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WIND ENERGY FACILITY – ALETTA PROJECTS

Heritage Scoping Report

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Executive Summary

PGS Heritage was appointed by SiVEST Environmental Division to undertake a Heritage Scoping Report that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed development of Aletta wind energy facility near Copperton, Northern Cape Province

The Heritage Scoping Report has shown that the proposed Aletta project may have heritage resources present on the property. This has been confirmed through archival research and evaluation of aerial photography of the sites.

Evaluation of aerial photography has indicated the following area that may be sensitive from an archaeological perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in Table 1.

The heritage sensitivity does not indicate no-go areas in the maps, but rather the possibility of encountering heritage sites that will require further mitigation before construction commence.

Table 1: Landform to heritage matrix

LAND FROM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Pans	Dense LSA sites
Dunes	Dense LSA sites
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material

These findings provide the basis for the recommendation of further field truthing through an archaeological walk down and palaeontological desktop study covering the site. The aim of this will be to compile a comprehensive database of heritage sites in the study areas, with the aim of developing a heritage management plan for inclusion in the Environmental Management Plan as derived from the EIA.

Projected Impact Summary

Table 2 provides a summary of the projected impact rating for this project on heritage resources as derived from Section 4.2-4 of this report.

Table 2: Comparison of summarised impacts on environmental parameters

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Heritage resources	Impact during construction	51		24	
			High Negative Impact		Low Negative Impact

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HERITAGE SCOPING REPORT

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1 INTRODUCTION

PGS Heritage was appointed by SiVEST Environmental Division to undertake a Heritage Scoping Report that forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed development of Aletta wind energy facility near Copperton, Northern Cape Province

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites, finds and sensitive areas that may occur in the study area for the EIA study. The Heritage Impact Assessment (HA) aims to inform the Environmental Impact Assessment in the development of a comprehensive Environmental Management Plan 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 of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

PGS Heritage (PGS) compiled this Heritage Scoping Report.

The staff at PGS has a combined experience of nearly 80 years in the heritage consulting industry. PGS and its staff have extensive experience in managing the HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, Project manager for this project, is registered as a Professional Archaeologist with the Association of Southern African Professional Archaeologists (ASAPA) and has CRM accreditation within the said organisation, as well as being accredited as a Professional Heritage Practitioner with the Association of Professional Heritage Practitioners – Western Cape (APHP).

1.3 Assumptions and Limitations

The aim of the scoping document is to identify the possible types of heritage resources that might be present in the study area, as well as possible hotspots for the locality of such resources.

This report can in no way be seen as the final report and study phase for the EIA project and it assumes that a full ground truthing and survey will be conducted during the EIA phase of the project to identify heritage sites present in the impacted areas.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA), Act 107 of 1998

ii. National Heritage Resources Act (NHRA), Act 25 of 1999

iii. Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i) GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998
   a) Basic Assessment Report (BAR) – Regulations 19 and 23
   b) Environmental Scoping Report (ESR) – Regulation 21
   c) Environmental Impacts Assessment (EIA) – Regulation 23
   d) Environmental Management Programme (EMPr) – Regulations 19 and 23
ii) National Heritage Resources Act (NHRA) Act 25 of 1999
   a) Protection of Heritage Resources – Sections 34 to 36; and
   b) Heritage Resources Management – Section 38
iii) Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
   a) Section 39(3)

The NHRA (Act 25 of 1999) stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA (Act 25 of 1999) states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…" In addition, the NEMA (No 107 of 1998) and the GNR 982 (Government Gazette 38282, 14 December 2014) state that, "the objective of an environmental impact assessment process is to, … identify the location of the development footprint within the preferred site … focussing on the geographical, physical, biological, social, economic, cultural and heritage aspects of the environment" (GNR 982, Appendix 3(2)(c) emphasis added). In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive and legally compatible HIA report is compiled.

Refer to **Appendix A** for further discussions on heritage management and legislative frameworks

Table 3: Terminology

Acronyms	***Description***
AIA	Archaeological Impact Assessment
BP	Before present
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

Archaeological resources

This includes:

i. 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;

ii. 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;

iii. 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;

iv. 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:

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
ii. carrying out any works on or over or under a place;
iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
iv. constructing or putting up for display signs or boards;
v. any change to the natural or existing condition or topography of land; and
vi. 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, such as the caves with archaeological deposits identified close to both development sites for this study.

Holocene
The most recent geological time period which commenced 10 000 years ago.

