HERITAGE IMPACT ASSSESSMENT

BASIC ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF SUPPORTING ELECTRICAL INFRASTRUCTURE FOR THE VICTORIA WEST WIND FARM, VICTORIA WEST, NORTHERN CAPE PROVINCE

Report prepared for:

CSIR – Environmental Management Services

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Report prepared by:

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South Africa

4 March 2016

SPECIALIST EXPERTISE

Name:	Wouter Fourie
Profession:	Archaeologist
Date of birth:	1974-04-30
Parent Firm:	PGS Heritage
Position at Firm:	Director
Years with firm:	14
Years of experience:	19
Nationality:	South African

EDUCATION:

Name of University or Institution :		University of Pretoria
Degree obtained	:	BA
Major subjects	:	Archaeology, Geography and Anthropology
Year	:	1996

Name of University or Institution :		University of Pretoria
Degree obtained	:	BA [Hons] (Cum laude)
Major subjects	:	Archaeology and Geography
Year	:	1997

Name of University or Institution :		National Nuclear Regulator
Certificate obtained	:	Radiation Protection Officer Certificate
Year	:	1999

Name of University or Institution :		University of Cape Town
Certificate obtained	:	Project Management Foundations short course
Year	:	2015

Name of University or Institution :		University of Cape Town
Certificate obtained	:	MPhil – Conservation of Buil Environment
Year	:	Current

PROFESSIONAL QUALIFICATIONS:

Professional Heritage Practitioner – Association of Professional Heritage Practitioners (APHP)
Professional Archaeologist – Association of Southern African Professional Archaeologists – Professional Member – No 043

CRM Accreditation
Principal Investigator – Grave Relocations
Field Director – Iron Age
Field Supervisor – Colonial Period and Stone Age
Accredited with Amafa KZN

KEY QUALIFICATIONS
Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Project management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems

HERITAGE IMPACT ASSESSMENTS

International

2013 -2016 – SLR Consulting – Heritage Impact Assessment, Manica Gold Project, Manica Province, Mozambique

2012 – SLR Consulting – Heritage Impact Assessment, Namoya SALR – Gold Mine, Maniema Province in the eastern Democratic Republic of Congo (DRC)

2010 – Digby Wells & Associates – Grave Relocation Procedures and Consultation – RAP Process, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo

2010 – Digby Wells & Associates – Archaeological Study, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo

2012 – Consolidated Contractors Group S.A.L. –Mitigation and Grave Relocation at Site 37-A3-16 on the Mahalpye to Kudumatse Road Construction Project Central District, Botswana

2008 – Digby Wells & Associates – Mmamabula Mining Project CIC, Botswana

South African

Below a selected list of over 400 heritage studies completed

Aurecon,GRAP103 – Heritage Register for the Ekurhuleni Metropolitain Municipality, Aurecon

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Humansrus Solar Park, Daniëlskuil, Northern Cape

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Rooipunt Solar Park, Upington, Northern Cape

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Arriesfontein Solar Park, Daniëlskuil, Northern Cape

Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Slypklip Solar Park, Kimberley, Northen Cape

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Loeriesfontein Solar Park, Northern Cape

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, De Aar Solar Park, Northern Cape

Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Droogefontein Solar Park, Kimberley, Northern Cape

Kumba Iron Ore (Synergistics), Heritage Impact Assessment, Shishen Relocation Project, Northern Cape

Eskom, Archaeological Walkdown, Hydra-Perseus Transmission line (260km), Northern Cape Province

Nature Conservation Corporation, Phase 2 Heritage Impact Assessment and EMP, Gamma-Omega Transmission line (550km), Western Cape Province

Aurecon, Archaeological Walk Down and EMP, Eros- Neptune Transmission Line (380km), Transkei, Eastern Cape Province

Nature Conservation Corporation, Phase 2 Heritage Impact Assessment and EMP, Hydra-Perseus Transmission line (260km – selected areas), Northern Cape Province

GCS (Pty) Ltd, Archaeological Impact Assessment, Tormin Mineral Sands, Namakwaland Coast, Western Cape

