artefacts (incl. Fauresmith), one (1) site with LSA structures and deposit and eight (8) findspots.

Two (2) archaeological sites (**Karee\_6, Karee\_18**) were rated as having high heritage significance, two (2) archaeological sites (**Karee\_12, Karee\_15**) were rated as having medium heritage significance, and two (2) archaeological sites (**Karee\_2, Karee\_8**) were rated as having low heritage significance.

Eight (8) findspots (**Karee\_1, Karee\_3, Karee\_4, Karee\_9, Karee\_14, Karee\_16, Karee\_17, Karee\_19**) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.

## 5. ANTICIPATED IMPACTS ON HERITAGE RESOURCES

The pre-construction and construction phase of the proposed WEF will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g. for widened or new access roads, wind turbine foundations, hardstanding areas, on-site substation, underground cables, construction laydown area, O&M building and BESS). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall **MODERATE NEGATIVE** rating but with the implementation of the recommended buffers and management guidelines will be reduced to a **LOW NEGATIVE** impact.

## 6. RECOMMENDATIONS

The calculated impact as summarised in **Section 9** of this report confirms that the impact of the new Karee WEF and associated grid connection infrastructure will be reduced with the mitigation measures. These findings, in addition to implementing a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources.

An assessment of the final footprint of the new Karee WEF and associated grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMP.

### The following mitigation measures will be required:

- An archaeological walk down of the final approved layout will be required before construction commences;
- Implement a 30-meter buffer around the structure at **Karee-11**.
- Implement a 30-meter buffer around all archaeological site with a rating of IIIB and higher.
- Implement a 500-meter buffer around the farmstead site at **Karee\_10**.
- Implement a 100-meter buffer around the rock art site at **Karee\_6**.
- Demarcate the resources rated as IIIC-IIIA no-go areas.
- A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.
- A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

### General

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.



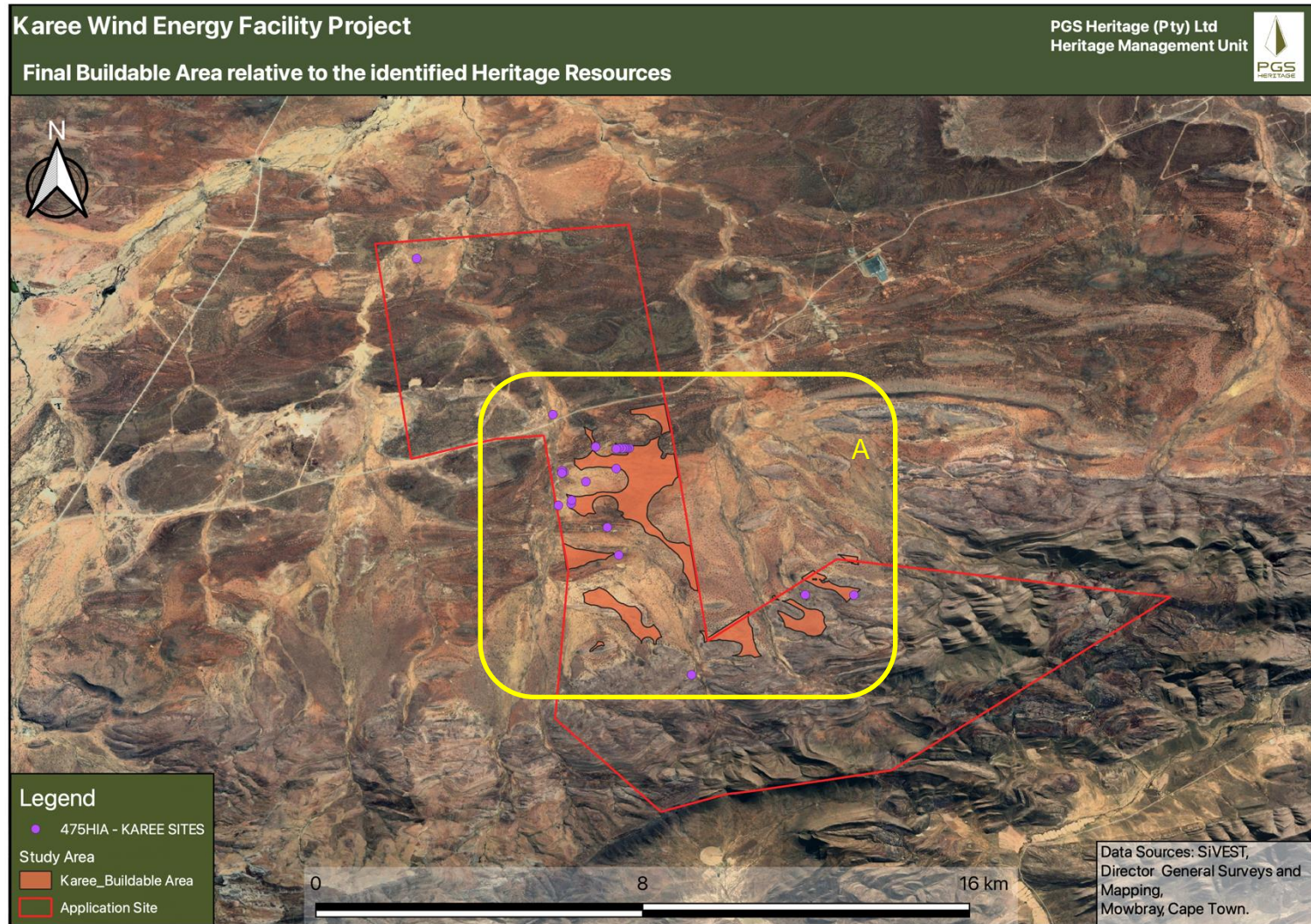
## 7. FINAL PROPOSED BUILDABLE AREA

The final proposed buildable area took into consideration the specialist recommendations identified during the 2021 and 2022 field assessments (**Figure 4, Figure 5**).

From an archaeological and historical structure perspective, the proposed footprint areas will not change the impact on the identified heritage resources in the AIA.

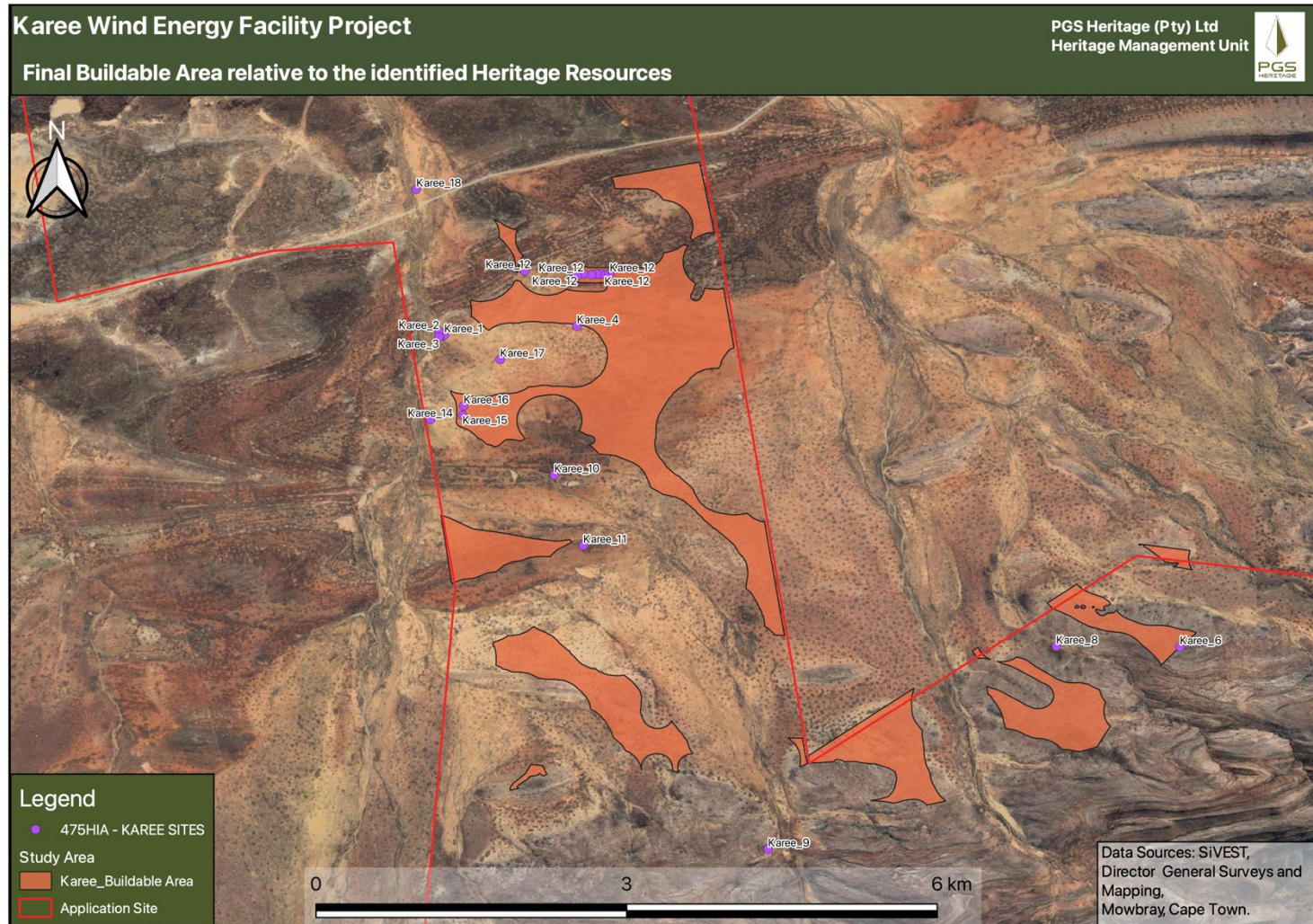
As such, the recommended mitigation measures as described in the AIA report remain.

We have no objection to the proposed buildable area associated with the Karee WEF project.



**Figure 4: Final proposed buildable area relative to the locality of the heritage resources identified within the study area. See inset A below.**





**Figure 5: Inset A.**

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

| <b>Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6</b>  | <b>Section of Report</b>  |
|--|---|
| 1. (1) A specialist report prepared in terms of these Regulations must contain-<br>a) details of-<br>i. the specialist who prepared the report; and<br>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | Page ii of Report- Contact details and company<br><br>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, 6 and 7  |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;  | Section 8, 9 and 10   |
| d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;   | Section 2 and 6   |
| 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 7 and 8   |
| g) an identification of any areas to be avoided, including buffers;  | Section 8 and 12  |
| 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;  | <b>Figure 29, Figure 30,</b><br>Section 8   |
| 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;   | Executive Summary and Section 9, 10, 11 and 12 |
| k) any mitigation measures for inclusion in the EMPr;  | Section 8 and 11                               |
| l) any conditions for inclusion in the environmental authorisation;  | Section 8 and 11                               |
| 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>i. (as to) whether the proposed activity, activities or portions thereof should be authorised; <ul style="list-style-type: none"> <li>(iA) regarding the acceptability of the proposed activity or activities; and</li> </ul> </li> <li>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> | Executive Summary; Section 12                  |
| 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                      |

## **SiVEST (PTY) LTD**

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## **ARCHAEOLOGICAL IMPACT ASSESSMENT**

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## **Glossary of Terms**

### **Archaeological resources**

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### **Cultural significance**

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

### **Development**

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

### **Early Stone Age**

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

### **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)**

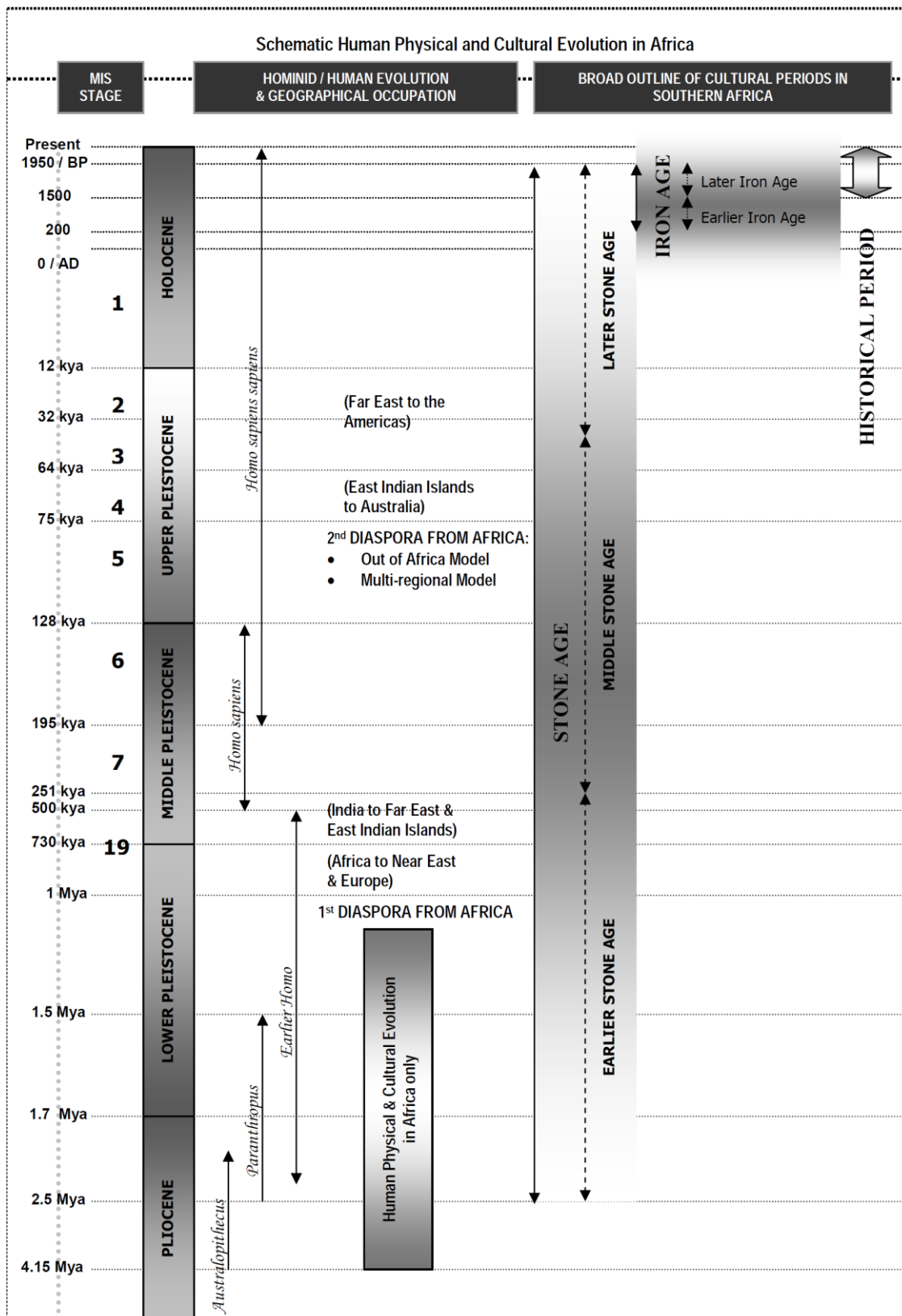
The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

## **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 6: Human and Cultural Timeline in Africa (Morris, 2008).**

### List of Abbreviations

| Abbreviations    | Description   |
|------------------|---|
| AIA              | Archaeological Impact Assessment                                  |
| APHP             | Association of Professional Heritage Practitioners                |
| ASAPA            | Association of South African Professional Archaeologists          |
| BESS             | Battery Energy Storage System                                     |
| CRM              | Cultural Resource Management                                      |
| DFFE             | Department of Forestry, Fishery and Environment                   |
| DWS              | Department of Water and Sanitation                                |
| ECO              | Environmental Control Officer                                     |
| EIA practitioner | Environmental Impact Assessment Practitioner                      |
| EIA              | Environmental Impact Assessment                                   |
| ESA              | Early Stone Age   |
| GN               | Government Notice   |
| GPS              | Global Positioning System   |
| HIA              | Heritage Impact Assessment  |
| HWC              | Heritage Western Cape   |
| I&AP             | Interested & Affected Party                                       |
| LSA              | Late Stone Age  |
| LIA              | Late Iron Age   |
| Mainstream       | South African Mainstream Power Developments (Pty) Ltd             |
| MSA              | Middle Stone Age  |
| MIA              | Middle Iron Age   |
| NCA              | National Competent Authority                                      |
| NEMA             | National Environmental Management Act                             |
| NHRA             | National Heritage Resources Act                                   |
| O&M              | Operation and Maintenance   |
| PGS              | PGS Heritage (Pty) Ltd  |
| REIPPPP          | Renewable Energy Independent Power Producer Procurement Programme |
| SADC             | Southern African Development Community                            |
| SAHRA            | South African Heritage Resources Agency                           |
| SIVEST           | SiVEST (PTY) Ltd  |
| WEF              | Wind Energy Facility  |



# **SiVEST (PTY) LTD**

## **PROPOSED CONSTRUCTION OF THE KAREE WIND ENERGY FACILITY AND ASSOCIATED GRID INFRASTRUCTURE, NEAR CERES, WESTERN CAPE PROVINCE, SOUTH AFRICA**

### **ARCHAEOLOGICAL IMPACT ASSESSMENT**

#### **1. INTRODUCTION**

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as “Mainstream”), has appointed SiVEST SA (Pty) Ltd (hereafter referred to as “SiVEST”) to undertake the required BA Processes for the proposed construction of the 200MW Karee Wind Energy Facility (WEF) and associated grid infrastructure near Touws River in the Western Cape Province.

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 Karee WEF will comprise thirty-five (35) 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.

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 Forestry, Fishery and Environment (DFFE), 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 area. The AIA aims 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 AIA was compiled by PGS.

The staff at PGS has a combined experience of nearly 90 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.

Nikki Mann, the author, 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).

Cherene de Bruyn, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director, she is further also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds a MA in Archaeology, BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology.

Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (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 archaeological methodology included fulfilling the requirements of the National Heritage Resources Act (NHRA) (section 35 and 36) that protects the following features in the landscape:

- Material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Graves and burial grounds, including ancestral graves, royal graves, graves of traditional leaders, graves of victims of conflict, historical graves and cemeteries, and other human remains not covered by the Human Tissue Act (1983) (Act No 65 of 1983).