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

Palaeontology
Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

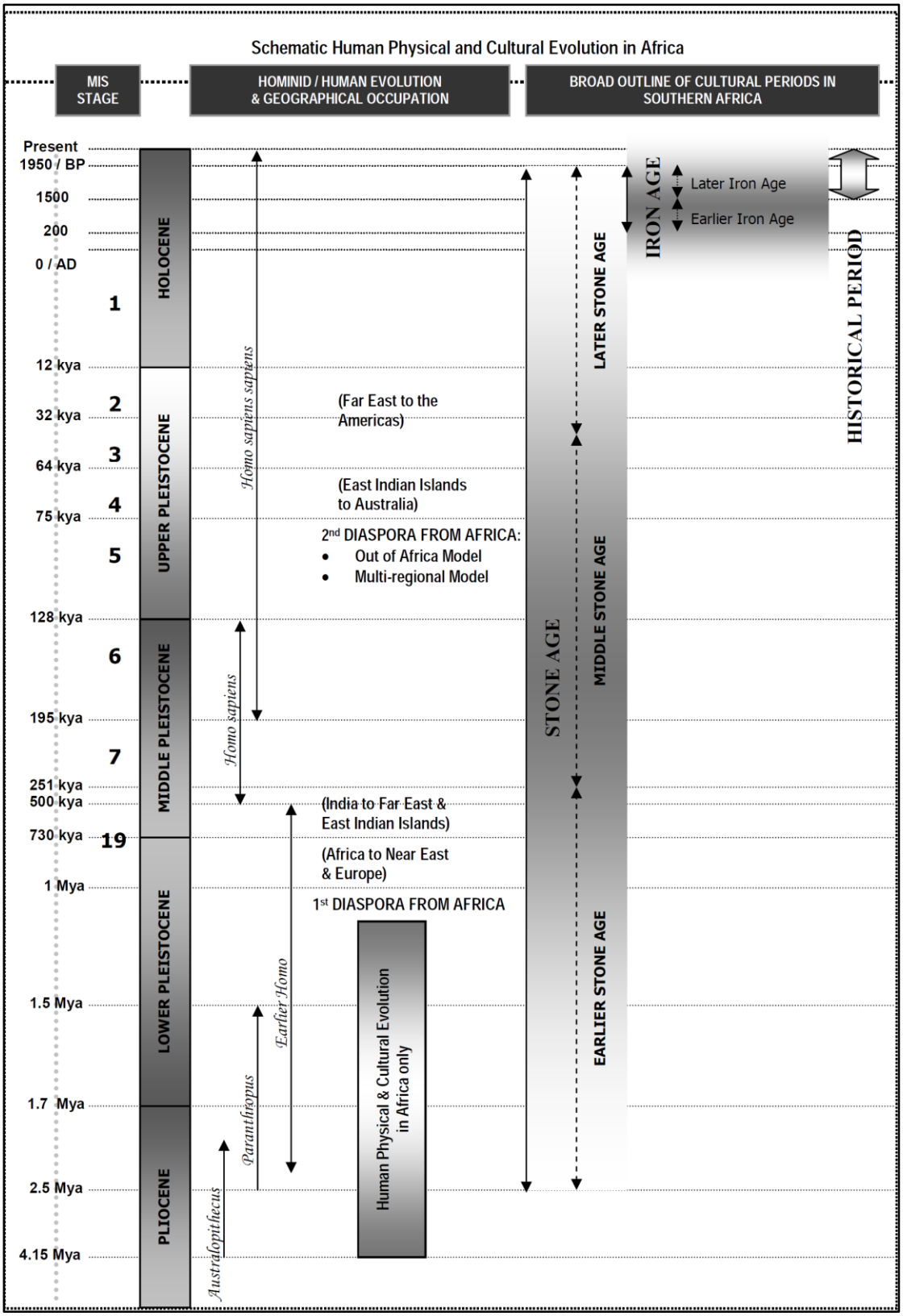

Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

The Aletta Wind facility will be located approximately 15km south-east of Copperton, in the Siyathemba Local Municipality within the Northern Cape Province. The wind development will consist of a 140MW wind facility. Additionally, a 132kV power line and substation will be required to connect the wind facility to the Eskom grid. This will be assessed as part of a separate Basic Assessment (BA). (Figure 2).

The project includes the following farms:

- The whole of the farm Drielings Pan No. 101

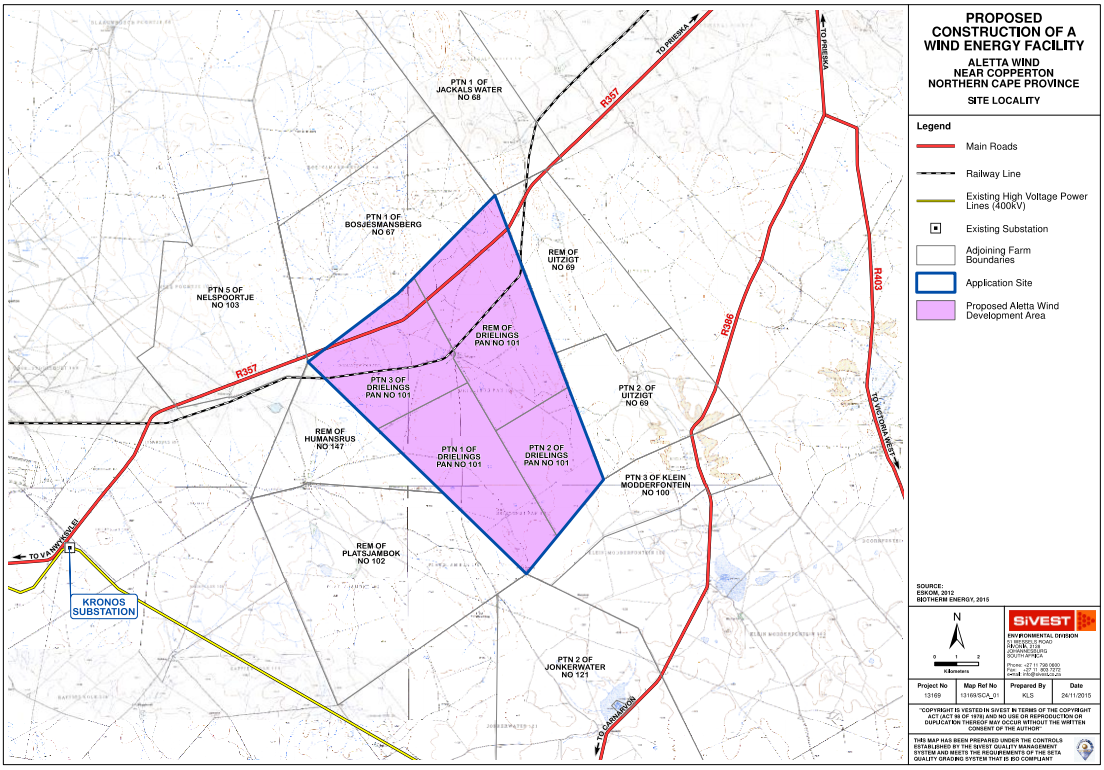

Figure 2 – Aletta WEF Locality

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

PGS Heritage (PGS) compiled this Heritage Scoping Document as part of the Heritage Impact Assessment (HIA) report for the proposed Aletta wind energy facility. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

3.1.1 Scoping Phase

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

3.1.2 Impact Assessment Phase

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by a qualified archaeologist, which aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

Appendix B, outlines the Plan of study for the Heritage Impact Assessment process, while **Appendix C** provides the guidelines for the impact assessment evaluation that will be done during the EIA phase of the project.

4 BACKGROUND RESEARCH

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.

4.1 Previous Studies

Researching the SAHRIS online database (http://www.sahra.org.za/sahris), it was determined that a number of other archaeological or historical studies have been performed within the wider vicinity of the study area. Previous studies listed for the area in the APM Report Mapping Project included a number of surveys within the area listed in chronological order below:

VAN RYNEVELD, K. 2006. Phase 1 Archaeological Impact Assessment - Vogelstruisbult 104, Prieska District, Northern Cape, South Africa. National Museum Bloemfontein

KAPLAN, J.M. 2010. Archaeological Scoping Study and Impact assessment of a proposed photovoltaic power generation facility in Copperton Northern Cape. Agency for Cultural Resource Management

KAPLAN, J.M. & WILTSHIRE, N. 2011. Archaeological Impact Assessment of a proposed wind energy facility, power line and landing strip in Copperton, Siyathemba municipality, Northern Cape. Agency for Cultural Resource Management

ATWELL, M. 2011. Heritage Assessment Proposed Wind Energy Facility And Related Infrastructure, Struisbult: (Farm 103, Portions 4 And 7), Copperton, Prieska, Atwell & Associates

ORTON, JAYSON. 2012a. Heritage Impact assessment for a proposed photovoltaic energy plant on the farm Klipgats Pan near Copperton, Northern Cape. Archaeology Contracts Office Department of Archaeology. University of Cape Town

ORTON, JAYSON. 2012b. Heritage Impact Assessment for a proposed photovoltaic energy plant on the farm Hoekplaas near Copperton, Northern Cape. Archaeology Contracts Office Department of Archaeology. University of Cape Town

ORTON, J & WEBLEY, L. 2013. Heritage Impact Assessment for Multiple Proposed Solar Energy Facilities on the Remainder of Farm Klipgats Pan 117, Copperton, Northern Cape

Van der Walt, Jaco. 2012. Archaeological Impact Assessment Report for the proposed Garob Wind Energy Facility Project, located close to Copperton in the Northern Cape. Heritage Contracts and Archaeological Consulting CC (HCAC)

FOURIE, W. 2012. Heritage Impact Assessment for the proposed Eskom Cuprum to Kronos Double Circuit 132kv Power line and Associated Infrastructure, Prieska, Northern Cape.

FOURIE, W. 2015. Heritage Impact Assessment for the proposed Helena 1 PV project, Copperton Northern Cape.

FOURIE, W. 2015. Heritage Impact Assessment for the proposed Helena 2 PV project, Copperton Northern Cape.

FOURIE, W. 2015. Heritage Impact Assessment for the proposed Helena 3 PV project, Copperton Northern Cape.