Strategic Environmental Focus, Heritage Impact Assessment, Kalahari Manganese, Hotazel, Northern Cape

SUMMARY OF OTHER EXPERIENCE

Positions Held

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

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

2000-2004: CEO– Matakoma Consultants

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

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

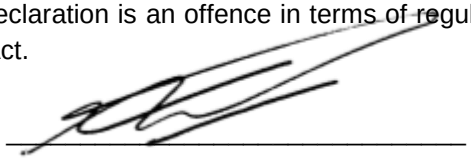
2003 – 2015: Director - Professional Grave Solutions (Pty) Ltd t/a PGS Heritage

Director - Professional Grave Solutions Botswana (Pty) Ltd

SPECIALIST DECLARATION

I, Wouter Fourie., as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, 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 have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- 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 have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: 

Name of Specialist: Wouter Fourie – PGS Heritage (Pty) Ltd

Date: 4 March 2016

EXECUTIVE SUMMARY

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

The Heritage Impact Assessment has shown that the proposed infrastructure corridor contain heritage resources. This has been confirmed through archival research, evaluation of aerial photography of the site and a site visit. The analysis of the studies previously undertaken in the area assisted in the development of the following landform type to heritage find matrix .

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

The fieldwork that covered the proposed supporting infrastructure corridor covered approximately 20 km in total with an evaluation field of 20 meters for small finds (10 meters either side of the archaeologist) and 100 meters for larger finds such as marked cemeteries and historical structures (50 meters either side of the archaeologist).

A total of 2 heritage related sites were logged, namely a farmstead and one Stone Age find spot.

Farmstead
The Uitvlugtfontein farmstead (**VW001**), now abandoned, consisting of a main residential house, shed, barn (waenhuis) and associated stock pens. The farmstead is shielded by trees on the north-western and southern sides, excluding the stock pens and its associated barn. The main residence, although abandoned, is still in good order and an example of the vernacular Karoo farmstead. The out buildings, sheds and stocks pens have retained their original function and construction and are estimated to be older than 60 years.

Stone Age find spot
The find spot consisted of a medium density scatter of lithics (**VW002**). The site was situated within the wildlife camp on a flat sandy plain which is arched north east to north west by a dried river, the shortest distance from the river being about 280 m to the north. The heavily patinated MSA stone tool consisted of blades, side scrapers and cores with many chips all from hornfels.

Impact Assessment
Possible impacts identified during the study and mitigation measures proposed are:

- Impact on unidentified heritage resources
    - An archaeological and palaeontological walkdown of the final infrastructure alignment;
    - Incorporate a chance finds protocol and heritage resources induction in to the EMPr of the project; and
    - Document and implement further mitigation measures on heritage sites identified during the walk downs and also those discovered during construction.
- Impact on historical structures
    - Demarcate the site as a no-go area during construction.
- Impact on cultural landscape
    - Consider relocating the power line alignment as far as possible within the corridor, to the south of the current farmstead

These impacts are envisaged during the construction phase and with the implementation of appropriate mitigation measures will only be relevant during the construction phase and the significance thereof would be considered to be low to very low.

Cumulative Impacts

Due to the nature of heritage resources that occur in the vast majority of cases subsurface or as feint markers in the landscape the possibility of finding previously unidentified heritage resources such as archaeological material, graves and fossils do exist. Heritage resources are seen as irreplaceable and the impact on such resources without mitigation measures can be seen as **low**, depending on the type and rarity of such a resource.

The proposed additional infrastructure will probably not add to the cumulative impacts foreseen in the larger study area that includes the Victoria West WEF. By implementing the recommended mitigation measures as indicated for the construction phase.

By implementing the proposed measures, the impact significance post mitigation can be reduced to **very low**.

Taking the evaluation of the possible impacts in to account there is no reason why the proposed power line and infrastructure should not be authorised with the implementation of the recommended mitigation measures.