PGS compiled this AIA report for the inclusion in the HIA for the proposed development of the Karee WEF. 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 literature review and other specialist studies are extracted from the background research completed for Kudusberg and Rondekop WEFs. Both these projects are adjacent

to the current project area. The text and wording have been taken from these reports as agreed upon with the owner.

Step II – Physical Survey: A physical survey was conducted on foot of the approved infrastructure, by two archaeologists, which aimed at locating and documenting sites falling within and adjacent to the approved development footprint. To address the shortcoming of the original HIA a physical survey was conducted on foot of the proposed development, by a qualified archaeologist and two field assistants, which aimed at locating and documenting sites falling within and adjacent to the approved 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:

## 2.1 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.<br>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.<br>Current examples: Blombos, Paternoster Midden.  | May be declared as a Provincial Heritage Site managed by HWC. 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.<br>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.<br>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 the criteria for Grade I status.<br>Current examples: St George's Cathedral, Community House | May be declared as a Provincial Heritage Site managed by HWC. | Exceptionally High Significance |

| Grading | Description of Resource   | Examples of Possible Management Strategies  | Heritage Significance                                |
|---------|---|---|--|
| 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                                     |
| NCW     | A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be  | 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   | No research potential or other cultural significance |

| <b>Grading</b> | <b>Description of Resource</b>           | <b>Examples of Possible Management Strategies</b>                | <b>Heritage Significance</b> |
|----------------|--|--|------------------------------|
|                | retained as part of the National Estate. | for structures in this category if they are older than 60 years. |                              |



### 3. ASSUMPTIONS AND LIMITATIONS

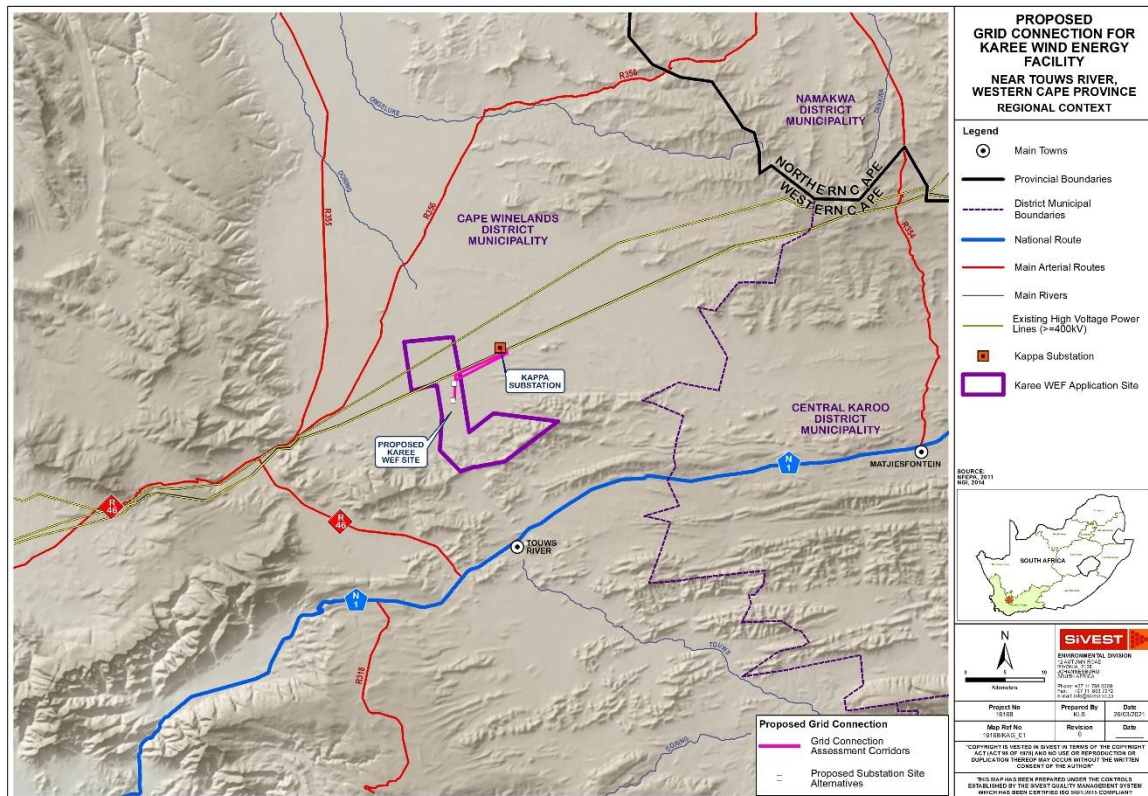
Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current dense vegetation cover. 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. In the event that 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 and associated grid infrastructure is located approximately 12km and 20km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality (**Figure 7**).



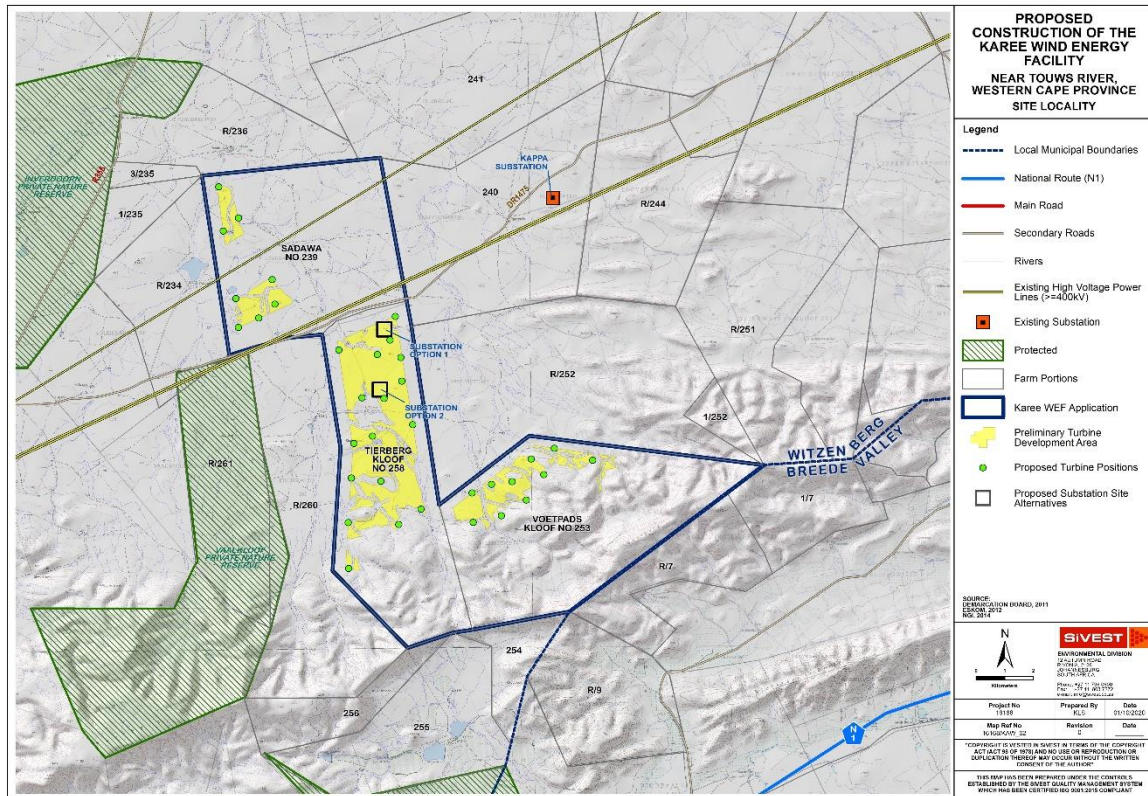
**Figure 7: Regional Context Map**

#### 4.1.1 WEF

The WEF application site as shown on the locality map below (**Figure 8**) is approximately 11 841 hectares (ha) in extent and incorporates the following farm portions:

- Farm Sadawa No 239
- Farm Tierberg No 258; and
- Farm Voetpads Kloof No 253.

A smaller buildable area (1753.1 ha) has however been identified as a result of a preliminary suitability assessment undertaken by Mainstream and this area is likely to be further refined with the exclusion of sensitive areas determined through various specialist studies being conducted as part of the BA process.

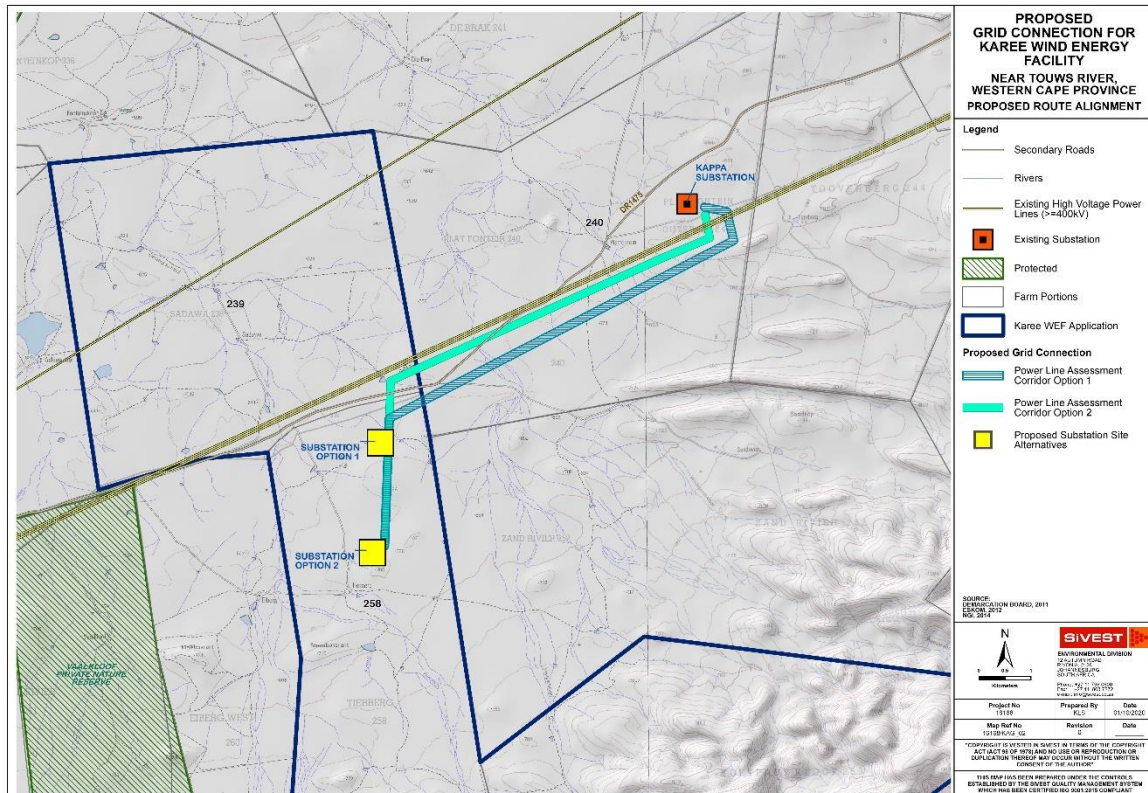


**Figure 8: Karee WEF Site Locality**

#### 4.1.2 Grid Connection

At this stage, it is proposed that the 132kV power lines will connect the Karee WEF on-site substation to the national grid via Kappa Substation (**Figure 9**).





**Figure 9: Proposed 132kV Power Line Route Alignment**

## 4.2 Project Description

It is anticipated that the proposed Karee WEF will comprise up to thirty-five (35) 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. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which is currently being undertaken in parallel to the WEF BA process.

### 4.2.1 Wind Farm Components

- Up to 35 wind turbines, each between 4MW and 6.6MW, with a maximum export capacity of approximately 200MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the BA process;
- Each wind turbine will have a hub height of between 120m and 200m and rotor diameter of up to approximately 200m;
- Permanent compacted hard standing areas / platforms (also known as crane pads) of approximately 100m x 100m (total footprint of approx. 10000m<sup>2</sup>) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;

- Each wind turbine will consist of a foundation of up to approximately 30m in diameter. In addition, the foundations will be up to approximately 3m in depth;
- Electrical transformers (690V/33kV) adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to between 11kV and 33kV;
- One (1) new 11kV - 33/132kV on-site substation including associated equipment and infrastructure, occupying an area of approximately 2ha (i.e. 20 000m<sup>2</sup>). The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in the WEF BA and in the grid infrastructure (substation and 132kV overhead power line) BA to allow for handover to Eskom. Following construction, the substation will be owned and managed by Eskom. The current applicant will retain control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction;
- A Battery Energy Storage System (BESS) will be located next to the onsite 33/132kV substation and included in the 2ha substation area. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks;
- The wind turbines will be connected to the proposed substation via 11 to 33kV underground cabling and overhead power lines.
- Road servitude of 8m and a 20m underground cable or overhead line servitude.
- Internal roads with a width of up to approximately 5m wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 WCG provincial Roads;
- One (1) construction laydown / staging area of up to approximately 3ha to be located on the site identified for the substation. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town;
- Operation and Maintenance (O&M) buildings, including offices, a guard house, operational control centre, O&M area / warehouse / workshop and ablution facilities to be located on the site identified for the substation. This will be included in the 2ha substation area.
- A wind measuring lattice (approximately 120m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions;
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and
- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.
- Optic fibre overhead or underground line from the Adamskraal Substation to the proposed on-site substation.

#### 4.2.2 *Grid Components*

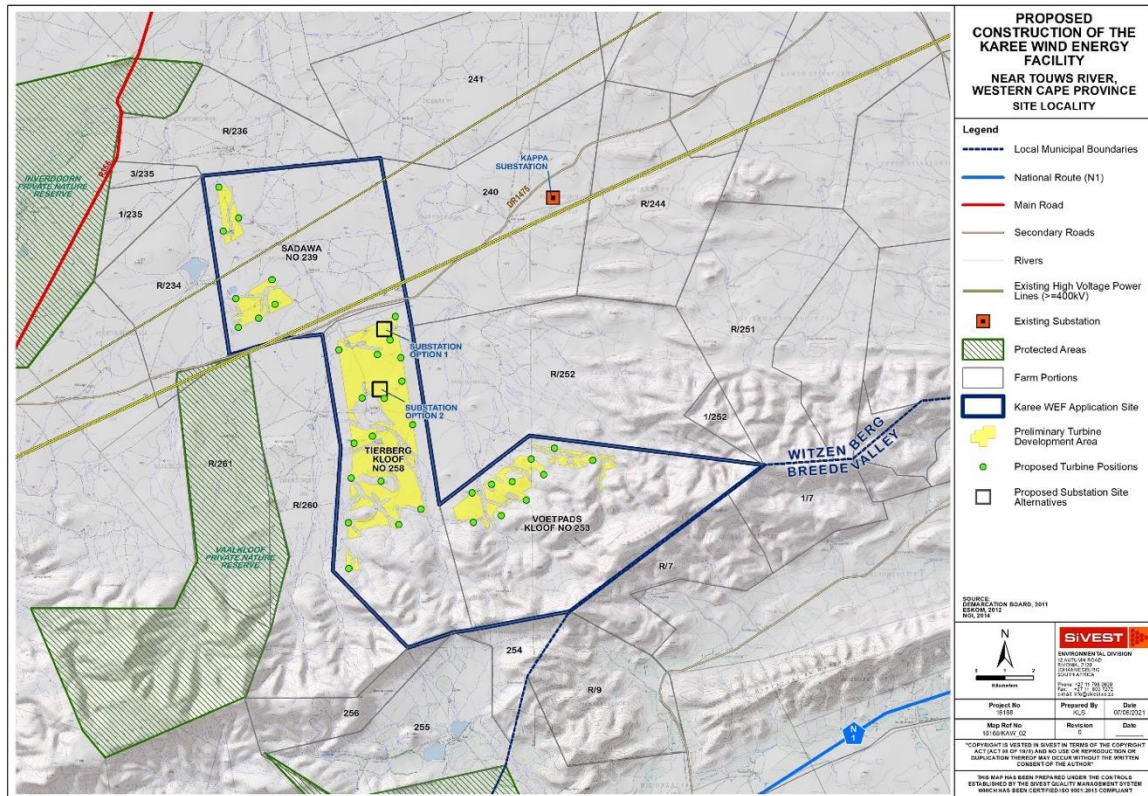
The proposed grid connection infrastructure to serve the Karee WEF will include the following components:

- One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site substation to Kappa Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

#### 4.3.1 Wind Energy Facility

The choice of technology selected for the Karee WEF is based on environmental constraints and technical and economic considerations. No other technology alternatives are being considered as wind energy facilities are more suitable for the site than other forms of renewable energy due to the high wind resource.

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. The proposed preliminary layout is shown in **Figure 10** below.



**Figure 10: Preliminary Turbine layout and development area**

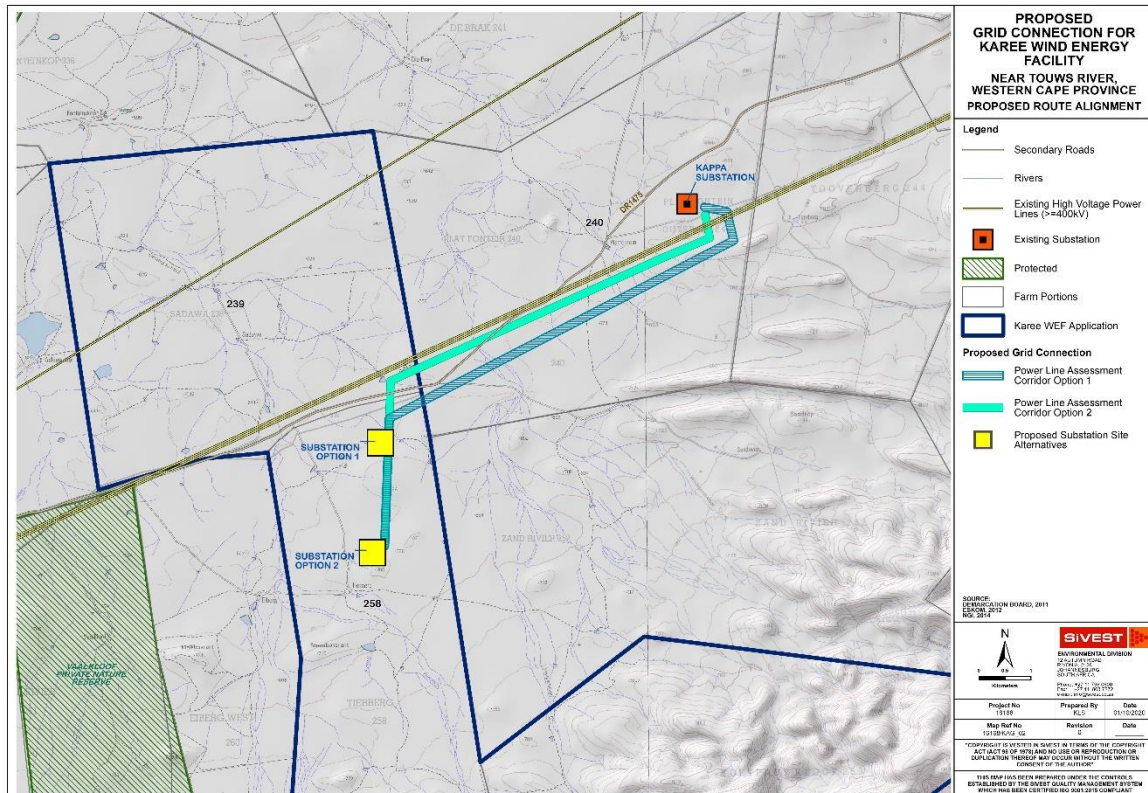
#### 4.3.2 Grid Components

The grid connection infrastructure proposals include two (2) substation site alternatives, each of which are 25 hectares in extent, and two (2) power line route alignment alternatives (**Figure 11**). These alternatives will be considered and assessed as part of the BA process and will be amended or refined to avoid identified environmental sensitivities.