4.1.1 Findings from the studies

Palaeontology

The following map (**Figure 3**) is an extract from the palaeontological desktop study completed by Almond (2013) for the proposed solar project on the farm Bosjesmansberg 67, bordering on the north to the study area. The map indicates the main geological units as:

The main geological units mapped within the study region are:

i) Precambrian basement rocks (igneous / metamorphic): Reddish-brown with dots (Mu) = Uitdraai Formation (Brulpan Group)
ii) Karoo Supergroup sediments: Grey (C-Pd) = Mbizane Formation (Dwyka Group)
iii) Late Caenozoic (Quaternary to Recent) superficial deposits: Pale yellow (Qg) = Gordonia Formation (Kalahari Group)

Almond (2013), indicated that the, "underlain at depth by unfossiliferous Precambrian metasediments as well as by glacial sediments of the Dwyka Group that contain very few fossils (mainly reworked blocks of stromatolitic carbonate). The overlying superficial sediments (alluvium, gravels, aeolian sands, soils *etc*) are of low to very low palaeontological sensitivity. The impact significance of the solar facility development, *including* the transmission line options, on local fossil heritage resources is considered to be VERY LOW.

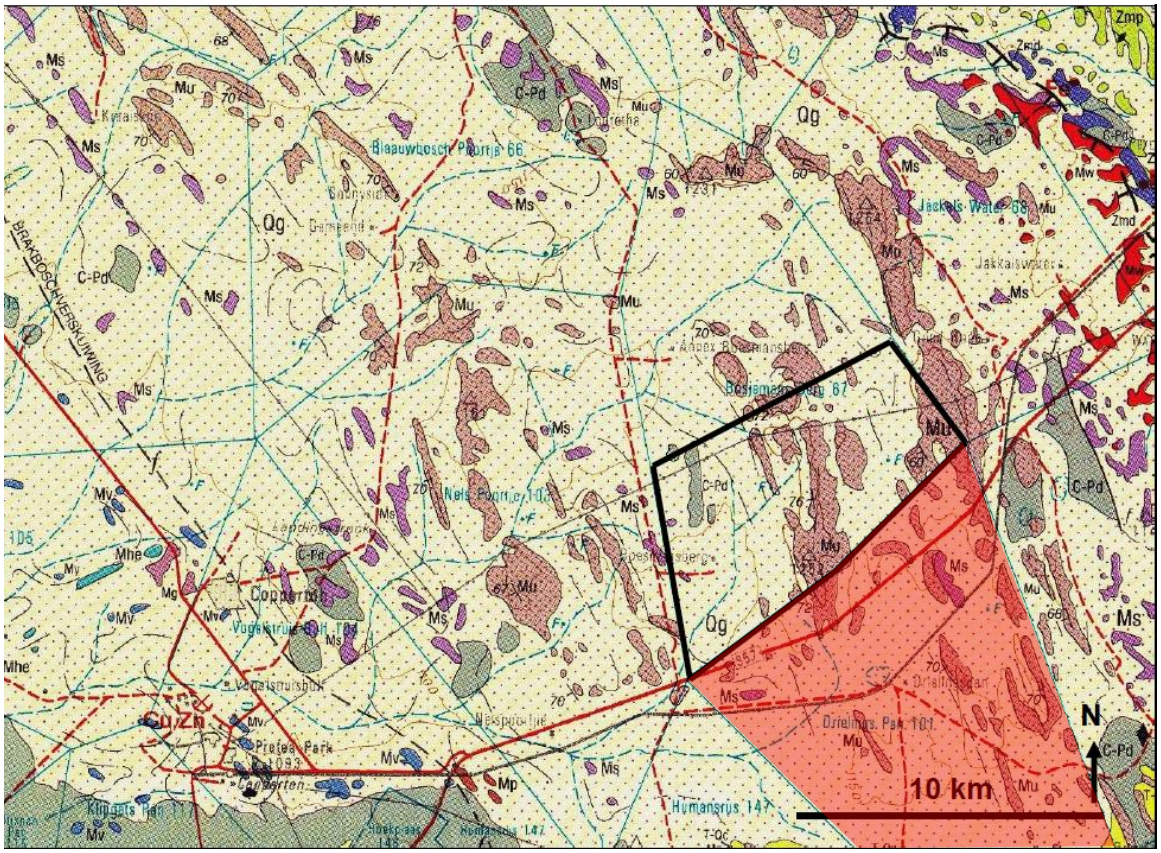

Figure 3 – 1: 250 000 geology sheet 3022 Britstown (Council for Geoscience, Pretoria) (Almond, 2013) The Outline of the current study in red

Archaeology

Most archaeological material in the Northern Cape is found near water sources such as rivers, pans and springs, as well as on hills and in rock shelters. Sites usually comprise of open sites where the majority of evidence of human occupation is scatters of stone tools (Parsons 2003). Evaluation of the alignment has identified possible sensitive areas.

The areas marked in blue and red (Figure 6**)** shows drainage lines and pans in the proposed development areas.

Since September 2011 a large number of Heritage and Archaeological Impact Assessments were completed in the vicinity of the proposed development area **(**Figure 7**)**. Most notably the work of Orton (2011, 2012 and 2013), Kaplan (2010) and Kaplan and Wiltshire (2011) and Van der Walt (2012), has confirmed the statement by Parsons (2003), as noted earlier.