LIST OF ABBREVIATIONS

AIA	Archaeological Impact Assessment
ASAPA	Association of Southern African Professional Archaeologists
CMPr	Conservation Management Programme
CRM	Cultural Resource Management
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LIA	Late Iron Age
LSA	Later Stone Age
MSA	Middle Stone Age
MW	Mega Watt (1,000,000 Watts)
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PGS	PGS Heritage (Pty) Ltd
PIA	Palaeontological Impact Assessment
PHRA	Provincial Heritage Resources Authority
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

GLOSSARY

Definitions	
Archaeological resources	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 a 10m buffer area; 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, technological value or significance.
Development	This means any physical intervention, excavation or action other than

	those caused by natural forces, which may according to the heritage agency result in a change to the nature, appearance or physical nature of a place or influence its stability & 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
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
Later Stone Age	The archaeology of the last 20 000 years, associated with fully modern people (Figure 1)
Late Iron Age (Early Farming Communities)	The archaeology of the last 1000 years up to the 1800's associated with ironworking and farming activities such as herding and agriculture (Figure 1).
Living/Intangible Heritage	This means the intangible aspects of inherited culture, and may include- (a) cultural tradition; (b) oral history; (c) performance; (d) ritual; (e) popular memory; (f) skills and techniques; (g) indigenous knowledge systems; and (h) the holistic approach to nature, society and social relationships
Palaeontology	Any fossilised remains or fossil trace of animals or plants which lived in the geological past and any site which contains such fossilised remains or trace.