All power line route alignments will be assessed within a 150m wide assessment corridor (75m on either side of power line). These alternatives are described below:

- Power Line Corridor Option 1 is between 8.9km and 10.9km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation; and
- Power Line Corridor Option 2 is between 8.4km and 10.3km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.





**Figure 11: Proposed Substation and Power line options**

#### 4.3.3 No-go Alternative

The 'no-go' alternative is the option of not undertaking the proposed WEF and grid connection infrastructure projects. 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.

The 'no-go' option is a feasible option; however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewable energy sector.



## 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) ring 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 SAHRA 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 (DEA) in terms of Section 38(8) of the National Heritage Resources Act. The commenting authority is 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 paleontological (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** to **high** archaeological and cultural heritage significance (**Figure 12**).

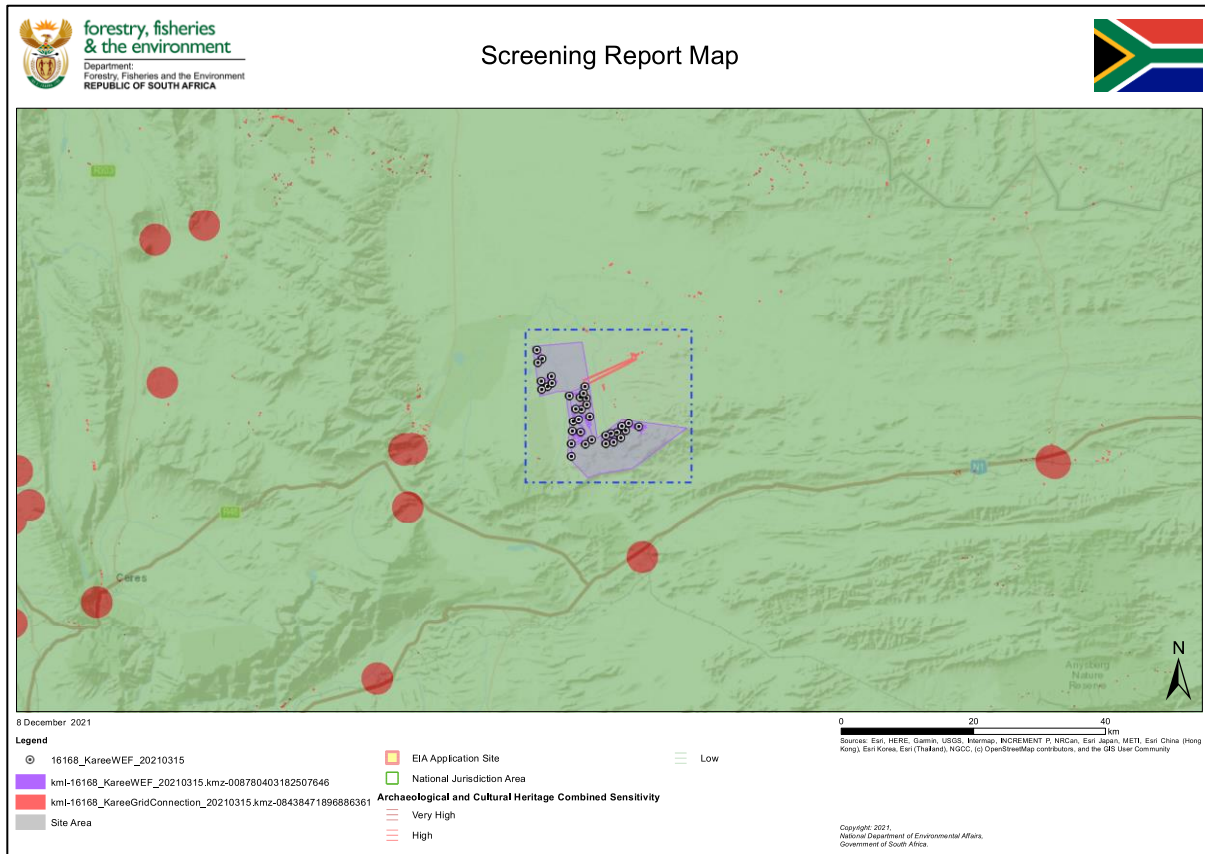
**Table 3: Reporting requirements for GN648**

| 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  | -                                   |
| 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. | -                                   |

<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)*.



**Figure 12: DFFE Screening tool outcome indicating low to high significance rating.**

### 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.

## 6. DESCRIPTION OF THE RECEIVING ENVIRONMENT

A site visit was conducted by two archaeologists from PGS from 9<sup>th</sup>-12<sup>th</sup> March 2021. The general vicinity of the proposed development area was assessed.

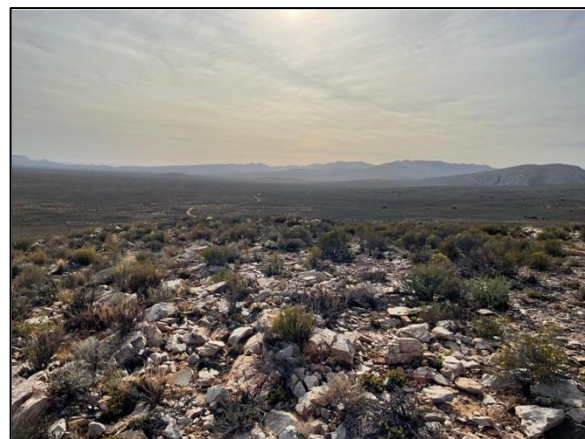
The proposed development area is located approximately 12km and 20km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality. The proposed project covers approximately 11 841 hectares.

The landscape comprises various ridges, valleys, and surrounding plains (1227- 693 amsl). The prevailing vegetation type and landscape features of the area form part of the Central Mountain Shale Renosterveld within the Fynbos Biome and the Koedoesberge-Moordenaars Karoo within the Succulent Karoo Biome. The Central Mountain Shale Renosterveld is described as slopes and broad ridges of low mountains and escarpments, with tall shrub-land dominated by *Renosterbos* and large suites of mainly non-succulent Karoo shrubs and with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats. The Koedoesberge- Moordenaars Karoo is described as a slightly undulating to hilly landscape covered by low succulent scrub and dotted by scattered tall shrubs, patches of 'white' grass visible on plains, the most conspicuous dominants being dwarf shrubs of *Pteronia*, *Drosanthemum* and *Galenia* (Mucina & Rutherford, 2006).

Photographs of the general study area are provided below.



**Figure 13: General view of the flat plains from a hilltop within the study area.**



**Figure 14: View of a typical rocky hilltop.**





**Figure 15: General view of a rocky valley.**



**Figure 16: View of a partially eroded shale outcrop within the study area.**



**Figure 17: View of a quartzite outcrop.**



**Figure 18: Typical sparse to moderate vegetation growth within the study area.**



**Figure 19: View of a rocky land surface within the study area.**



**Figure 20: Typical view of a deflation zone.**





**Figure 21: Thick yellow-orange sand with moderate vegetation growth.**



**Figure 22: Example of bioturbation observed within the study area.**



**Figure 23: View of an erosion gully.**



**Figure 24: View of farm fencing within a more densely vegetated region of the study area.**

## 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/Historical Maps

Historical topographic maps (1:50 000) for various years (1969, 1987, 1997, 2007) 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 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.

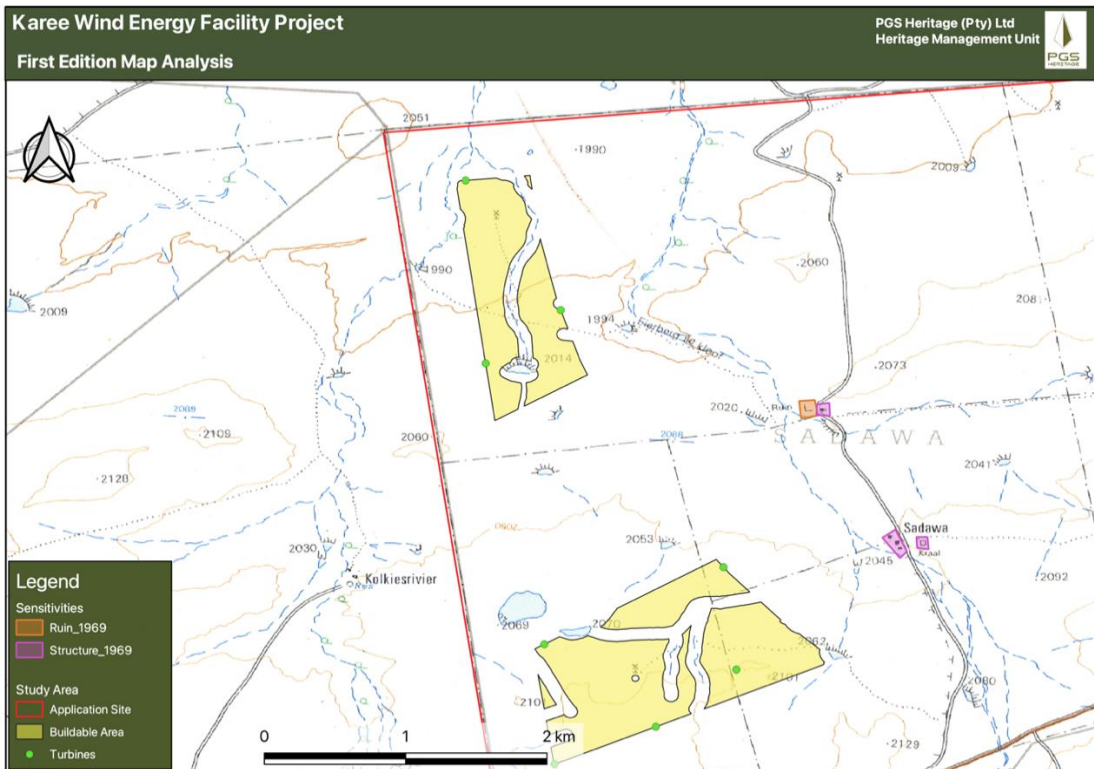
There were several structures identified within the vicinity of the proposed development area. Most of the structures identified were farmsteads, ruins or kraals as illustrated in the 1969 topographic map 3319BB (**Figure 25, Figure 26**).

7.1.1 1: 50 000 Topographical Map 3319BB - First Edition 1969

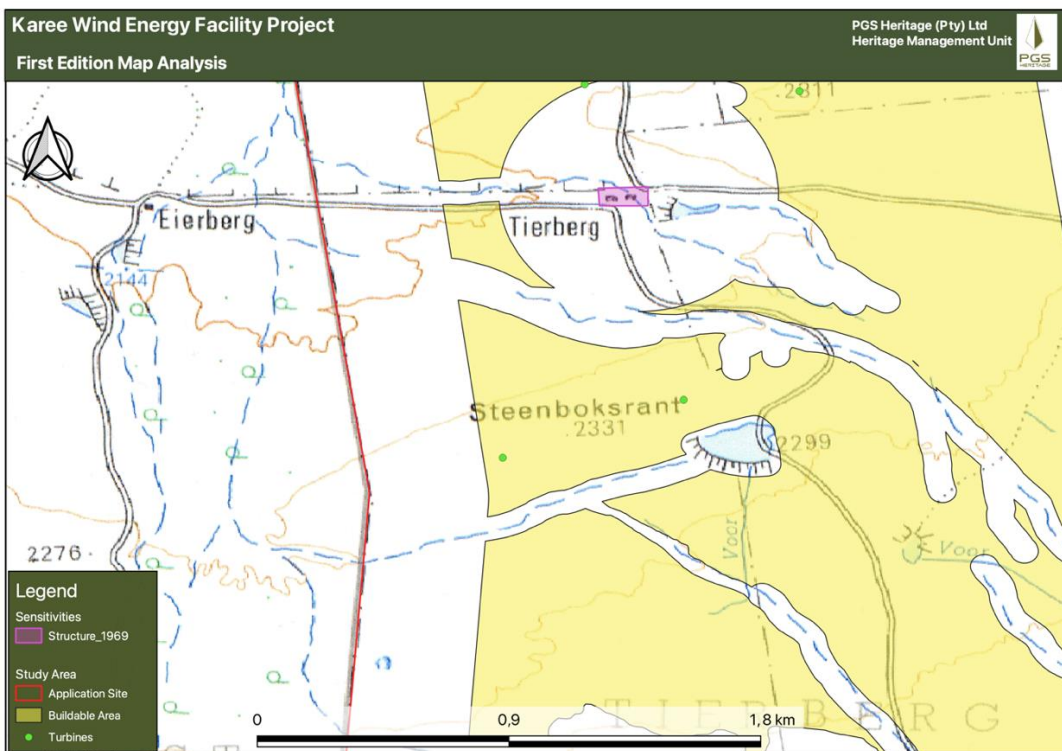
A section of the First Edition of the 3319BB (IVERDOORN) Topographical Sheet is depicted in **Figure 25** and **Figure 26**. This map sheet was based on aerial photography undertaken in 1963, was surveyed and drawn by the Trigonometrical Survey Office in 1969.

Several sites containing structures or ruins are depicted in the vicinity of the study area. All these identified sites are likely to be at least 52 years old.





**Figure 25: First Edition of 3319BB Topographic Map 1: 50 000 dating to 1969, showing the proposed Karee WEF, with several possible heritage features (Structure: pink polygon, Ruin: orange polygon) located within the application site area.**



**Figure 26: First Edition of 3319BB Topographic Map 1: 50 000 dating to 1969, showing the proposed Karee WEF, with one possible heritage feature (Structure: pink polygon) located within the study area.**

## 7.2 Historical Overview of the Study Area

Until recently, this region was fairly poorly understood from an archaeological perspective. This, however, is no longer strictly true, given the creation of the Komsberg REDZ, and the ensuing applications for WEFs in this area (Fourie et al 2015). Several HIAs, all of them with archaeological components have, as a result, been conducted within the area. Little research work, which is generally more thorough and comprehensive, has been done, so that while we have a broad understanding of the heritage character of the region, more specific conclusions cannot be derived.

Over 10 HIAs have been compiled around the study area, all with respect to wind farms and their associated infrastructure, and the findings of these reports are largely congruent. The reports identified surprisingly little pre-colonial or stone-age archaeology (Booth 2012, 2015a and 2015b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2016), with the little that has been identified in the form of scatters located on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses (Booth 2016a and 2016b). The dry, fairly desolate ridges, which are subject to high winds and, therefore the proposed locations for the turbines, are generally entirely devoid of Stone Age archaeological remains (Webley and Halkett 2017). These findings were also supported by the Heritage Scoping Assessment Report (Fourie et al 2015) compiled as part of the Department of Environmental Affairs' (2015) Strategic Environmental Assessment wind and solar energy developments. A mitigation phase excavation (Evans et al. 1985) has been undertaken at two small rock shelters in the grounds of the South African Astronomical Observatory near Sutherland in the early 1980s. More recently, changing farming methods as represented by the distribution and variety of stone-built features (walls and kraals) was assessed as part of a Master's thesis (Regensberg 2016).