Figure 4 - Early Stone Age stone tools found close to Kronos substation, just west of the study area

Orton (2012) notes that literature has shown that the Bushmanland area is littered by low density lithic scatters, with well weathered Early (ESA) and Middle Stone Age (MSA) artefacts dominating the assemblages. Orton's (2012 and 2013) and Fourie's (2012, 2013, 2015) work on the Klipgats Pan and Hoekplaas, has produced numerous find spots as well as clusters of site located on elevated terraces overlooking pan-like areas (identified as the drainage area as indicated in Figure 7**)**, noted by Orton as being of LSA origin.

Fourie (2015) notes that findspots were mostly characterised by three types of setting, deflated red sands, and pebble concentrations associated with a calcrete exposure and non-deflated red sand exposures in between low-density vegetation.

The findspots varied from Later Stone Age (LSA) scatters consisting of flakes, chips and some cores manufactured from fine-grained quartzite, chalcedony, and cryptocrystalline (ccs) material; Middle Stones Age (MSA) lithics consisting of cores, chips and flakes with a low occurrence of formal tools. The majority of the material utilised were either lideanite that occur in the form of medium sized boulders or round washed pebbles in the area or coarse-grained quartzite that occur as sporadic outcrops.

Earlier Stone Age (ESA) lithics found at some of these finds spots consisted of hand axes, cleavers and large flakes. Most of the lithics were either rolled or heavily weathered with patination evident on 95% of the lithics.

Figure 5 - Close-up view of quartzite flakes and debitage at Kr_Cu/2012/003 (Debitage and lithics indicate by dots) a site situated some 500 meters to the east of the study area (Fourie, 2013)

Kaplan and Wiltshire's (2011) work to the north of the study area has confirmed the presence of Stone Age Sites with a high local significance rating with the sites at Modderpan and Saaipan covering ESA, MAS and LSA finds. A number of knapping occurrences and find spots were also made during the fieldwork.

Van der Walt (2012) indicates that the fieldwork done for the HIA on Bosjesmansberg, adjacent to the study area has shown a high incidence of low density scatters all over the study area. Wiltshire (2011) indicates the presence of round stone built kraals, close or on low rises, that could possibly be associated with herder activity.

4.1.2 Historical structures and history

Some structures identified during map analysis (Figure 6) and needs to be investigated during the Impact Assessment phase.

4.1.3 Heritage sensitivities

The evaluation of the possible heritage resource finds and their heritage significance linked to mitigation requirements was linked to types of landscape. This enabled the development of a heritage sensitivity map (Figure 7). The heritage sensitivity rating does not indicate no-go areas but the possibility of finding heritage significant site that could require mitigation work.