Human and Cultural Time line in Africa

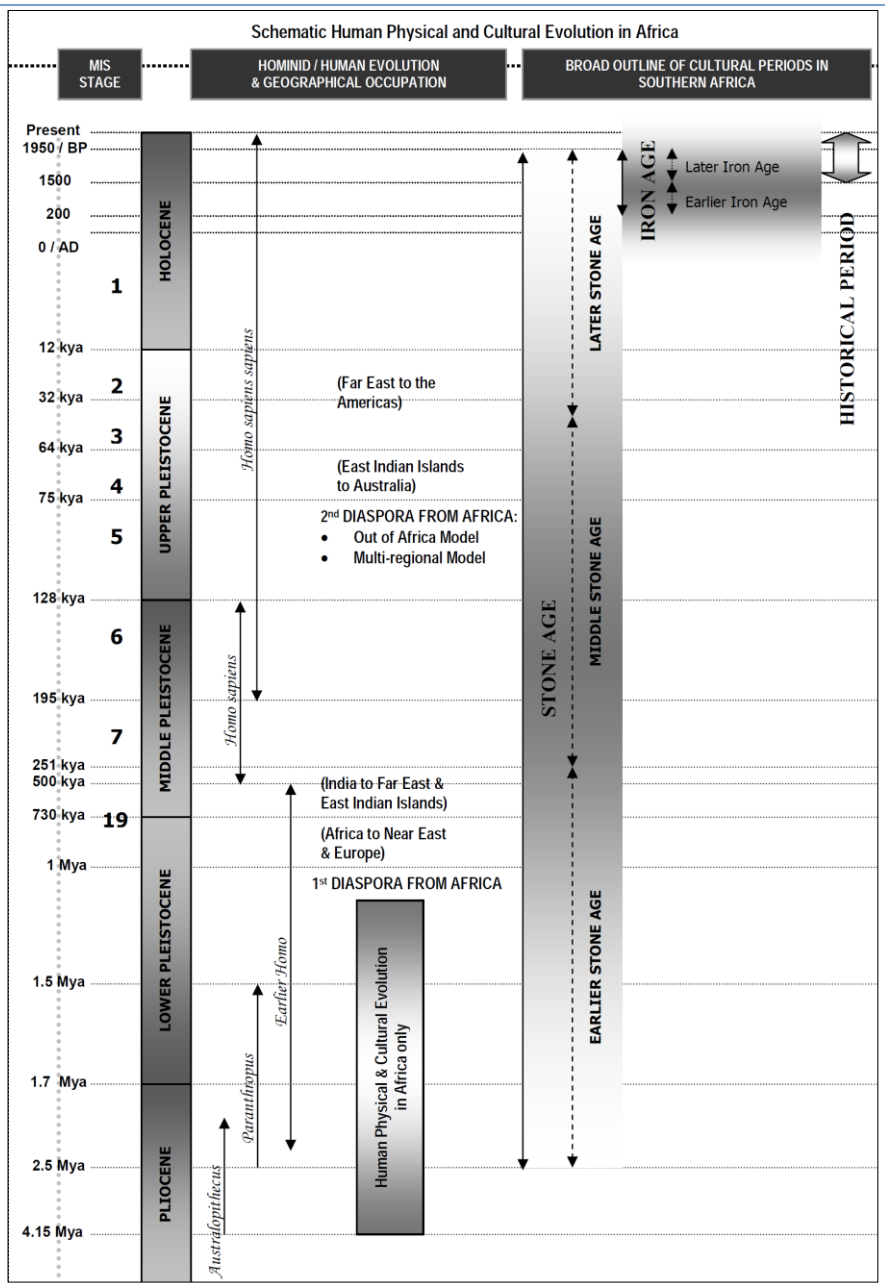


Figure 1: Human and Cultural Time line in Africa (Morris, 2008)

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R982	**Addressed in the Specialist Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 1 and 2
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 2
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.1
e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	Section 1.1
f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 1.2
g) an identification of any areas to be avoided, including buffers;	Section 1.2.3- 1.2.5
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;	Appendix C
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.1.4
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;	Section 1.4
k) any mitigation measures for inclusion in the EMPr;	Section 1.7
l) any conditions for inclusion in the environmental authorisation;	Section 1.8
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 1.8 and Appendix D
n) a reasoned opinion- i. as to whether the proposed activity or portions thereof should be authorised; and ii. if the opinion is that the proposed activity 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;	Section 1.8
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	N/A

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HERITAGE IMPACT ASSESSMENT

1.1. INTRODUCTION AND METHODOLOGY

1.1.1. Scope and Objectives

PGS Heritage (PGS) was appointed by CSIR – Environmental Management Services to undertake a Heritage Impact Assessment (HIA) Study that forms part of the Basic Assessment (BA) for the proposed construction of supporting infrastructure for the Victoria West Wind Farm (WEF), Victoria West, Northern Cape Province

The aim of the study is to identify possible heritage sites, finds and sensitive areas that may occur in the study area for the BA study. The Heritage Impact Assessment (HIA) aims to inform the BA in the development of a comprehensive Environmental Management Programme (EMPr) 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).

1.1.2. Terms of Reference

The purpose of the specialist study was to undertake a HIA and recommend mitigation measures for any heritage resources that would be adversely affected by the development of the proposed construction of supporting electrical infrastructure for the Victoria WEF, Victoria West, Northern Cape Province.

The terms of reference included the following:

- Describe the existing area to be directly affected by the proposals in terms of its current cultural, historical, archaeological and palaeontological characteristics and the general sensitivity of these components to change.
- Describe the likely scope, scale and significance of impacts on the cultural, historical, archaeological and palaeontological components as may be associated with the proposals.
- Describe the likely scope, scale and significance of impacts on the cultural, historical, archaeological and palaeontological components of the area associated with the construction process.
- Make recommendations on the scope of any mitigation measures that may be applied prior to and/or during construction to avoid/reduce the significance of the identified construction-related impacts.
- Describe the likely scope, scale and significance of impacts associated with the operation or use of the proposed power lines on the cultural, historical, archaeological and palaeontological components, including the benefits and detriments.
- Make recommendations on the scope of any mitigation measures that may be applied to avoid/reduce the significance of the operations-related impacts. These mitigation measures could also be design recommendations as well as operational controls, monitoring programmes, management procedures and the like.
- Identify any rehabilitation measures that can be reasonably applied with the completion of the construction works.
- Broadly describe the implications of a ‘No-Go’ option where the proposals are not established.

- To comment broadly on the cumulative cultural, historical, archaeological and palaeontological impacts associated with the proposals.
- Confirm if there are any outright fatal flaws to the establishment of the proposals proposed power lines from a cultural, historical, archaeological and palaeontological perspective.
- Undertake a desktop study and a site visit to achieve the objectives described above.