| DATE                                   | DESCRIPTION  |
|--|--|
| 2.5 million to 250 000 years ago       | <p>The Earlier Stone Age (ESA) is the first and oldest 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 more robust flaked tools. It dates to approximately &lt;2 million years ago. The second technological phase is the Acheulian and comprises more refined stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago.</p> <p>The area is known to have been inhabited since the Early Stone Age (ESA), with some surface scatters identified on a survey west of Matjiesfontein (Hart and Miller 2011) and a well-preserved ESA site with complete and well-formed bifaces south of Sutherland (Hart et al. 2010). Other ESA sites include the Montagu Cave in the Western Cape, near the small town of Montagu (Mitchell 2007).</p> |
| 250 000 to 40 000 years ago            | <p>The Middle Stone Age (MSA) is associated with lithics, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley 2013). Middle Stone Age (MSA) material is also present, and most often found in the form of occasional lithics and rare open sites (Hart et al. 2010). Later Stone Age (LSA) scatters have also been documented throughout the region, although at remarkably low density (Booth 2012, 2016a and 2016b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2015).</p>   |
| 40 000 years ago, to the historic past | <p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small stone tools known as microliths Rescue</p>   |

| DATE             | DESCRIPTION  |
|------------------|--|
|                  | excavations conducted at two shelters near Sutherland, however, yielded significant LSA cultural material including various stone artefacts such as cores, utilized lithics, blades and chunks, and formal tools such as scrapers, adzes, backed blades, points and miscellaneous retouched pieces. Fragments of ostrich eggshell (OES) and ostrich eggshell beads, faunal remains and freshwater molluscs were also recorded (Evan et al. 1985). This archaeological signature represents the earliest inhabitants of this region, and, by the time of the LSA, these people constitute the antecedents of the San hunter-gatherers who occupied the landscape in the last 10 000 years. Most tools are made on hornfels, quartzite and chert, while quartz and Karoo shale were also utilised (Hart et al. 2010).  |
| 800 AD – 1600 AD | Within the last 2 000 years, pastoralists, the Khoekhoen, arrived in the area, bringing with them livestock, thin-walled ceramics and new social and economic systems. In this area, there is extensive evidence for the presence of these groups in the landscape. This evidence comes in the form of circular, stone-built enclosures constructed of piled stone up to half a metre high and from 3m to 4m to 9 m in diameter (Hart et al. 2010). These enclosures represent living spaces, which contained grass huts or Matjieshuise (mat covered houses) and kraals. The kraals are generally situated on the leeward slopes of low ridges and likely date to between 300 and 1 000 years ago (Hart et al. 2010). The kraals sometimes form complexes of as many as 13 interlocking enclosures, often with adjoining 'lammerkraals' (lamb pens). These sites can be found with fine, red burnished pottery and OES fragments. Other evidence for herders in this area has been identified in the form of open camps situated along dry riverbeds in valley bottoms. These sites are large, measuring 80m x 80m, and are associated with fine, thin-walled Cape Coastal pottery, frequent informal stone tools, stone features, grinding surfaces, ash middens, animal bone and several graves with broken grindstones atop them; colonial period artefacts have also been found in association with these sites (Ibid.).  |
| Rock art         | Rock art, which can be attributed to the San hunter-gatherers or the pastoralists, is known within the region, although it's not commonly identified, and more concentrated in the Cape Fold Mountains to the south of the project area (Booth 2016a and 2016b; van der Walt 2015). These paintings tend to be of the fine line tradition, attributed to hunter-gatherers, or finger painting, which is attributed to the herders.   |
| 1700-1900 AD     | <p>Early Trekboere entered the region in the late 1700s, moving their livestock down into the valleys and plains of the Karoo from the better-watered escarpment to escape the harsh winters there. As a result of this pattern of seasonal movement of flocks the Trekboere usually had a loan farm on the plateau, and a stockpot (legplaats) in the Karoo. The itinerant trekboere initially lived much like the pre-colonial herders, travelling with grass huts or Matjieshuise that could be easily erected where necessary (Hart and Kendrick 2014). The early arrival of these trekboere was initially met with resistance from the San, initially with the result that settlement of the area was impeded (Schoeman 1986). In retaliation against their stock losses, and the killing of Khoisan herders and slaves, the settlers established the Kommando system, which resulted in officially sanctioned hunting of the San by the late 1770s (Hart and Webley 2011). These massacres are recorded archivally and in place names in the area, such as the farm Oorlogskloof near Sutherland where more than 30 stone cairn burials are to be found. Further mass graves might be found on Gunstfontein Farm, while there is purportedly also a cave where the San made a last stand against the kommandos (Ibid.).</p> <p>Increasingly, as the exploitation of the area became better established, and particularly after the Great Trek of the 1830s, their structures and imprint on the landscape became more permanent. The evidence for this early inhabitation of the region is to be found in historic farmhouses and associated buildings, stone cairns, stonewalling, farm infrastructure such as reservoirs and, more recent wind pumps. Artefactual material from this period includes European ceramics, glass and iron fragments. The stonewalling and kraals of this period are distinguished from the pre-colonial kraals as they are usually rectilinear and are faced on two sides with infill between the faces and are often mortared using local materials.</p> |
| 1899-1903        | The area was witness to a further period of military action during the South African War, with some skirmishes near Skietfontein in the Komsberg Mountains (Hart and   |

| DATE | DESCRIPTION   |
|------|---|
|      | Webley 2011). The threat of Boer guerrilla activities also prompted the British to build several defensive structures in the region, including redoubts, gun platforms and blockhouses (van der Walt 2015; Hart and Webley 2011; Orton and Halkett 2011). |

### 7.3 Historical Background of surrounding Towns

#### 7.3.1 *Touws River*

The first farmers settled in the region during the 18<sup>th</sup> century (Erasmus, 2014). The farms on which the town was established was allocated in 1748 (Erasmus, 2014). As a station, names Montagu Road was opened on 7 November 1877(Erasmus, 2014), but was remained to Touws river on 1 January 1883 (Erasmus, 2014). The residential area of Touws River was laid out in 1921, on property owned by J.D. Logan, who was the Laird of Matjiesfontein (Erasmus, 2014).

#### 7.3.2 *Matjiesfontein*

James Douglas Logan established Matjiesfontein as a health resort in 1883 (Erasmus, 2014). Matjiesfontein was the first town in South Africa to have electricity and sewage system (Erasmus, 2014). The Matjiesfontein Waterworks opened in 1889 (Erasmus, 2014). During the Anglo-Boer War, the headquarters of the Cape Command was located at Matjiesfontein (Erasmus, 2014).

### 7.4 South Africa Heritage Resources Information System (SAHRIS)

A review of SAHRIS has revealed that a number of other archaeological studies have been performed within the wider vicinity of the study area. The following studies were conducted around the study area of this report:

- ALMOND, J. & ORTON, J. 2017. Heritage Impact Assessment: Proposed Construction of a Substation and 132 kV Distribution Line to support the Proposed Sutherland 2 WEF, Sutherland and Laingsburg Magisterial Districts, Northern and Western Cape. – **Historical and Stone Age heritage remains as well as several burial grounds and fossil sites were uncovered in this assessment. It was recommended that development may continue under the condition that 30m & 20m buffers are implemented around certain ‘no-go’ sites and that the relevant contingencies are implemented should heritage remains be affected by the development process.**
- BANDAMA, F. & MOHAPI, M. 2014. An Archaeological Scoping and Assessment Report for The Proposed Gamma (Victoria West, Northern Cape) - Kappa (Ceres – Western Cape) 765Kv (2) Eskom Power Transmission Line. - **This scoping report identified a range of heritage resources in and around the local area including stonewalling (kraals and possible windbreaks), ESA-LSA artefact scatters, buildings and farm complexes (with associated**

artefacts like glass, metal and ceramic), rock art and engravings, pottery and graves (both formal and informal).

- BOOTH, C. 2011. An archaeological desktop study for the proposed establishment of the Hidden Valley wind energy facility and associated infrastructure on a site south of Sutherland, Northern Cape Province. – **Desktop level assessment based on previous fieldwork done in the study area. A full Phase 1 AIA was recommended.**
- BOOTH, C. 2012. A Phase 1 AIA for the proposed Hidden Valley Wind Energy Facility, near Sutherland, Northern Cape Province. – **Historical heritage resources were uncovered in this assessment. It was recommended that an archaeologist be present during all construction-related activities in two of the study areas.**
- BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Karusa Facility Substation and Ancillaries, near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, NC Province. - **No significant heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Eskom Karusa Switching Station, Ancillaries and a 132kV Double Circuit Overhead Power Line, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. – **Some low significance Historical heritage remains were uncovered in this assessment. It was recommended that a 30m buffer around discovered sites be adhered to and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- BOOTH, C. 2015. A Phase 1 Archaeological Impact Assessment for the Proposed Soetwater Substation, 132kV Overhead Powerline and Ancillaries Soetwater Wind Energy Facility, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. - **No significant heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- BOOTH, C. 2015. An Archaeological Walk-Through For The Proposed Karusa Wind Energy Facility Situated On The Farms: De Hoop 202, Standvastigheid 210, Portion 1 Of The Farm Rheebokke Fontein 209, Portion 2 Of The Farm Rheebokke Fontein 209, Portion 3 Of The Farm Rheebokke Fontein 209 And The Remainder Of The Farm Rheebokke Fontein 209, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. – **Historical heritage resources were uncovered in this assessment. It was recommended that the historical remains be recorded and a destruction permit is applied for if they are not able to be avoided.**
- BOOTH, C. 2015. An Archaeological Walk-Through For The Proposed Soetwater Wind Energy Facility Situated On The Farms: The Remainder Of And Portion 1, 2 And 4 Of Farm Orange Fontein 203 And Annex Orange Fontein 185, Farm Leeuwe Hoek 183 And Farm Zwanepoelshoek 184, Near Sutherland, Karoo Hoogland Local Municipality, Namakwa District Municipality, Northern Cape Province. – **No significant heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**

- BOOTH, C. 2015. Phase 1 Archaeological Impact Assessment for the proposed extension of the existing Komsberg Substation (two alternative areas) and widening of the access road, near Sutherland, NC Province. – **No heritage remains were uncovered in this assessment. It was recommended that the development may continue.**
- BOOTH, C. 2016. A Phase 1 Archaeological Impact Assessment (Aia) for the proposed Brandvalley Wind Energy Facility (WEF) situated in the Karoo Hoogland Local Municipality (Namakwa District Municipality), the Witzenburg Local Municipality (Cape Winelands District Municipality) And Laingsburg Local Municipality (Central Karoo District Municipality). **Middle and Later Stone Age stone artefacts, as well as several historical features (stonewalling kraals and cottages) with associated historical artefacts, were found.**
- BOOTH, C. 2016. A Phase 1 Archaeological Impact Assessment (Aia) for the proposed power line alternatives and substation options for the Rietkloof Wind Energy Facility (Wef) situated in the Witzenburg Local Municipality and Laingsburg Local Municipality, Cape Winelands and Central Karoo District Municipalities. **Middle and Later Stone Age stone artefacts, as well as several historical features (stonewalling kraals, cottages and graves) with associated historical artefacts, were found.**
- BOOTH, C. 2017. An Archaeological Assessment for the Amendment to Turbine Specifications and the Revised Layout of the Karusa Wind Energy Facility Situated on the Farms De Hoop 202, Standvastigheid 210, Portion 1 of the Farm Rheeboeke Fontein 209, Portion 2 of the Farm Rheeboeke Fontein 209, Portion 3 of the Farm Rheeboeke Fontein 209 and the Remainder of the farm Rheeboeke Fontein 209, Near Sutherland, Karoo Hoggland Local Municipality, Namakwa District Municipality, Northern Cape Province. - **No significant heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- FOURIE, W. 2010. Archaeological Walk Down Report: Gamma-Omega Transmission Section 1: Gamma-Kappa. - **This study identified a range of heritage resources, the majority of which comprise Stone Age artefact scatters of varying densities. These are primarily ESA and MSA scatters, although LSA artefacts were also located. In addition, rock engravings were also found, along with stone-walled structures of varied construction (kraals, walls, possible windbreaks); infrequent non-decorated potsherds were sporadic. Later historical structures were also found (with glass, metal and ceramic fragments), along with associated graves/burial areas. The earliest graves place regional occupation pre-1892.**
- FOURIE, W., ALMOND, J. & ORTON J. 2014. National Wind and Solar PV SEA Specialist Assessment Report – Heritage Evaluation. This report provides an overview of potential heritage impacts in the REDZ Komsberg focus area 2. - **The following types of heritage are listed for this area: Middle and Later Stone Age artefact scatters (frequently associated with water sources), rock art (confined to the mountainous areas), colonial farmsteads (18-19<sup>th</sup> Century – farmhouses, kraals and earth dams), provincial heritage sites (i.e., Matjiesfontein, Karooport), South African War period fortifications and cemeteries (dating back to the early 1800s).**
- FOURIE, W. 2020. Proposed development of the 800MW Oya solar photovoltaic (PV) facility and associated infrastructure near Matjiesfontein, Western Cape. **A total of six archaeological sites, three burial ground and graves, two farmsteads and four stone kraals were identified.**

- HALKETT, D, & ORTON, J. 2011. Heritage Impact Assessment for the Proposed Photovoltaic Solar Energy Facility on the Remainder of Farm Jakhalsvalley 99, Sutherland Magisterial District, Western Cape. – **Historical heritage resources were uncovered in this assessment. It was recommended that the development may continue however, the remains should be avoided and that the ECO must make sure of this.**
- HALKETT, D. 2011. Heritage Impact Assessment Proposed Renewable Energy Facility at the Sutherland Site, Western and Northern Cape Provinces. – **Some historical and Stone Age heritage remains as well as a burial ground that was uncovered in this assessment. It was recommended that development may continue and that the relevant contingencies are implemented should heritage remains be affected by the development process.**
- HALKETT, D. 2012. Heritage Impact Assessment of the impacts resulting from the raising of the existing Keerom Dam, situated between Montagu and Touws River, Western Cape. **Isolated ESA and MSA artefacts and a single farm complex were found.**
- HALKETT, D. 2017. Heritage Impact Assessment: Proposed Construction of the 132Kv Powerline for the Maralla Wind Energy Facility near Sutherland Northern Cape. – **Historical, Iron Age and Stone Age heritage remains were uncovered in this desktop assessment. A targeted walk-down was recommended and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- HART, T. 2015. Heritage impact assessment for the proposed Komsberg East and West Wind Energy Facilities and Grid Connections to be situated in the Western Cape Province, Escarpment Area, Moordenaars Karoo. **Evidence of 19th century historic Trekboer farming includes numerous stone kraals, stock posts and occasional historic farmsteads were found.**
- KAPLAN, J. 2009. Phase 1 Archaeological Impact Assessment of the Proposed Driefontein Resort (Driefontein Farm No. 127) Sutherland, Northern Cape Province. **Historical heritage remains were uncovered in this assessment. It was recommended that the historical remains be avoided and that a Conservation Management Plan be drafted to protect the remains.**
- KAPLAN, J. 2015. Proposed borrow pit (Karusa East) on the Farm Rheeboeke Fontein 209/2 & 209/3 near Sutherland, Northern Cape. – **Low significance historical heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant heritage authorities should be contacted if any human remains are uncovered during the development process.**
- KAPLAN, J. 2015. Proposed borrow pit (Karusa North) on the Farm Rheeboeke Fontein 209 Remainder near Sutherland, Northern Cape Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999). – **Historical, Iron Age and Stone Age heritage remains were uncovered in this assessment. Relevant sites should be protected, 20m buffers implemented where necessary and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**
- KAPLAN, J. 2015. Proposed quarry on the farm Jakhals Valley 99 Portion 3 near Sutherland, Northern Cape. - **No significant heritage resources were uncovered in this assessment. It was recommended that the development may continue and that the relevant contingencies are implemented should heritage remains be uncovered during the development process.**

- MURIMBIKA, M. 2014. Executive Summary For Phase 1 Heritage Impact Assessment Study Report: Proposed Gamma-Kappa 2nd 765kV Eskom Transmission Powerline and Substations Upgrade Development in Western Cape. - **This report summarises a range of heritage resources in and around the local area including stonewalling (kraals and possible windbreaks), ESA-LSA artefact scatters, buildings and farm complexes (with associated artefacts like glass, metal and ceramic), rock art and engravings, pottery and graves (both formal and informal).**
- NILSEN, P. 2012. Proposed Upgrade of the Laingsburg Water Supply Pipeline, Laingsburg, Western Cape Province. **No material remains of historic or prehistoric origin were observed.**
- ROUSSOUW, L. 2007. Phase 1 Archaeological Impact Assessment and Palaeontological Impact Assessment of 30 Gravel Quarries in the R354 Between Calvinia and Sutherland, Northern Cape Province – **No heritage remains were uncovered.**
- SMEYATSKY, I & FOURIE, W. 2018. Archaeological Impact Assessment for the Proposed Development of the 325MW Rondekop Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Northern Cape Province – **This report documented numerous archaeological and historical features such as MSA scatters, graves, farmsteads and graves.**
- SMITH, A.B. 2008. Eskom Gamma-Omega 765kV Transmission Line: Archaeological Desktop Survey. - **This study, focusing on an area defined as the Karoo, identified five farms near to the current study area that contains Stone Age (ESA, MSA and LSA) artefacts, pottery and rock paintings.**
- SMUTS, K. 2018. Archaeological Impact Assessment for the Proposed Development of the 325MW Kudusberg Wind Energy Facility and associated infrastructure, between Matjiesfontein and Sutherland in the Western and Northern Cape Provinces – **This report documented numerous archaeological and historical features such as rock art sites, MSA scatters, graves, farmsteads and graves.**
- TUSENIUS, M. 2012. Archaeological Impact Assessment of the proposed extension of a borrow pit on Koeëlfontein 59, Laingsburg District, Central Karoo, Western Cape. **MSA artefacts were identified.**
- TUSENIUS, M. 2012. Archaeological Impact Assessment of proposed borrow pits at Springfontein 60 And Skoppelmanskraal 54 and the Extension Of An Existing Borrow Pit at Dikboom 53, Laingsburg District, Western Cape. **Several dispersed sandstone and Matjiesfontein chert artefacts were found.**
- VAN DER RYST, M. & FOURIE, W. 2014. Phase 2 Specialist Study of Affected Stone Age Locality on The Gamma Kappa Transmission Line – Tower GKB-T846 (Site GK062), Tankwa Karoo, Touwsrivier. - **This report documents medium density scatters of ESA, MSA and LSA artefacts at a single deflated, secondary context, locality, with the assemblage comprising a very low quantity of formal tools.**
- VAN DER WALT, J. 2015. Archaeological Impact Assessment Report for the Proposed Gunstfontein Wind Energy Facility, Northern Cape. - **Historical remains as well as Rock Art was uncovered in this assessment. It was recommended that the development footprint be updated in order to accommodate the heritage findings and that the ECO must make sure the heritage resources are protected.**
- VAN DER WALT, J. 2016. Archaeological impact assessment report for the proposed Gunstfontein 132 kV power line, switching station and ancillaries for the proposed Gunstfontein



wind energy facility near Sutherland, Northern Cape. – **Desktop level assessment based of previous fieldwork done in the study area. Historical remains, as well as Rock Art, was uncovered in this assessment. It is recommended that a full heritage walk down of the of study area must be conducted.**

- VAN SCHALKWYK, J. 2018. Phase 1 Cultural Heritage Impact Assessment: the expansion of an existing borrow pit on the Farm Tweedside 151 in the Laingsburg Local Municipality of Western Cape Province. **No sites, features or objects of cultural heritage significance were found.**
- WEBLEY, L. 2017. Heritage Impact Assessment: Proposed Construction of the Maralla West Wind Energy Facility near Sutherland in the Northern Cape. – **Historical and Stone Age heritage remains were uncovered in this assessment. It was recommended that highly sensitive No-Go area should be avoided, that a walk-down be conducted should the development layout change and that the relevant contingencies are implement should heritage remains be uncovered during the development process.**
- WEBLEY, L. & HALKET, D. 2017. Heritage Impact Assessment: proposed construction of the Esizayo Wind Energy Facility Near Laingsburg in the Western Cape Province. **A few large scatters of LSA stone artefacts, several “pastoralist settlements, the Nuwerus cemetery, a spread of early 20th century historical material on the lower slopes of two koppies, and numerous roughly-packed, circular enclosures of dry stone walling were identified.**
- WURZ, S. 2006. Phase 1 Archaeological Impact Assessment For Slandnedo, Boschluyskloof, Laingsburg District, Western Cape. **A historic core of a farmhouse and a graveyard was identified.**

## 7.5 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 project based on the desktop assessment (**Figure 27**).

### 7.5.1 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 to high** sensitivity rating (**Figure 12**). The field work in the study area demonstrates that historical structures, archaeological sites and grave and burial grounds of heritage significance warrant conservation. The general low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in this specific region.