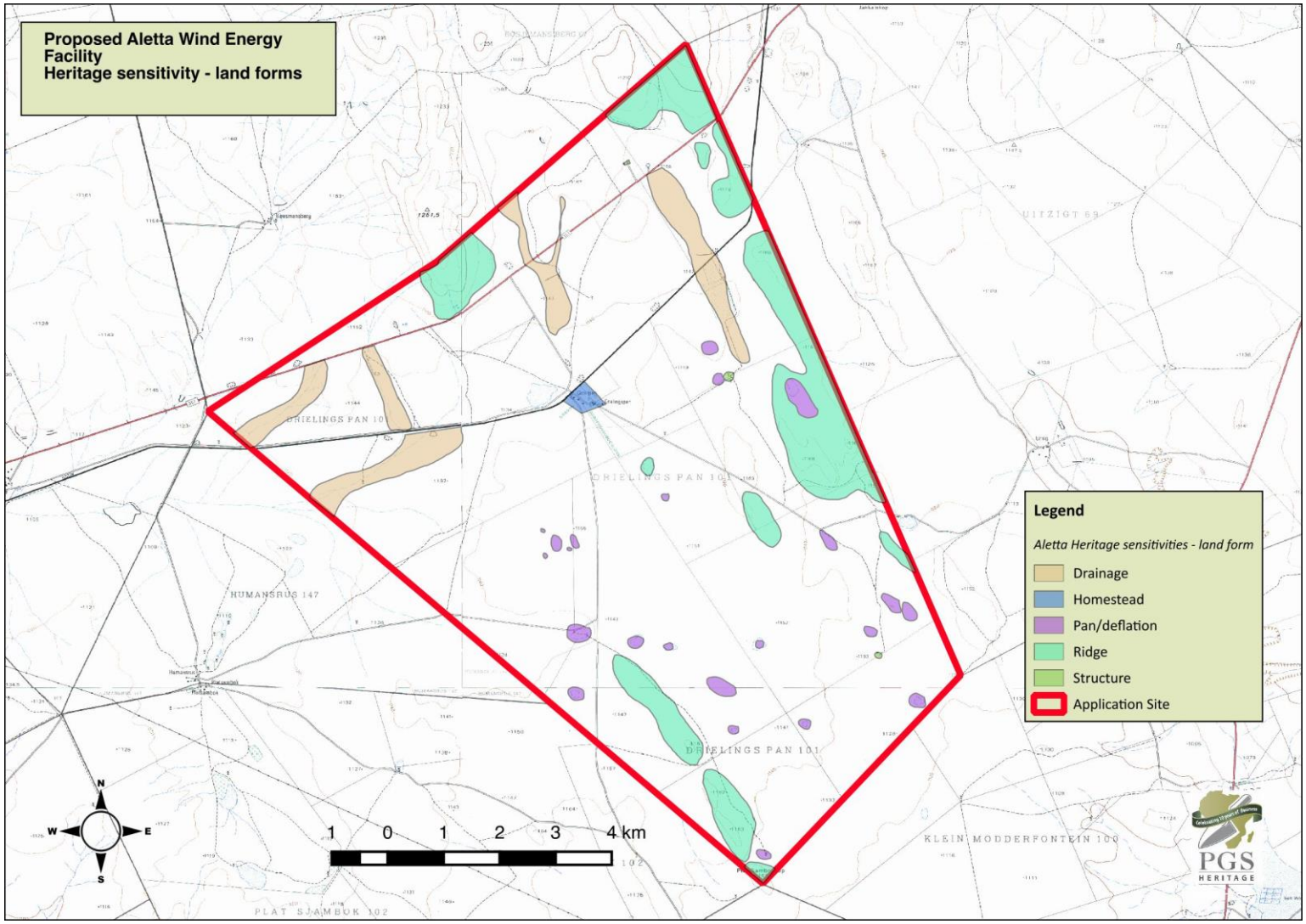

Figure 6 – Landforms linked to heritage resources

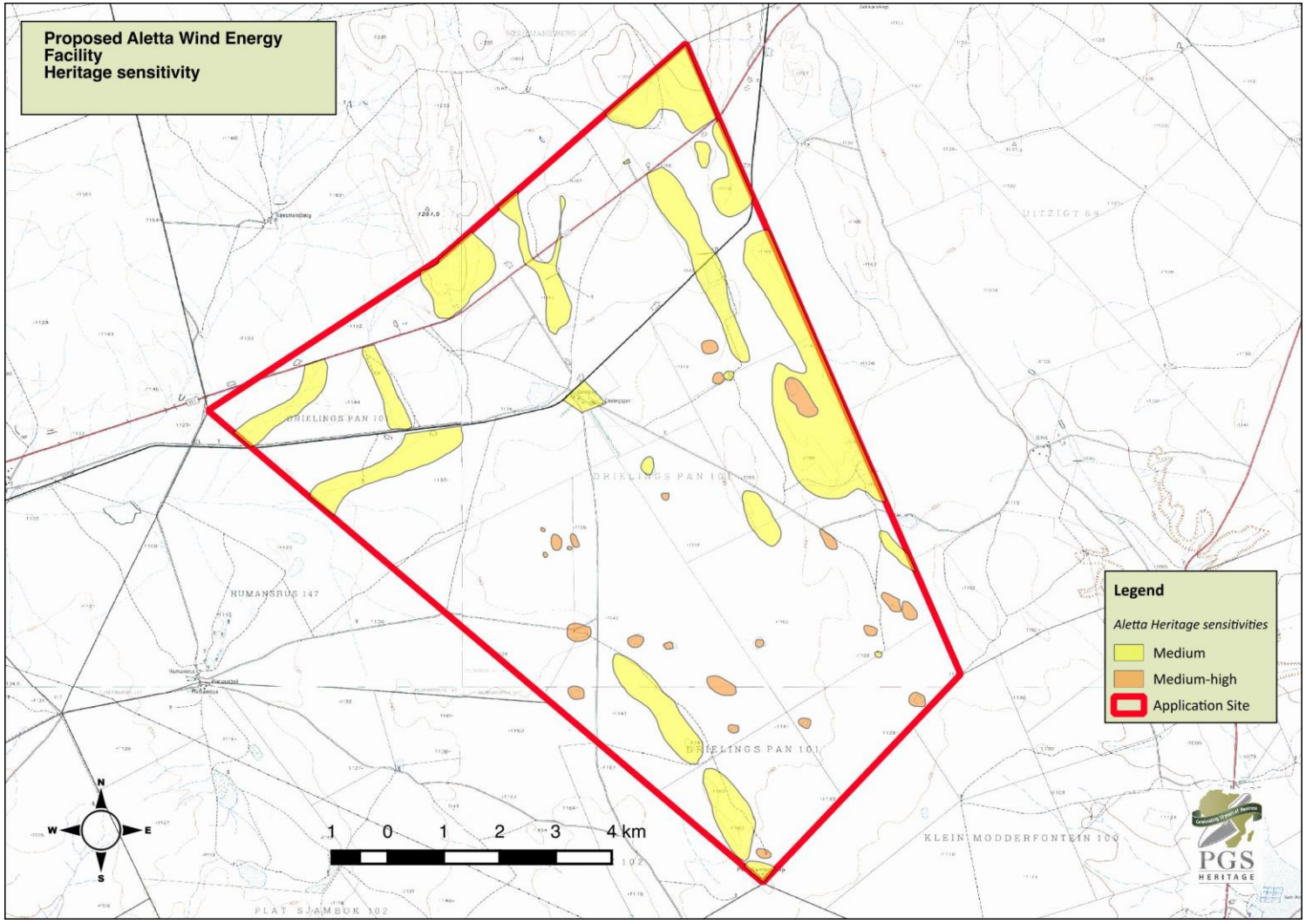

Figure 7 – Possible heritage sensitive areas

4.1.4 Possible finds

Evaluation of aerial photography has indicated the following area that may be sensitive from an archaeological perspective (**Figure 7**). The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in **Table 4**.