### 7.5.2 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

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 4**.

**Table 4: Tangible heritage sites 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 |

Previous heritage reports have shown that archaeological sites are abundant in the surrounding areas, especially near certain landscape features. This factor needs to be held into consideration.

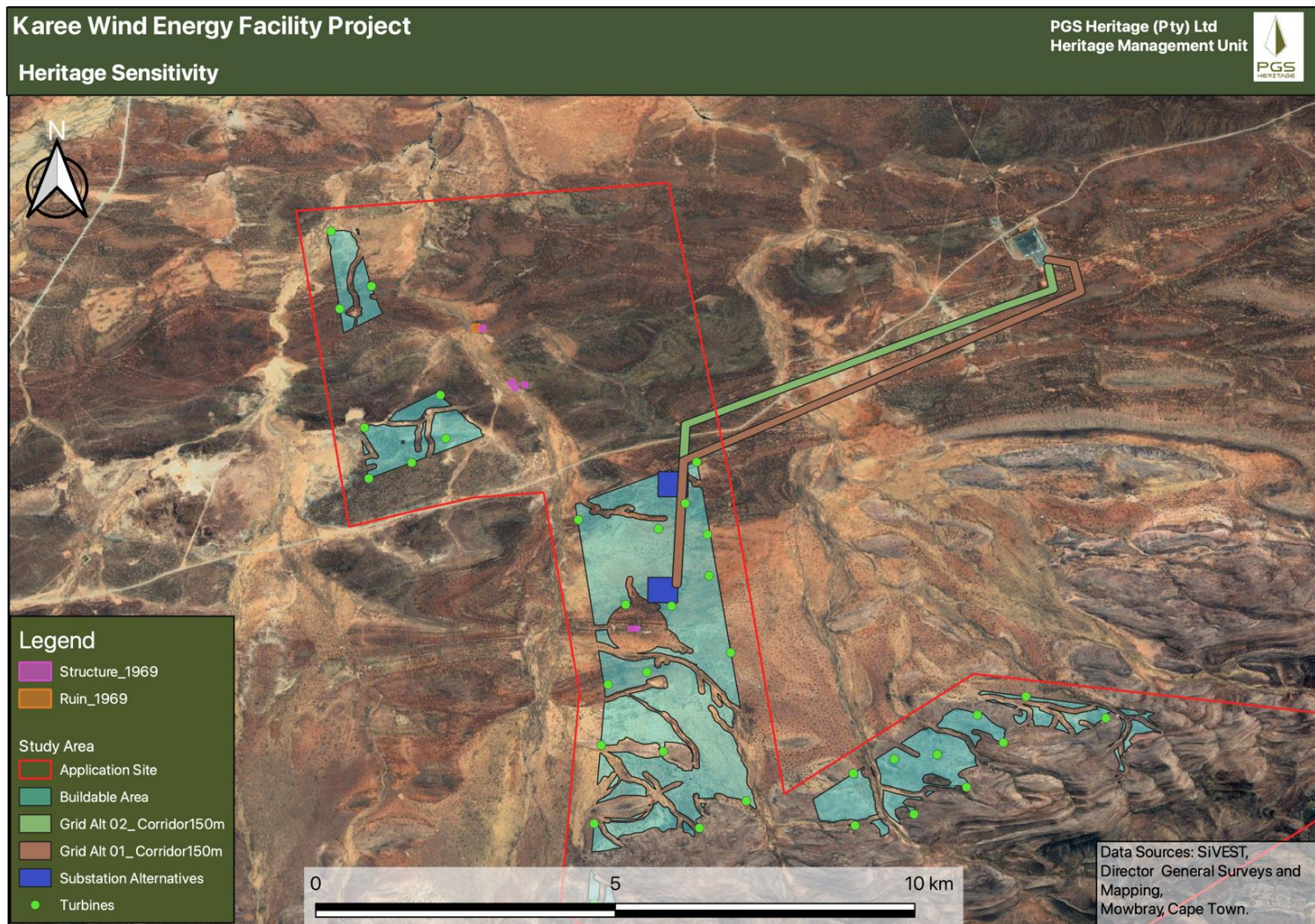
### 7.5.3 Possible Heritage Finds

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. The heritage reports identified little pre-colonial or Stone Age archaeology (Booth 2012, 2015a and 2015b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2016). In the cases where Stone Age archaeology was recorded, the scatters of stone artefacts were identified on the flat floodplains up to the foothills of the mountains and within river valleys along watercourses (Booth 2016a and 2016b). The fairly desolate ridges in the region are subject to high winds and are generally devoid of archaeological remains (Webley and Halkett, 2017).

The analysis of the studies conducted in the area assisted in developing the following landform to heritage find matrix in **Table 5**. Dry river courses have been referenced as having possible heritage sensitivity within the study area (**Figure 27**). It must be noted that the proposed development layout for the most part, has excluded river courses from the footprint.

**Table 5: Landform type to heritage find matrix**

| <b>LAND FORM TYPE</b>                | <b>HERITAGE TYPE</b>               |
|--------------------------------------|------------------------------------|
| Crest and foot hill                  | MSA scatters                       |
| Pans/ dry river courses/flood plains | LSA/MSA scatters                   |
| Outcrops                             | Occupation sites dating to LSA     |
| Farmsteads                           | Historical archaeological material |



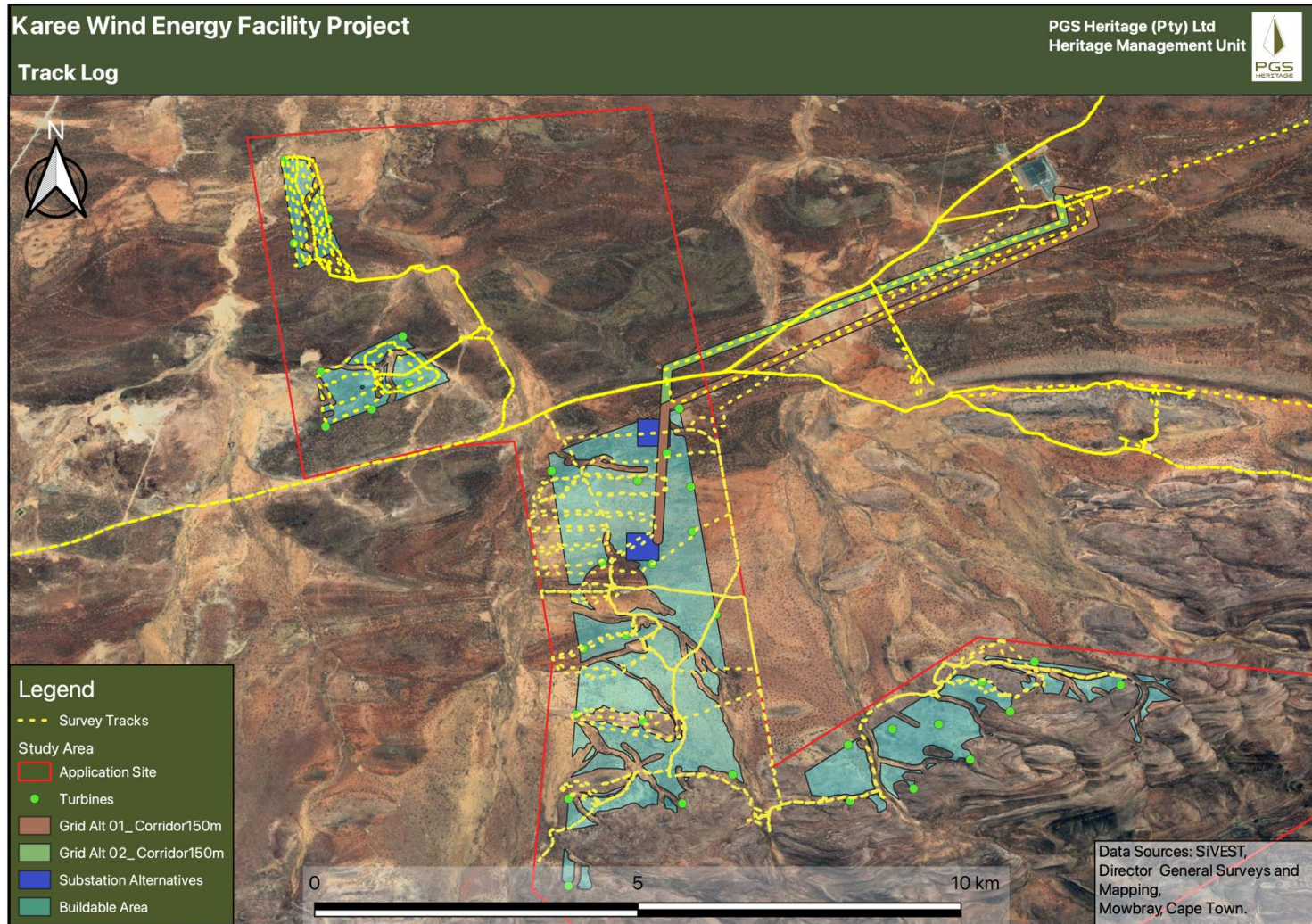
**Figure 27: Possible heritage sensitivity areas; Structures (incl. kraals and farmsteads; pink polygons) and ruin (orange polygon) within the Karee WEF study area.**

## 8. FIELDWORK FINDINGS

A selective survey of the study area was conducted from the 9-12 March 2021. Due to the nature of cultural remains, with the majority of artefacts occurring below surface, an archaeologist from PGS and a field assistant conducted a vehicle and foot-survey of the proposed development area. An additional survey of the grid connection was conducted from 11-12 April 2022. This fieldwork team consisted of consisting of three archaeologists (Cherene de Bruyn, Michelle Sachse and Nicolas Fletcher) and a field assistant (Xander Fourie). The fieldwork was logged with GPS devices to provide a tracklog of the area covered (**Figure 28**).

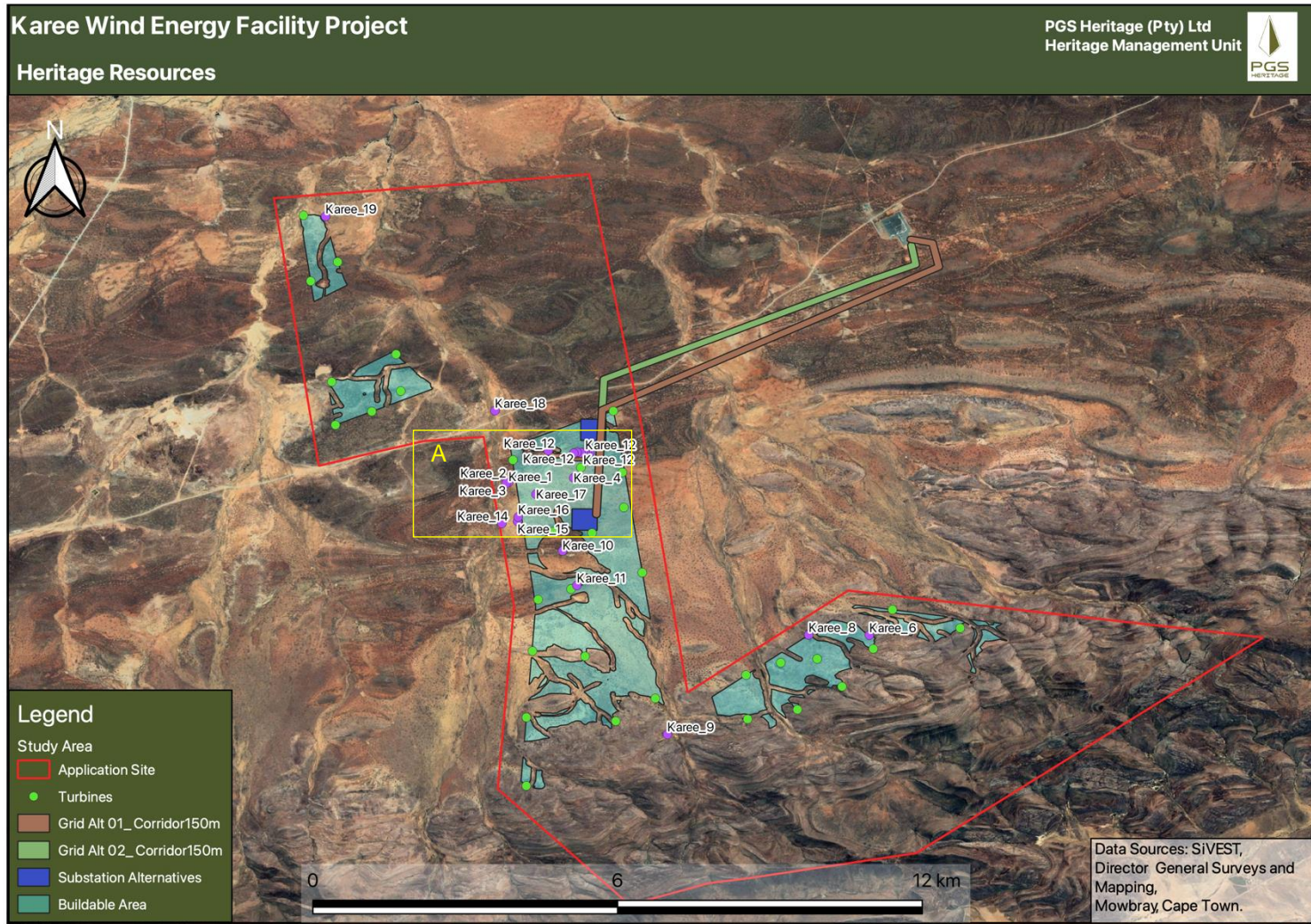
The fieldwork identified 16 heritage finds that were then classified as either find spots, archaeological sites or structures (incl. historical farmsteads, kraals) (**Figure 29, Figure 30**). The fieldwork completed for the AIA component has confirmed the presence of two (2) structures (including one farmstead and a one-roomed stone structure) and fourteen (14) archaeological sites (which includes eight (8) findspots).





**Figure 28: Track log recordings from the site visit to Karee WEF.**

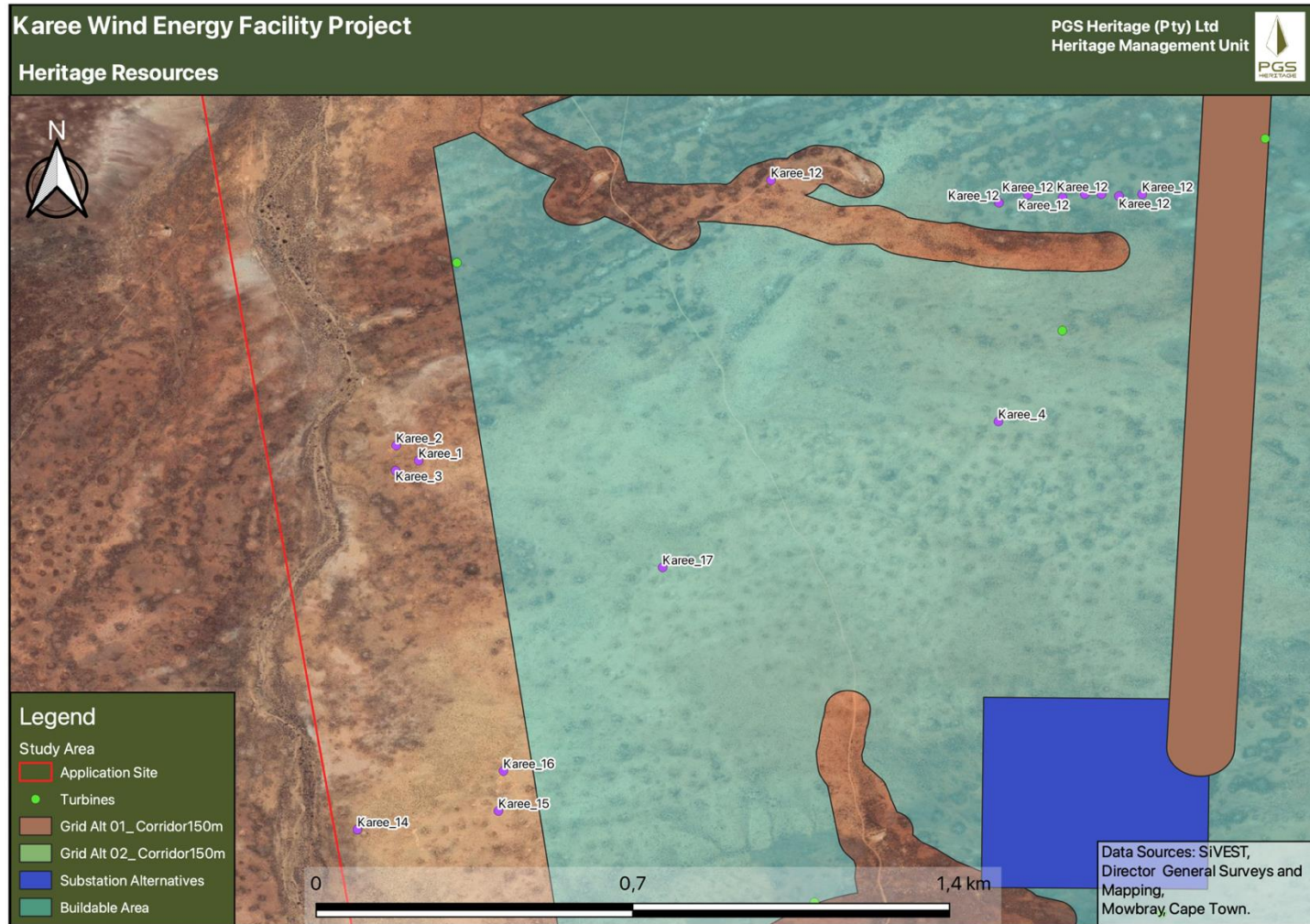




a

**Figure 29: Locality of the heritage resources identified within the study area. See inset A below.**





**Figure 30: Heritage resources identified within the proposed WEF area. Inset A.**  
(Note that the numerous points labelled Karee\_12 represent the logged extent of stone tools over approximately 300 meters.)

## 8.1 Find spots

The find spots (**Karee\_9, Karee\_14; Table 6**) were only documented where more than 5 identifiable modified lithics were observed within a 5-metre radius. Most of the find spots coincided with ridges and sheet wash plains which were characterised by low-density scatters of lithics consisting mainly of lithics, debitage and cores. Raw materials utilised included quartzite, chert and hornfels. Additionally, single isolated artefacts were observed across the study area portions (**Figure 32**). All of the findspots are located in areas that are not demarcated for development and will thus not be impacted upon by the proposed development.

**Table 6: Find spots**

| Site Number | Lat         | Lon        | Description                                       | Sensitivity | Heritage Rating |
|-------------|-------------|------------|---|-------------|-----------------|
| Karee_1     | -33.160520° | 19.927454° | Low density LSA scatter                           | Low         | NCW             |
| Karee_3     | -33.160756° | 19.926911° | Low density LSA scatter                           | Low         | NCW             |
| Karee_4     | -33.159593° | 19.941199° | Low density MSA scatter                           | Low         | NCW             |
| Karee_9     | -33.213805° | 19.961013° | Low density LSA and MSA scatter                   | Low         | NCW             |
| Karee_14    | -33.169271° | 19.926007° | Low density LSA scatter                           | Low         | NCW             |
| Karee_16    | -33.167885° | 19.929465° | Deflation hollow, MSA, ESA quartzite              | Low         | NCW             |
| Karee_17    | -33.163054° | 19.933239° | Deflated lithics, cores from quartz and quartzite | Low         | NCW             |
| Karee_19    | -33.104363° | 19.888752° | Low density LSA scatter                           | Low         | NCW             |



**Figure 31: Example of a deflated area**






**Figure 32: Some of the low-density scatters identified during the fieldwork.**




## 8.2 Sites


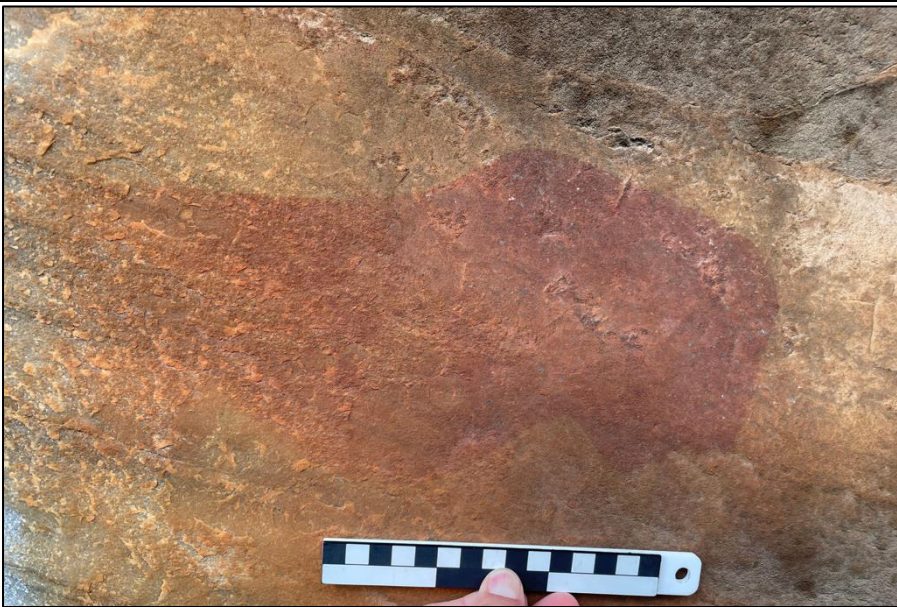
**Table 7: Archaeological resources**



| Site number  | Lat         | Lon        | Description   | Heritage Significance | Heritage Rating |
|--|-------------|------------|---|-----------------------|-----------------|
| Karee_2  | -33.160164° | 19.926925° | <p>The site comprises a scatter of stone artefacts. It is found on the farm Tierberg No 258, situated approximately 170m east of an ephemeral stream. The LSA tools are made of quartzite and jasper. Fragments of ostrich eggshell were also observed.</p> <p><b>Extent:</b> approximately 10 meter in diameter</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- As Karee_2 is located within the area that is not demarcated for development, it is unlikely that it will be impacted. <b>No mitigation is required.</b></li> </ul> | Low                   | IIIC            |
|  <p><b>Figure 33: View of site Karee_2.</b></p> |             |            |   |                       |                 |

| Site number | Lat         | Lon       | Description   | Heritage Significance | Heritage Rating |
|-------------|-------------|-----------|---|-----------------------|-----------------|
| Karee_6     | -33.192836° | 20.00368° | <p>The site is situated in the south-eastern section of the proposed WEF. It is characterised by a set of quarzitic sandstone ridges that run east to west in the lower foothills of the Bokkeveld Mountains.</p> <p>The ridges produce a natural concave overhang with some fallen boulders creating a natural shelter. The rock face contains various rock art motives with the most abundant being the ochre smudges that remain of human figures. Two distinct areas of these groups were identified spread over a 20-meter distance along the overhang.</p> <p>The remains of an eland painting could also be discerned. It is approximately 20 cm in length. Various lithics and debitage of LSA material were identified on the floor of the shelter.</p> <p>The site is provisionally rated as IIIA with a high heritage significance.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- The site should be demarcated with a 100-meter buffer and should be treated as a No-Go-Zone.</li> <li>- If development occurs within 100m of Karee_6, the rock shelter will need to be satisfactorily studied and recorded before impact occurs.</li> </ul> | High                  | IIIA            |


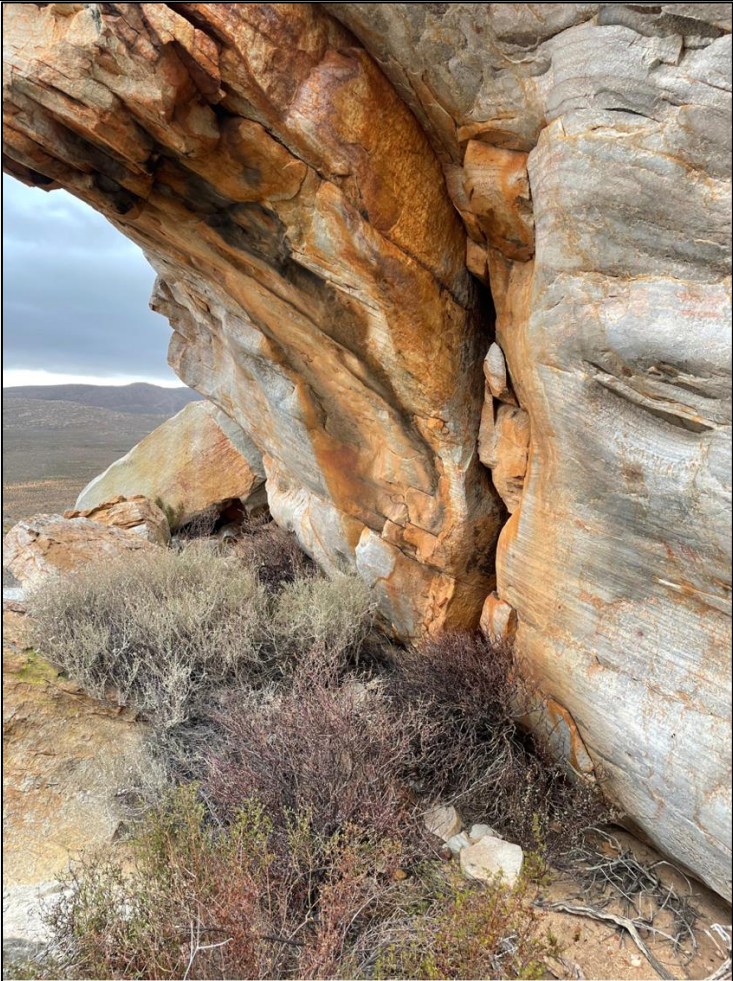
| Site number   | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|---|-----|-----|---|-----------------------|-----------------|
|   |     |     |  |                       |                 |
| <p><b>Figure 34: General view of the rock shelter at Karee_6.</b></p> |     |     |   |                       |                 |





| Site number | Lat | Lon | Description  | Heritage Significance | Heritage Rating |
|-------------|-----|-----|--|-----------------------|-----------------|
|             |     |     |  <p>Figure 35: View of the two main panels of the shelter, with the eland painting on the left and procession of figure just of the left of the scale.</p> |                       |                 |
|             |     |     |  <p>Figure 36: Eland painting.</p>  |                       |                 |

| Site number  | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|--|-----|-----|---|-----------------------|-----------------|
|  |     |     |  |                       |                 |
| Figure 37: Second procession of figures.   |     |     | Figure 38: First set of figures on the right main panel of the shelter.             |                       |                 |



| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p>Figure 39: Lithics and debitage on the shelter floor.</p>   |                       |                 |
|             |     |     |  <p>Figure 40: View from the west to east of the shelter.</p> |                       |                 |





| Site number | Lat         | Lon        | Description  | Heritage Significance | Heritage Rating |
|-------------|-------------|------------|--|-----------------------|-----------------|
| Karee_8     | -33.192783° | 19.990872° | <p>The area is characterised by the remains of a stone packed structure with a low background scatter of LSA material. No other material culture was identified around the area.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- As Karee_8 is located within the area that is not demarcated for development, it is unlikely that it will be impacted. <b>No mitigation is required.</b></li> </ul>  | Low                   | NCW             |
|             |             |            |  <p><b>Figure 41: View of stone packed structure.</b></p>   |                       |                 |
|             |             |            |  <p><b>Figure 42: Some LSA material found around the site.</b></p>   |                       |                 |
| Karee_10    | -33.175031° | 19.938853° | <p>The site comprises the original farmstead found on the farm Tierberg No 258. The farmstead consists of a central flat roof, stone-built farmhouse with various additions to the back and eastern side (<b>Figure 43</b>). Various additions have totally changed the character of the building. Notable is the removal of the original wooden door and window frames (<b>Figure 45</b>). These were replaced with steel frames with the placement flush with the outer wall resulting in a change of the façade of the original building.</p> | Medium                | IIIB            |



| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     | <p>The additions were not sympathetic to the original fabric of the structure with corrugated and asbestos sheeting used to replace the original brakdak and a parapet added on top of the roof sheeting. A date of 1934 is inscribed on the side of the older section of the farmhouse which possibly indicates its original date of construction (<b>Figure 48</b>).</p> <p>The structure was depicted at this locality on the 3319BB topographical sheet dating to 1969 (<b>Figure 49</b>).</p> <p><b>Extent:</b> The farmstead with its outbuildings covers an area of 150m x 60m</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- A 500-meter buffer around the farmstead must be kept if any development is to occur in its vicinity.</li> <li>- As Karee_10 is located within the area that is not demarcated for development, it is unlikely that it will be impacted. <b>No mitigation is required.</b></li> <li>- If development occurs within the 500m buffer of <b>Karee_10</b>, it needs to be satisfactorily studied and recorded before impact.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> <li>- A mitigation report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the farmstead can be included.</li> <li>- The completed mitigation report must be submitted to the relevant heritage authorities with a permit application to allow for the destruction of the site.</li> </ul> |                       |                 |




| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p>Figure 43: Front façade of the original stone-built structure.</p> |                       |                 |





| Site number   | Lat | Lon | Description  | Heritage Significance | Heritage Rating |
|---|-----|-----|--|-----------------------|-----------------|
|                 |     |     |   |                       |                 |
| Figure 44: Side view of the original house with the addition visible to the right of the picture. |     |     | Figure 45: Steel window frames was installed during the renovation of the structure. |                       |                 |

| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p>Figure 46: View of the remains of the dip trough leading from the original sheep pen.</p> |                       |                 |
|             |     |     |  <p>Figure 47: View of the stone chimney and geyser.</p>                                     |                       |                 |


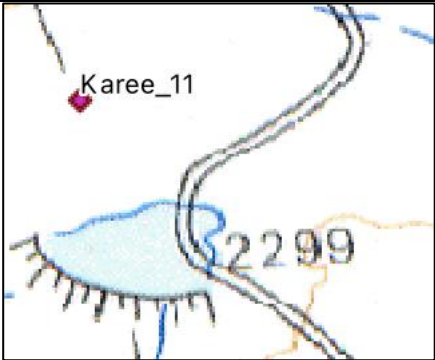


| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  |                       |                 |
|             |     |     | Figure 48: View of the date (“1934”) that the structure was erected.                |                       |                 |

| Site number | Lat         | Lon        | Description   | Heritage Significance | Heritage Rating |
|-------------|-------------|------------|---|-----------------------|-----------------|
|             |             |            |  <p><b>Figure 49: 3319BB topographical sheet surveyed in 1969 depicts a structure at Karee_11.</b></p>  |                       |                 |
| Karee_11    | -33.182338° | 19.941867° | <p>The site comprises a one roomed stone structure (<b>Figure 50</b>). It is found on the farm Tierberg No 258, 360m west of a farm track and 255m north of a dam. The structure has partially collapsed. The walls are constructed from cemented natural stone, the window frames are wooden and the roof, which is no longer in place, is corrugated iron (<b>Figure 51</b>). No other material culture was observed at the site.</p> <p>The structure was not depicted at this locality on the 3319BB topographical sheet dating to 1969 (<b>Figure 52</b>). The construction technique with the use of cement and stone indicates a construction period of the later part of the 20<sup>th</sup> century. As no additional information was available, the site is provisionally rated as IIIC.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- A 30-meter buffer around the structure must be kept if any development is to occur in its vicinity.</li> <li>- If development occurs within the 30m buffer of <b>Karee_11</b>, it needs to be satisfactorily studied and recorded before impact.</li> <li>- Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</li> <li>- A mitigation report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the farmstead can be included.</li> <li>- The completed mitigation report must be submitted to the relevant heritage authorities with a permit application to allow for the destruction of the site.</li> </ul> | Low                   | IIIC            |

| Site number   | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|---|-----|-----|---|-----------------------|-----------------|
|   |     |     |  |                       |                 |
| Figure 50: General view of the stone structure at Karee_11. |     |     |   |                       |                 |



| Site number | Lat | Lon | Description  | Heritage Significance | Heritage Rating |
|-------------|-----|-----|--|-----------------------|-----------------|
|             |     |     |  <p>Figure 51: Closer view of the partially collapsed stone structure at Karee_11.</p>                   |                       |                 |
|             |     |     |  <p>Figure 52: 3319BB topographical sheet surveyed in 1969 does not depict a structure at Karee_11.</p> |                       |                 |



| Site number | Lat         | Lon        | Description   | Heritage Significance | Heritage Rating |
|-------------|-------------|------------|---|-----------------------|-----------------|
| Karee_12    | -33.154204° | 19.944606° | <p>The site is characterised by a low to medium density of scatter of large quarzitic cores and lithics that are interspersed in a dense pebble layer. The transect walked, logged continuous stone tools over an extent of approximately 300 meters.</p> <p>Most of the material are crude cores and large lithics with multiples flake scars present. Some of the cores show heavy-duty retouch. The absence of blade blanks and prepared cores can possibly indicate as larger ESA component to this site.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>- If development occurs within 30m of <b>Karee_12</b>, a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.</li> </ul> | Medium                | IIIB            |





Figure 53: View of pebble lay that characterises the site at Karee\_12.





Figure 54: Examples of multifaceted cores.



| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p><b>Figure 55: Cores with multiple flaked facets.</b></p> |                       |                 |
|             |     |     |  <p><b>Figure 56: A core with heavy retouch.</b></p>        |                       |                 |

| Site number | Lat         | Lon        | Description  | Heritage Significance | Heritage Rating |
|-------------|-------------|------------|--|-----------------------|-----------------|
| Karee_15    | -33.168830° | 19.929348° | <p>The site is characterised by a low density scatter of ESA material scattered over a 10x10meter area. The most significant of the stone tools present is two hand axes of which one is an excellent example of the later ESA Fauresmith hand axes (<b>Figure 59</b> and <b>Figure 60</b>). No further material culture was identified in the area.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>- If development occurs within 30m of <b>Karee_15</b>, a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.</li> </ul> | Medium                | IIIB            |





| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p>Figure 57: View of deflated area.</p> |                       |                 |
|             |     |     |  <p>Figure 58: Collection of cores.</p>  |                       |                 |





| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     | <div data-bbox="302 210 1003 1155" data-label="Image"> <p>A photograph showing the dorsal view of a hand axe. The axe is a light brown, flaked stone tool with a pointed tip and a wider base. It is placed on a reddish-brown, sandy surface. To the left of the axe is a vertical scale bar with alternating black and white segments, used for size reference.</p> </div> <p>Figure 59: Dorsal view of the hand axe.</p> |                       |                 |
|             |     |     | <div data-bbox="1176 392 1971 999" data-label="Image"> <p>A photograph showing the lateral view of the same hand axe. The axe is positioned horizontally on the same reddish-brown, sandy surface. A horizontal scale bar with alternating black and white segments is placed above the axe for size reference.</p> </div> <p>Figure 60: Lateral view of the hand axe.</p>  |                       |                 |



| Site number | Lat       | Lon      | Description   | Heritage Significance | Heritage Rating |
|-------------|-----------|----------|---|-----------------------|-----------------|
| Karee_18    | -33.14542 | 19.92456 | <p>The site (<b>Figure 61</b>) is situated within the transmission line servitude some 80 meters to the west of a pylon. The site is situated on the eroded banks of a dry river bed and is largely deflated exposing a rich cultural layer.</p> <p>Two distinctive stone packed structures were identified as possible hearths (<b>Figure 62</b>). The site consists of an extensive scatter of LSA cores, lithics, ostrich egg shell pieces and one marine shell (<b>Figure 63</b> and <b>Figure 64</b>).</p> <p>The site is currently endangered by wind and water erosion and natural elements pose a major threat to the integrity of the site.</p> <p><b>Extent:</b> Approximately 30m in diameter.</p> <p><b>Recommendation:</b></p> <ul style="list-style-type: none"> <li>- A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>- If development occurs within 30m of <b>Karee_18</b>, a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.</li> </ul> | High                  | IIIA            |

| Site number | Lat | Lon | Description  | Heritage Significance | Heritage Rating |
|-------------|-----|-----|--|-----------------------|-----------------|
|             |     |     |  <p>Figure 61: General view of site. Structure visible in foreground (Scale 10cm).</p> |                       |                 |
|             |     |     |  <p>Figure 63: Ostrich eggshell pieces.</p>   |                       |                 |



| Site number | Lat | Lon | Description   | Heritage Significance | Heritage Rating |
|-------------|-----|-----|---|-----------------------|-----------------|
|             |     |     |  <p>Figure 62: Possible hearth (Scale 10cm).</p>                      |                       |                 |
|             |     |     |  <p>Figure 64: Cores, lithics and debitage in situ (Scale 10cm).</p> |                       |                 |

## 9. IDENTIFICATION AND ASSESSMENT OF IMPACTS

The fieldwork findings have shown that find spots, structures, graves, burial grounds and archaeological sites characterise the study area. From the proposed location of the WEF and associated infrastructure, it is clear that the cultural significance of some of the heritage resources and their context may be impacted by proximity to the development area.