Table 4: Landform to heritage matrix

LAND FROM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Pans	Dense LSA sites
Dunes	Dense LSA sites
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material

To be able to compile a heritage management plan to be incorporated into the Environmental Management Plan the following further work will be required for the EIA.

- Archaeological walk through of the areas where the project will be impacting;
- Palaeontological desktop assessment of the areas and selective site visits where required by the palaeontologist;

4.2 Environmental Issues and Potential Impacts

ISSUE	Impact on archaeological sites
DISCUSSION	As seen from the archival work and discussion in section 4.1 the possibility of archaeological finds has been identified as being high and thus further field work is required to develop a comprehensive Heritage Management Plan. Finds in studies adjacent to the study area has indicated the need for comprehensive fieldwork.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified archaeological sites and the discovery of such sites during construction can seriously hamper construction timelines. Fieldwork can thus provide valuable information on such site in the study area and provide timeous management of such site through realignment of development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological walk down of impact areas
CUMULATIVE	The possible research opportunities due to the discovery of new

EFFECT	archaeological sites and the subsequent mitigation will provide valuable information on the Copperton archaeology.

ISSUE	**Impact on palaeontological sites**
DISCUSSION	The palaeontological potential of the area has been confirmed as being low
EXISTING IMPACT	Site impacted by existing developments such as transmission lines and road networks.
PREDICTED IMPACT	Unidentified palaeontological sites and the discovery of such sites during construction can seriously hamper construction timelines.
EIA INVESTIGATION REQUIRED	Further palaeontological desktop work will be conducted to augment the information for the HIA
CUMULATIVE EFFECT	None foreseen at this stage.

ISSUE	**Impact on historical sites**
DISCUSSION	As seen from the archival work and discussion in section 4.1 the possibility of historical finds have been identified and thus further fieldwork is required to develop a comprehensive Heritage Management Plan.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified historical structure and the discovery of such structures during construction can seriously hamper construction timelines. Fieldwork can thus provide valuable information on such site in the study area and provide timeous management of such site through realignment of development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological walk down of impact areas will identify possible impacted sites
CUMULATIVE EFFECT	None foreseen at this stage.

4.3 Projected impact assessment

The fieldwork from previous HIA's and AIA's in the surrounding areas have shown that the study area is characterised by a background scatter of Stone Age artefacts.

It must be kept in mind that this HSR and fieldwork could in no way identify all archaeological sites within the development footprint and as such it was has shown that the possibility of encountering Stone Age archaeological site is extremely high.

The following set of tables provide an assessment of the impact on heritage resources within the development foot print.

Table 5: Rating of impacts – Archaeological sites

IMPACT TABLE	
Environmental Parameter	*Heritage Resources – Archaeological resource*
Issue/Impact/Environmental Effect/Nature	*The possibility of encountering previously unidentified heritage resources and specifically Stone Age archaeological sites. As well as the impact on the identified archaeological sites*
Extent	*Will impact on the footprint area of the development*
Probability	*Fieldwork in the larger area, has shown that such a predicted impact will definitely occur*
Reversibility	*Due to the nature of archaeological sites the impact is seen as irreversible, however mitigation could enable the collection of enough information to preserve the data from such a site*
Irreplaceable loss of resources	*The development could lead to significant losses in unidentified and unmitigated site*
Duration	*The impact on heritage resources such as archaeological sites will be permanent*
Cumulative effect	*As the type of development impact on a large area, and other similar development in the area will also impact on archaeological sites the cumulative impact is seen as having a medium negative impact.*
Intensity/magnitude	*The large scale impact on archaeological sites and will require mitigation work.*
Significance Rating	*The overall significance rating for the impact on heritage resources is seen as high pre-mitigation. This can be attributed to the very definite possibility of encountering more archaeological sites as shown through fieldwork. The implementation of the recommended heritage mitigation measures will address the envisaged*

	impacts and reduce the overall rating to a low impact rating.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	4
Reversibility	2	2
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	3	2
Intensity/magnitude	3	2
Significance rating	-51 (high negative)	-24 (low negative)
Mitigation measures	• *Monitoring during construction by and archaeologist* • *Mitigation through archaeological excavations and collection* • *Walkdown of final power line route*	