Archaeological remains are rare objects, often preserved due to unusual circumstances and are non-renewable resources. When a development is proposed, and specialist studies are undertaken as part of the wider evaluation of heritage resources, this provides an opportunity into a depository that would not otherwise exist. In this sense the impact is POSITIVE for archaeology provided that efforts are made to preserve or mitigate heritage resources in the study footprint, prior to and during the construction phase of the development. For this reason, four development scenarios, informed by EIA constraints are considered in this study, including the no-development / no-go option.

The general nature of impacts from the proposed development will be visual with regard to spatial and built heritage, and physical with regard to archaeological heritage resources. Mitigation measures for heritage resources will be recommended to mitigate impacts.

### 9.1 General Observations

In this section, an assessment will be made of the impact of the proposed development on the identified heritage sites. The assessment of the impact of the proposed WEF and the associated grid infrastructure will be addressed separately. An overlay of all the heritage sites identified during the fieldwork over the proposed development footprint areas was made to assess the impact of the proposed development on these identified heritage sites. This overlay resulted in the following observations:

The following general observations will apply for the impact assessment undertaken in this report:

- The impact assessment rating is based on the rating scale as contained in **Appendix B**.
- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. These sites are 2 archaeological sites (**Karee\_2** and **Karee\_8**), 8 findspots (**Karee\_1**, **Karee\_3**, **Karee\_4**, **Karee\_9**, **Karee\_14**, **Karee\_16**, **Karee\_17**, **Karee\_19**) and one structure (**Karee\_11**).
- One archaeological site (**Karee\_18**) of high heritage significance and one structure (**Karee\_10**) of medium heritage significance are located more than 100m away from the proposed



development. As a result, no impact is expected from the proposed development on these sites. This means that no impact assessment will be undertaken for the sites.

- One archaeological site (**Karee\_6**) of high heritage significance and two archaeological sites (**Karee\_12** and **Karee\_8**) of medium heritage significance were located less than 100m from the proposed development areas. As a result, an impact is expected from the proposed development on this site.
- 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 size of the study area and the subterranean nature of some heritage sites. The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such.
- Three project phases have been identified by SiVEST namely the Pre-Construction Phase, Construction Phase and Operational Phase. As site clearing activities of all the development footprint areas are grouped under the Pre-Construction Phase, the highest level of impact on the identified heritage sites is expected during this phase. No impacts are expected during the Construction and Operational Phases. All the identified heritage sites are expected to be destroyed in terms of the pre-mitigation impact assessments undertaken below, whereas only those sites not mitigated by amendments to the proposed development footprints will also be destroyed in terms of the post-mitigation impact assessment calculations undertaken below.

The following impact rating tables are based on the proposed WEF and associated grid infrastructure development layout within the region.

## 9.2 Pre construction

**Table 8: Assessment of the Impact of Proposed WEF on Heritage Sites**

| ENVIRONME<br>NTAL<br>PARAMETER        | ISSUE / IMPACT /<br>ENVIRONMENTAL<br>EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE<br>BEFORE MITIGATION |   |   |   |   |         |       |                    |        | RECOMMENDED MITIGATION<br>MEASURES  | ENVIRONMENTAL SIGNIFICANCE<br>AFTER MITIGATION |   |   |   |   |         |       |                    |               |
|---------------------------------------|---|---|---|---|---|---|---------|-------|--------------------|--------|---|--|---|---|---|---|---------|-------|--------------------|---------------|
|                                       |   | E   | P | R | L | D | I/<br>M | TOTAL | STATUS<br>(+ OR -) | S      |   | E  | P | R | L | D | I/<br>M | TOTAL | STATUS<br>(+ OR -) | S             |
| Planning Phase                        |   |   |   |   |   |   |         |       |                    |        |   |  |   |   |   |   |         |       |                    |               |
| Stone Age and<br>Rock Art sites       | Construction activities close to these resources can damage and cause irreparable damage or destroy the resource. Rock art sites are extremely sensitive to human actions and are easily damaged. | 1   | 2 | 4 | 3 | 4 | 4       | 56    | -                  | High   | 1. An archaeological walk down of the final approved layout will be required before construction commences.<br>2. Implement a 30-meter buffer around archaeological sites with a rating of IIIB ( <b>Karee_12, Karee_15</b> ).<br>3. Implement a 100-meter buffer around the rock art site ( <b>Karee_6</b> )<br>4. A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.<br>5. Chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.<br>6. Demarcate as no-go areas | 1  | 2 | 3 | 3 | 4 | 2       | 26    | -                  | Medium impact |
| Unidentified<br>heritage<br>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 | 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           |

**Table 9: Assessment of the Impact of Proposed Grid Infrastructure on Heritage Sites**

SiVEST Environmental  
Project Description: **Proposed Construction of the Karee Wind Energy Facility and Associated Grid Infrastructure - AIA**  
Version No. 0.2

Prepared by: PGS Heritage Pty Ltd for SiVEST

Date: 2 December 2022

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

### 9.3 CUMULATIVE IMPACTS

This section evaluates the possible cumulative impacts (IC) on heritage resources with the addition of the Karee WEF and associated grid infrastructure. The CI on heritage resources evaluated a 35-kilometer radius (**Figure 65**).

The following must be considered in the analysis of the cumulative effect of development on heritage resources:

- **Fixed datum or dataset:** There is no comprehensive heritage data set for the Touws River and Laingsburg region and thus we cannot quantify how much of a specific cultural heritage element is present in the region. The broader region has been covered by a heritage resources study, however, this study cannot account for all heritage resources. Further to this none of the heritage studies conducted can with certainty state that all heritage resources within the study area have been identified and evaluated;
- **Defined thresholds:** The value judgement on the significance of a heritage site will vary from individual to individual and between interest groups. Thus, implicating that heritage resources' significance can and does change over time. And so, will the tipping threshold for impacts on a certain type of heritage resource;
- **Threshold crossing:** In the absence of a comprehensive dataset or heritage inventory of the entire region we will never be able to quantify or set a threshold to determine at what stage the impact from developments on heritage resources has reached or is reaching the danger level or excludes the new development on this basis. (Godwin, 2011)

With regards to the historical resources, in most cases given a low-medium heritage significance on a local scale and in the majority of the cases were recommended as being easily mitigated or avoidable.

While the archaeological (incl. the rock shelter site) and farmstead sites in all cases given a medium-high heritage significance on a local scale and in the majority of the cases were recommended as being no-go areas or extensive mitigation required.

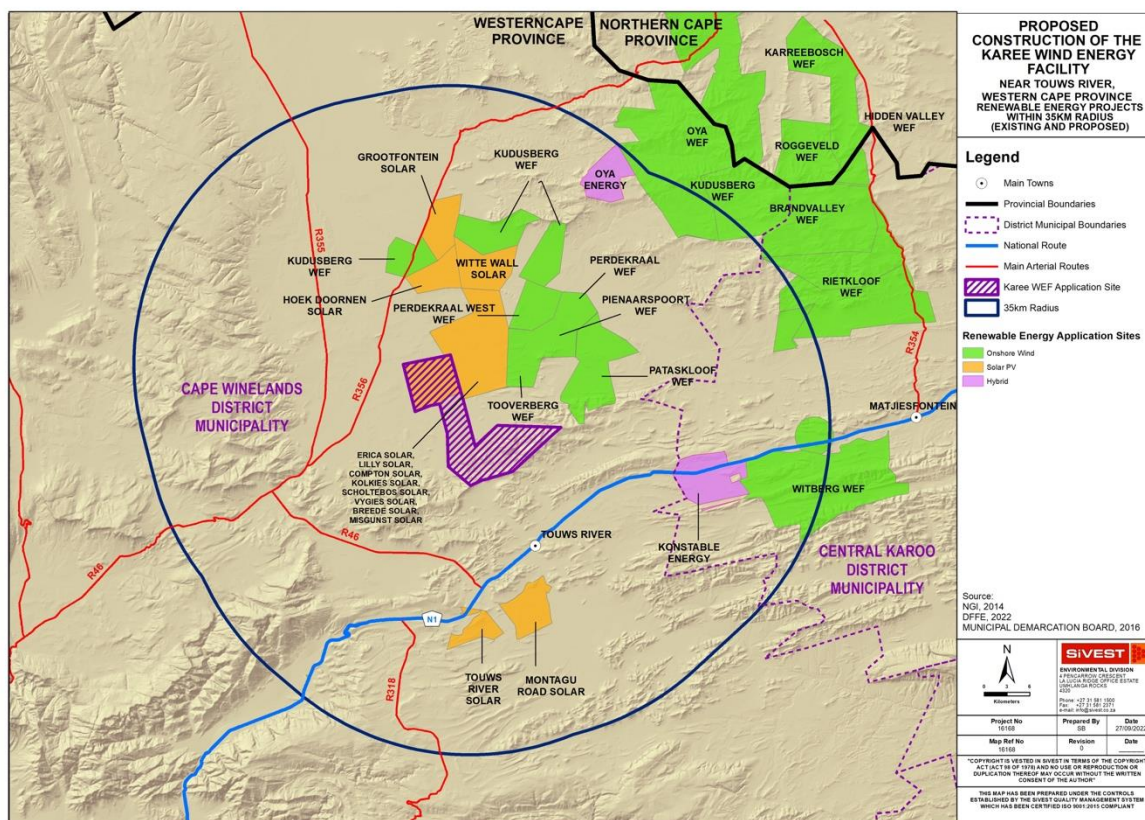
**Table 11** provides an analysis of the projected cumulative impact this project will add to impact on heritage resources.

**Table 10: Renewable energy developments proposed within a 35km radius of the Karee WEF application site.**

| Applicant                       | Project             | Technology                  | Capacity | Status of Application / Development |
|---------------------------------|---------------------|-----------------------------|----------|-------------------------------------|
| Oya Energy (Pty) Ltd            | Oya Energy Facility | Hybrid (Solar / Fuel-Based) | 305MW    | EIA Process underway                |
| Brandvalley Wind Farm (Pty) Ltd | Brandvalley WEF     | Wind                        | 140MW    | Approved                            |
| Kudusberg Wind Farm (Pty) Ltd   | Kudusberg WEF       | Wind                        | 325W     | Approved                            |



| Applicant   | Project   | Technology | Capacity | Status of Application / Development |
|---|---|------------|----------|-------------------------------------|
| South Africa Mainstream Renewable Power Perdekraal West (Pty) Ltd | Perdekraal West WEF & Associated Grid Connection Infrastructure | Wind       | 150M     | Approved                            |
| South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd | Perdekraal East WEF & Associated Grid Connection Infrastructure | Wind       | 110MW    | Operational                         |
| South Africa Mainstream Renewable Power Developments (Pty) Ltd    | Patatskloof WEF   | Wind       | 140MW    | EIA Process underway                |
| Rietkloof Wind Farm (Pty) Ltd                                     | Rietkloof WEF   | Wind       | 186MW    | Approved                            |
| ENERTRAG SA (Pty) Ltd   | Tooverberg WEF & Associated Grid Connection Infrastructure      | Wind       | 140MW    | Approved                            |
| Witberg Wind Power (Pty) Ltd                                      | Witberg WEF   | Wind       | 120MW    | Approved                            |
| Montague Road Solar (Pty) Ltd                                     | Montague Road Solar   | Solar PV   | 75MW     | Approved                            |
| Touwsrivier Solar   | Touwsrivier Solar   | Solar PV   | 36MW     | Approved                            |



**Figure 65: Renewable energy facilities proposed within a 35km radius of the proposed development (provided by SiVEST).**

**Table 11: Impact rating - Cumulative**

| ENVIRONMENTAL<br>PARAMETER | ISSUE / IMPACT /<br>ENVIRONMENTAL<br>EFFECT/ NATURE   | ENVIRONMENTAL SIGNIFICANCE<br>BEFORE MITIGATION |   |   |   |   |         |           |            |        |   | RECOMMENDED<br>MITIGATION<br>MEASURES | ENVIRONMENTAL SIGNIFICANCE<br>AFTER MITIGATION |   |   |   |         |           |            |     |  |  |
|----------------------------|---|---|---|---|---|---|---------|-----------|------------|--------|---|---------------------------------------|--|---|---|---|---------|-----------|------------|-----|--|--|
|                            |   | E   | P | R | L | D | I/<br>M | TOT<br>AL | STA<br>TUS | S      | E   |                                       | P  | R | L | D | I/<br>M | TOT<br>AL | STA<br>TUS | S   |  |  |
| Cumulative Phase           |   |   |   |   |   |   |         |           |            |        |   |                                       |  |   |   |   |         |           |            |     |  |  |
| Heritage Resources         | The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources. | 4   | 2 | 4 | 4 | 4 | 2       | 36        | -          | Medium | It can clearly be noted that the area in general is abundant with Stone Age and historical remains.<br><br>However, until a regional detailed study is commissioned by HWC or SAHRA. No further mitigations measures can be proposed other than those already recommended for the site-specific mitigation of sites in this report. | 4                                     | 1  | 4 | 4 | 4 | 1       | 17        | -          | Low |  |  |

## 9.4 Overall Impact Rating

It is my considered opinion that this additional load on the overall impact on heritage resources will be **low**. With a detailed and comprehensive regional dataset this rating could possibly be adjusted and more accurate.

## 10. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Two alternatives were provided for the substation sites and power line route alignments.

- Power Line Corridor Option 1 is between 8.9km and 10.9km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation; and
- Power Line Corridor Option 2 is between 8.4km and 10.3km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.

An assessment of the options for the substation and power lines shows that there will not be an impact on heritage resources. Therefore, no preference for substation or powerline exists.

### Key

|                      |  |
|----------------------|--|
| <b>PREFERRED</b>     | The alternative will result in a low impact/reduce the impact    |
| <b>FAVOURABLE</b>    | The impact will be relatively insignificant                      |
| <b>NOT PREFERRED</b> | The alternative will result in a high impact/increase the impact |
| <b>NO PREFERENCE</b> | The alternative will result in equal impacts                     |

| Alternative                  | Preference           | Reasons                         |
|------------------------------|----------------------|---------------------------------|
| <b>SUBSTATION</b>            |                      |                                 |
| Substation site Option 1     | <b>NO PREFERENCE</b> | No impact on heritage resources |
| Substation site Option 2     | <b>NO PREFERENCE</b> | No impact on heritage resources |
| <b>POWER LINE CORRIDOR</b>   |                      |                                 |
| Power Line Corridor Option 1 | <b>NO PREFERENCE</b> | No impact on heritage resources |
| Power Line Corridor Option 2 | <b>NO PREFERENCE</b> | No impact on heritage resources |

### 10.1 The No-Go Alternative

Environmental and heritage legislation requires the consideration of the no-go option. There will be impacts as the project would not proceed. There would also be no socio-economic benefits or increase in energy generation of renewable energy sources (see Section 5 of this report for a full description of the legal requirement).