Table 6: Rating of impacts – Palaeontological resources

IMPACT TABLE	
Environmental Parameter	*Heritage Resources – Palaeontological resources*
Issue/Impact/Environmental Effect/Nature	*The possibility of encountering previously unidentified fossils.*
Extent	*Will impact on the footprint area of the development*
Probability	*The fieldwork has shown that such a predicted impact will most probably not occur*
Reversibility	*Due to the nature of fossils the impact is seen as irreversible, however mitigation could enable the collection of enough information to preserve the data from such a site*
Irreplaceable loss of resources	*The development could lead to losses in unidentified and unmitigated fossils*
Duration	*The impact on heritage resources such as palaeontological sites will be permanent*
Cumulative effect	*As the type of development impact on a large area, and other similar development in the area will also impact on palaeontological sites the*

	cumulative impact is seen as having a low negative impact.	
Intensity/magnitude	*The large scale impact on palaeontological sites and may require mitigation work.*	
Significance Rating	*The overall significance rating for the impact on palaeontological resources is seen as medium pre-mitigation. This can be attributed to the very low possibility of encountering more fossil sites as shown through fieldwork. The implementation of the recommended heritage mitigation measures will address the envisaged impacts and reduce the overall rating to a low impact rating.*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	1	1
Reversibility	2	2
Irreplaceable loss	2	2
Duration	4	4
Cumulative effect	2	1
Intensity/magnitude	1	1
Significance rating	-12 (high negative)	-11 (low negative)
Mitigation measures	*None required*	

4.4 Cumulative Assessment

A large number of solar projects are proposed and some have been approved and is currently in construction around the study area. Section 4 identified finds and conclusions made by other HIA's from other project that has shown the vast distribution of Stone Age sites over the larger area around Copperton. Although some studies have proposed mitigation work only one report on mitigation work (Orton, 2014) for the Mulilo Prieska PV (Pty) Ltd development just south of the Coppertpm, has been completed at this stage.

The need for the implementation of the recommended mitigation measures is of great importance and must be seen in the context of the large areas to be impacted by the construction activity. By implementing the mitigation measures the cumulative effect will be reduce from a Medium to a Low negative impact rating.

4.5 Projected Impact Summary

Table 7 provides a summary of the projected impact rating for this project on heritage resources.

Table 7: Comparison of summarised impacts on environmental parameters

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Heritage resources	Impact during construction	51		24	
			High Negative Impact		Low Negative Impact

5 CONCLUSIONS AND RECOMMENDATIONS

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

The Heritage Scoping Report has shown that the proposed Aletta WEF projects may have heritage resources present on the property. This has been confirmed through archival research and evaluation of aerial photography of the sites.

Evaluation of aerial photography has indicated the following area that may be sensitive from an archaeological perspective (**Figure 7**). The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in **Table 4**.

The heritage sensitivity does not indicate no-go areas in the maps, but rather the possibility of encountering heritage sites that will require further mitigation before construction commence.

Table 8: Landform to heritage matrix

LAND FROM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Pans	Dense LSA sites
Dunes	Dense LSA sites
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material

These findings provide the basis for the recommendation of further field truthing through an archaeological walk down and palaeontological desktop study covering the site. The aim of this will be to compile a comprehensive database of heritage sites in the study areas, with the aim of

developing a heritage management plan for inclusion in the Environmental Management Plan as derived from the EIA.

5.1 Projected Impact Summary

Table 9 provides a summary of the projected impact rating for this project on heritage resources as derived from Section 4.2-4 of this report.

Table 9: Comparison of summarised impacts on environmental parameters

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Heritage resources	Impact during construction	51		24	
			High Negative Impact		Low Negative Impact

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Appendix A

LEGISLATIVE PRINCIPLES

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

3.1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the new legislation, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources are integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have interest in the graves: they may be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle will be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the developer's cost. Thus, developers will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection, to all historic and pre-historic cultural remains, including graves and human remains.

3.2 Graves and cemeteries

Graves younger than 60 years fall under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the Office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning, or in some cases the MEC for Housing and Welfare. Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. In order to handle and transport human remains the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

Appendix C

Heritage Assessment Methodology

The section below outlines the assessment methodologies utilised in the study.

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage (PGS) for the proposed Aletta WEF projects will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the NHRA (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consists of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site.

- Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by qualified archaeologists, aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

- Step III – The final step involved the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment 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^2
        - Medium - 10-50/50m^2
        - High - >50/50m^2
- **uniqueness** and
- **potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate pylon position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table 10: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	Grade 4C	Low Significance	Destruction

Appendix C

Impact Assessment Methodology to be utilised during EIA phase

Methodology for Impact Assessment

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

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 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

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

- planning
- construction
- operation
- 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 mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 11: Description

NATURE		
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.		
GEOGRAPHICAL EXTENT		
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
PROBABILITY		
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).
REVERSIBILITY		
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.

IRREPLACEABLE LOSS OF RESOURCES		
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.
DURATION		
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).

CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect, which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY/ MAGNITUDE		
Describes the severity of an impact		
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.

SIGNIFICANCE		
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: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) 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 Significance Rating**	**Description**
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	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".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The 2010 regulations also specify that alternatives must be compared in terms of impact assessment.