## 11. GENERAL RECOMMENDATIONS AND MITIGATION MEASURES

### 11.1 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.

### **11.2 Chance finds 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.

### **11.3 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



## 11.4 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 12** gives guidelines for lead times on permitting.

**Table 12: Lead times for permitting and mobilisation**

| <b>Action</b>  | <b>Responsibility</b>   | <b>Timeframe</b> |
|--|---|------------------|
| 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 HWC  | 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 HWC  | 2 weeks          |
| Relocation of burial grounds or graves in the way of construction        | Service provider – Archaeologist, HWC, local government and provincial government | 6 months         |

## 11.5 Heritage Management Plan for EMPr implementation

**Table 13: 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 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             |
| <b>Archaeological sites</b> that were rated as low ( <b>Karee_2, Karee_8</b> ) but don't fall within the proposed development area. | <ul style="list-style-type: none"> <li>As the site is located within the area that is not demarcated for development, it is unlikely that it will be impacted. <b>No mitigation is required.</b></li> </ul>  | Pre-construction           | Pre-construction and during construction | Applicant ECO Archaeologist              | None                                | Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA       | ECO Monthly checklist/report             |
| <b>Archaeological site</b> that was rated as medium heritage significance ( <b>Karee_12, Karee_15</b> )                             | <ul style="list-style-type: none"> <li>A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>If development occurs within 30m of the site, a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.</li> </ul> | Pre-construction           | Pre-construction and during construction | Applicant ECO Archaeologist              | None                                | Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA       | ECO Monthly checklist/report             |

| Area and site no.   | Mitigation measures  | Phase            | Timeframe                                | The responsible party for implementation | Monitoring Party (frequency) | Target  | Performance indicators (monitoring tool) |
|---|--|------------------|--|--|------------------------------|---|--|
| <b>Archaeological rock art site</b> that was rated as high heritage significance ( <b>Karee_6</b> ) | <ul style="list-style-type: none"> <li>The site should be demarcated with a 100-meter buffer and should be treated as a No-Go-Zone.</li> <li>If development occurs within 100m of the site, the rock shelter will need to be satisfactorily studied and recorded before impact occurs.</li> </ul>  | Pre-construction | Pre-construction and during construction | Applicant ECO Archaeologist              | None                         | Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA | ECO Monthly checklist/report             |
| <b>Archaeological site</b> that was rated as high heritage significance ( <b>Karee_18</b> )         | <ul style="list-style-type: none"> <li>A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>If development occurs within 30m of the site, a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.</li> </ul>   | Pre-construction | Pre-construction and during construction | Applicant ECO Archaeologist              | None                         | Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA | ECO Monthly checklist/report             |
| <b>Historical Structures</b> that were rated as low ( <b>Karee_11</b> )                             | <ul style="list-style-type: none"> <li>A 30-meter buffer around the site must be kept if any development is to occur in its vicinity.</li> <li>If development occurs within the 30m buffer of the site, it needs to be satisfactorily studied and recorded before impact.</li> <li>Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of</li> </ul> | Pre-construction | Pre-construction and during construction | Applicant ECO Archaeologist              | None                         | Ensure compliance with relevant legislation and recommendations from HW under Section 36 and 38 of NHRA | ECO Monthly checklist/report             |

| Area and site no.  | Mitigation measures  | Phase            | Timeframe        | The responsible party for implementation | Monitoring Party (frequency) | Target   | Performance indicators (monitoring tool) |
|--|--|------------------|------------------|--|------------------------------|--|--|
|  | <p>the structure (c) measured drawings of the floor plans of the structure.</p> <ul style="list-style-type: none"> <li>A mitigation report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the farmstead can be included.</li> <li>The completed mitigation report must be submitted to the relevant heritage authorities with a permit application to allow for the destruction of the site.</li> </ul>  |                  |                  |  |                              |  |  |
| <b>Historical Structure</b> that was rated as medium heritage significance ( <b>Karee_10</b> ) | <ul style="list-style-type: none"> <li>A 500-meter buffer around the farmstead must be kept if any development is to occur in its vicinity.</li> <li>As Karee_10 is located within the area that is not demarcated for development, it is unlikely that it will be impacted. <b>No mitigation is required.</b></li> <li>If development occurs within the 500m buffer of Karee_10, it needs to be satisfactorily studied and recorded before impact.</li> <li>Recording of the structure i.e. (a) map indicating the position and footprint of</li> </ul> | Pre-construction | Pre-construction | Applicant ECO Archaeologist              | None                         | Ensure compliance with relevant legislation and recommendations from HWC under Section 36 and 38 of NHRA | ECO Monthly checklist/report             |



| Area and site no. | Mitigation measures   | Phase | Timeframe | The responsible party for implementation | Monitoring Party (frequency) | Target | Performance indicators (monitoring tool) |
|-------------------|---|-------|-----------|--|------------------------------|--------|--|
|                   | <p>the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.</p> <ul style="list-style-type: none"> <li>• A mitigation report must be compiled for the site within which the recorded drawings from the previous item as well as all existing information on the farmstead can be included.</li> <li>• The completed mitigation report must be submitted to the relevant heritage authorities with a permit application to allow for the destruction of the site.</li> </ul> |       |           |  |                              |        |  |

## 12. CONCLUSION AND SUMMARY

SiVEST has appointed PGS on behalf of Mainstream to undertake the assessment of the proposed construction of the 200MW Karee WEF and associated grid connection infrastructure near Touws River in the Western Cape Province of South Africa.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant.

The fieldwork conducted for the evaluation of the possible impact of the new Karee WEF and associated grid connection infrastructure has revealed the presence of 16 heritage resources.

### 12.1 Historical structures

A total of two (2) structures were identified, including one farmstead and a one-roomed stone structure.

The farmstead (**Karee\_10**) was rated as having medium heritage significance and the other structure (**Karee\_11**) was rated as having low heritage significance.

### 12.2 Archaeological features

A total of fourteen (14) archaeological sites were identified, including one (1) site with LSA lithics and OES, one (1) rock shelter with rock art and lithics, one (1) site with LSA lithics and the remains of a stone structure, one (1) site with a pebble deposit with various artefacts, one (1) site with ESA, MSA and LSA artefacts (incl. Fauresmith), one (1) site with LSA structures and deposit and eight (8) findspots.

Two (2) archaeological sites (**Karee\_6, Karee\_18**) were rated as having high heritage significance, two (2) archaeological sites (**Karee\_12, Karee\_15**) were rated as having medium heritage significance and two (2) archaeological sites (**Karee\_2, Karee\_8**) were rated as having low heritage significance.

Eight (8) findspots (**Karee\_1, Karee\_3, Karee\_4, Karee\_9, Karee\_14, Karee\_16, Karee\_17, Karee\_19**) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.

### 12.3 Recommendations

The calculated impact as summarised in **Section 9** of this report confirms the impact of the new Karee WEF and associated grid connection infrastructure will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources.

An assessment of the final footprint of the new Karee WEF and associated grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMP.

#### The following mitigation measures will be required:

- An archaeological walk down of the final approved layout will be required before construction commences;
- Implement a 30-meter buffer around the structure at **Karee-11**.
- Implement a 30-meter buffer around all archaeological site with a rating of IIIB and higher.
- Implement a 500-meter buffer around the farmstead site at **Karee\_10**.
- Implement a 100-meter buffer around the rock art site at **Karee\_6**.
- Demarcate the resources rated as IIIC-IIIA no-go areas.
- A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.
- A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

### 12.4 General

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures.

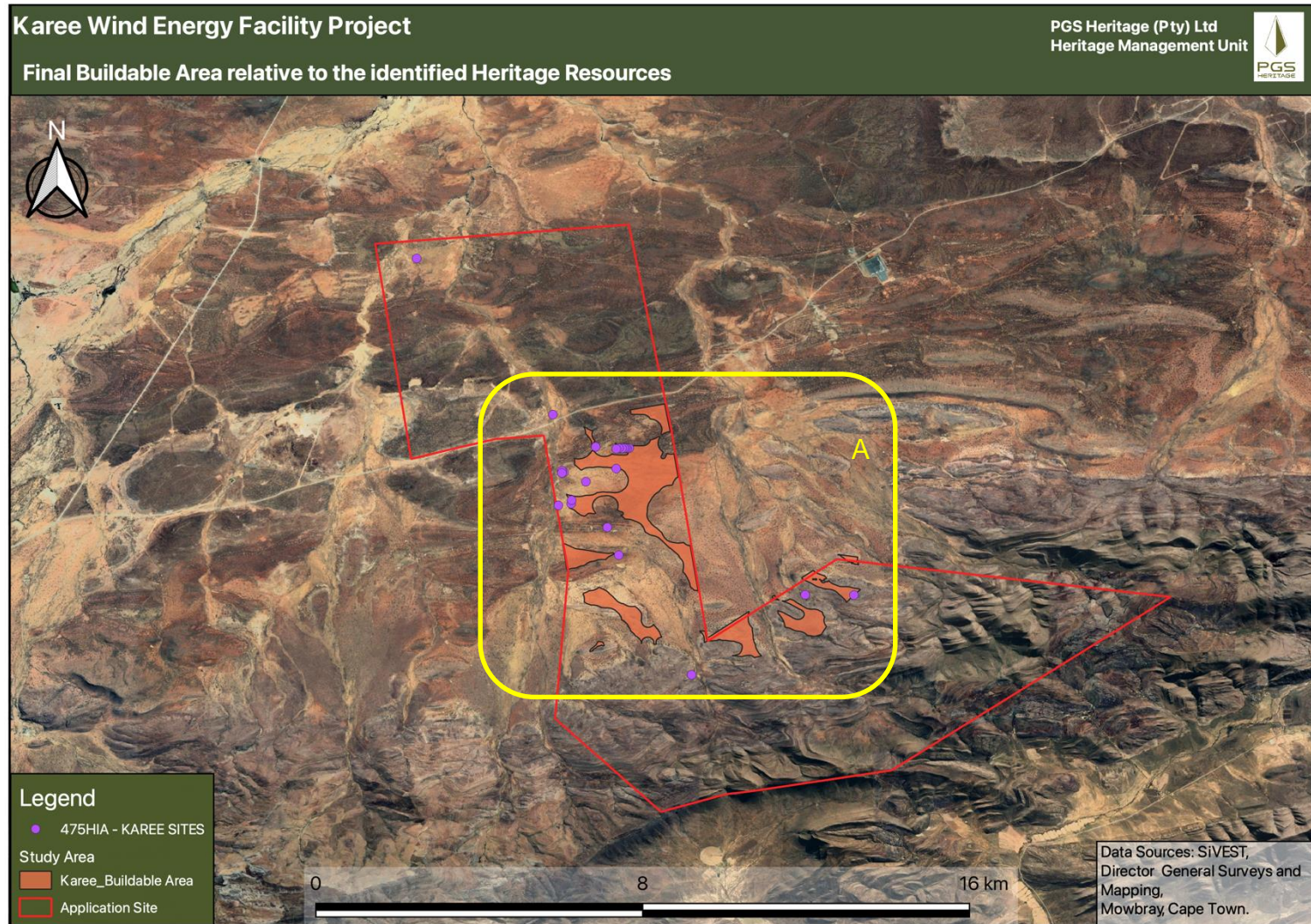
### 12.5 Final Proposed Buildable Area

The final proposed buildable area took the specialist recommendations identified during the 2021 and 2022 field assessments into consideration (**Figure 66, Figure 67**).

From an archaeological and historical structure perspective, the proposed footprint areas will not change the impact on the identified heritage resources in the AIA.

As such the recommended mitigation measures as described in the AIA report remain.

We have no objection to the proposed buildable area associated with the Karee WEF project.



**Figure 66: Final proposed buildable area relative to the locality of the heritage resources identified within the study area. See inset A below.**

**SiVEST Environmental**

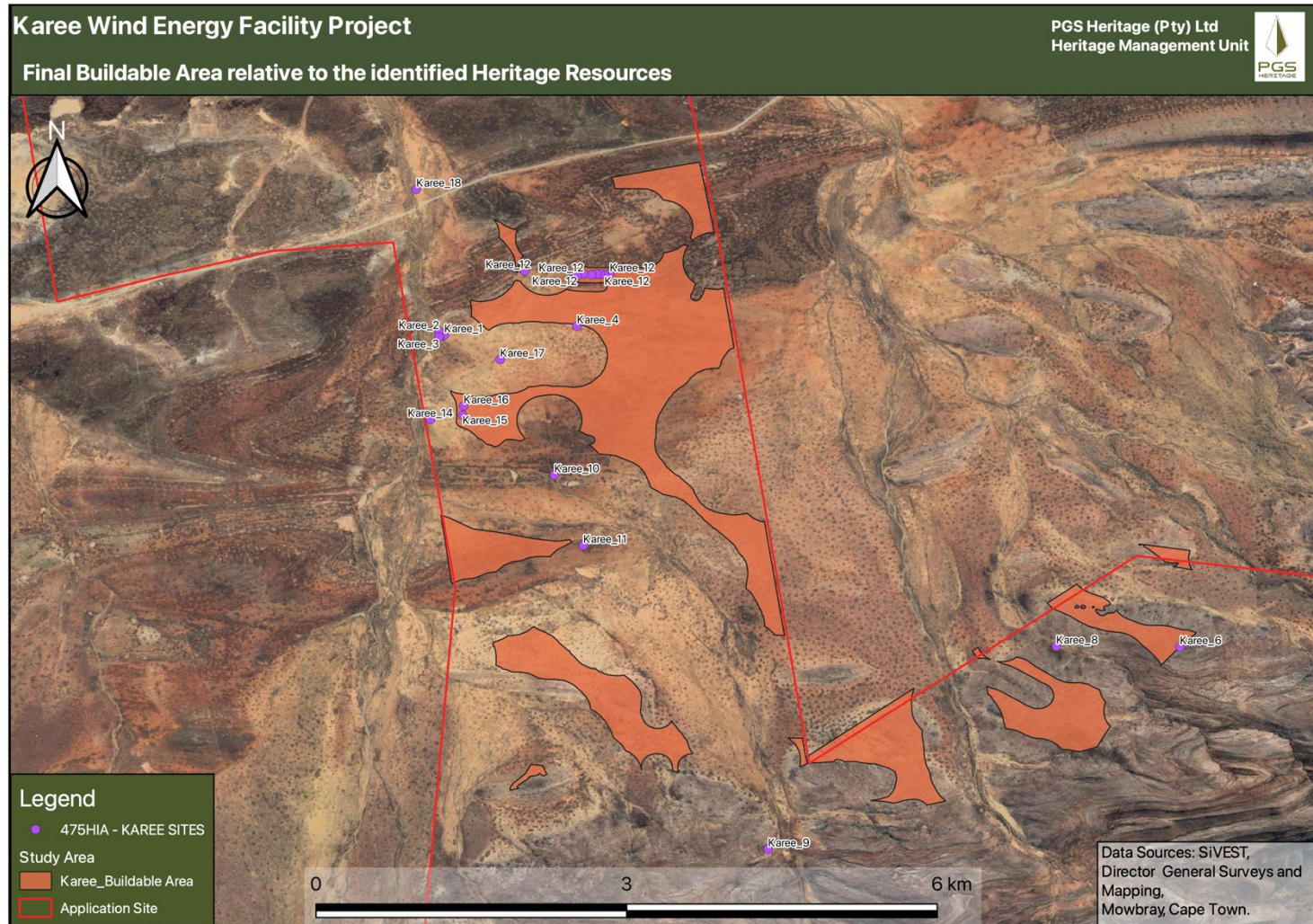
Project Description: **Proposed Construction of the Karee Wind Energy Facility and Associated Grid Infrastructure - AIA**

Version No. 0.2

Prepared by: **PGS Heritage Pty Ltd for SiVEST**

**Date:** 2 December 2022





**Figure 67: Inset A.**

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## Appendix A

### Project team CV's

## WOUTER FOURIE

### Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

#### Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia* -

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
- Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

#### Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP) CRM Accreditation (ASAPA) -

Principal Investigator - Grave Relocations

Field Director – Iron Age

Field Supervisor – Colonial Period and Stone Age

Accredited with Amafa KZN

#### Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Malawi, Mauritius and the Democratic Republic of the Congo.



## PROFESSIONAL CURRICULUM VITAE FOR NIKKI MANN

### Professional Archaeologist for PGS Heritage

**Name:** Nikki Mann  
**Profession:** Archaeologist  
**Date of birth:** 1992-10-13  
**Parent Firm:** PGS Heritage (Pty) Ltd  
**Position at Firm:** Archaeologist  
**Years with firm:** 2  
**Years of experience:** 7  
**Nationality:** South African  
**HDI Status:** White

### EDUCATION:

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc  
**Major subjects** : Archaeology, Environmental and  
Geographical Sciences  
**Year** : 2013

**Name of University or Institution** : University of Cape Town  
**Degree obtained** : BSc [Hons]  
**Major subjects** : Archaeology  
**Year** : 2014

**Name of University or Institution** : University of Cape Town  
**Certificate obtained** : MSc – Archaeology (phytolith analysis)  
**Year** : 2017

### Professional Qualifications:

Professional Archaeologist - Association of Southern African Professional Archaeologists -  
Professional Member – No 472

### Languages:

English  
French

### KEY QUALIFICATIONS

- 3 years of work in the heritage consulting field;



## POSITIONS HELD

**2021 – current:** Archaeologist - PGS (Pty) Ltd

**2019 – 2020:** Archaeologist - PGS (Pty) Ltd Lesotho

**2018 – 2020:** Contract Archaeologist – CTS Heritage

## REFERENCES

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## Appendix B

# **The Impact Assessment Scales used for this project**



## Environmental impact assessment (EIA) methodology

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

### Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

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. The total number of points scored for each impact indicates the level of significance of the impact.

### Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

Planning;  
Construction;  
Operation; and  
Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

### Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

**Table 14: Rating of impacts criteria**

| <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:

**Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.**

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 Rating             | Significance | 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.  |





## APPENDIX C

# SITE SENSITIVITY VERIFICATION REPORT

(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020)

## 1. Introduction

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as “Mainstream”), has appointed SiVEST SA (Pty) Ltd (hereafter referred to as “SiVEST”) to undertake the required BA Processes for the proposed construction of the 200MW Karee WEF and associated grid infrastructure near Touws River in the Western Cape Province.

In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

## 2. Site sensitivity verification

The site sensitivity verification of the proposed Karee WEF and associated grid connection is based on:

- A desktop review of (a) the relevant 1:50 000 scale topographic map 3319BB -Current and historical editions (1969, 1987, 1997, 2007), (b) Google Earth© satellite imagery, (c) published historical and archaeological literature, as well as (d) several previous HIA and AIA assessments undertaken in the general vicinity of the study area.
- A field assessment of the Karee WEF project area by field archaeologists during the period 9 to 12 March 2020 and 11 to 12 April 2022.

## 3. Outcome of site sensitivity verification

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. The heritage reports identified little pre-colonial or Stone Age archaeology (Booth 2012, 2015a and 2015b; Hart and Webley 2013; Hart and Kendrick 2014; Hart 2015; van der Walt 2016). In the cases where Stone Age archaeology was recorded, the scatters of stone artefacts were identified on the flat floodplains up to the foothills of the mountains, and within river valleys along watercourses (Booth 2016a and 2016b). The fairly desolate ridges in the region are subject to high winds and are generally devoid of archaeological remains (Webley and Halkett, 2017). Dry river courses have been referenced as having possible heritage sensitivity within the study area.

The field work in the study area demonstrates that archaeological sites and historical structures of heritage significance warrant conservation.

## 4. National Environmental Screening Tool

The Archaeological and Cultural Heritage Sensitivity Map for the Karee WEF project area prepared using the DFFE screening tool indicates a **Low to High Sensitivity** rating for the study area (**Figure**

12). The rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in the region. The field work that was conducted in the study area demonstrates that there are archaeological sites and historical structures of heritage significance that warrant conservation. Therefore, the DFFE screening tool sensitivity map in **Figure 12** is not entirely supported based on the findings of this fieldwork.

## **5. Conclusion**

The Archaeological and Cultural Heritage sensitivity of the Karee WEF and associated grid connection project areas has been evaluated, based on desktop studies and a site visit. It is concluded that the low rating as provided by the Environmental Screening Tool likely reflects the scarcity of heritage reports conducted in the region.