1.1.3. Approach and Methodology

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

PGS compiled this HIA report for the proposed development. 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) and the South African Heritage Resources (SAHRA) guidelines for Archaeological Impact Assessments (2007). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey leans on information gathered for the larger study area.

Step II – Physical Survey: A physical survey was conducted on foot and by vehicle through the proposed alignments by qualified archaeologists (March 2015), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint. The fieldwork was based on an overall field visit and does not constitute a walk down of the final alignment.

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.

The fieldwork covered the supporting infrastructure corridor of approximately 20 km with an evaluation field of 20 meters for small finds (10 meters either side of the archaeologist) and 100 meters for larger finds such as marked cemeteries and historical structures (50 meters either side of the archaeologist). The survey was conducted over 1 day (29 February 2016) over the extent of the central part of the corridor alignment. It must be stressed that the extent of the fieldwork was based on the available field time and was aimed at determining the heritage character of the area.

1.1 Significance assessment methodology

The significance of heritage sites was based on five 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 - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- 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 development 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 (see **Table 2**).

Table 2: 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	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 4A	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	Grade 4B	Medium	Recording before destruction
Generally Protected C (GP.C)	Grade 4C	Low	Destruction

1.1.4. Assumptions and Limitations

Not detracting in any way from the fieldwork undertaken, it is necessary to realise that the heritage sites located during the fieldwork do not necessarily represent all the heritage sites present within the area. Should any heritage feature or objects not included in the 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.

1.1.5. Source of Information

Information used in the HIA includes:

- Baseline information from the completed and approved HIA (Halkett and Webley, 2011)
- Google Earth Imagery (accessed march 2016)
- South African Heritage Resources Information system (SAHRIS)
- 1:50 000 topographical maps from the Surveyor General
- Process information sourced from the client.

1.1.6. Project description

Project components included within the Basic Assessment Process:

- 132 kV distribution line (± 20 km in length) (see **Appendix A** for drawings);
- A collector substation 200x200 m (see **Appendix B** for an indicative drawing);
- A laydown area;
- An Operations and Maintenance Area;
- Widening of existing roads (roads are currently ± 4 m).

Table 3: Farm portions affected by the proposed transmission line

Portion No	Farm Name
1/265	UIT VLUGT FONTEIN
RE/218	BULTHOUDERSFONTEIN
RE/217	BULTFONTEIN
RE/265	UIT VLUGT FONTEIN
RE/3	SCHIETKUIL
1/3	SCHIETKUIL

1.2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

1.2.1. Description of environment

The proposed alignment and infrastructure is situated 25-35 kilometers east of the town of Victoria West. The alignment and proposed substation positions start on the Remaining Extent of Bultfontein Farm 217 in the area of the approved Victoria West WEF. The collector substation, laydown area and O&M buildings alternatives and the start of the supporting infrastructure corridor are situated on the eastern slopes of the Bultfontein Farm plato.

The alignment then continues south-west until it crosses the R63 where it continues east towards the N1 tothe farms Portion 1 Uit Vlugt Fontein Farm 265 and Remaining Extent of Schietkuil Farm 3 on which the Gamma Eskom substation is located.

Figure 2: General views of the alignment of the proposed 132kV powerline

1.2.2. Historical and archaeological background

Previous archaeological and HIAs conducted in the vicinity of the proposed alignment (Smith, 2008, PGS, 2010, Halkett & Webley, 2011 and Murimbika, 2014) have shown a rich archaeological and historical history.

The archaeological epoch spans the Earlier Stone Age (ESA), through the Middel Stone Age (MSA) to the Later Stone Age (LSA). Smith (2008) refers to studies conducted by Sampson (1986a) as part of the Seacow River Valley Project that studied the entire catchment of the Seacow River some 70 kilometres to the east of the Gamma Substation. The study produced and amazing 16,000 sites most relating to pastoral sites. The study indicates that some sites of pastoral origin were found in the Victoria West / Beaufort West areas. This was corroborated during the 2010 study conducted by PGS where numerous herder sites dating to the LSA were discovered in the low ridges to the south of the current study area.

Further important archaeological finds are the Victoria West prepared core industry site first identified by the Magistrate of Victoria West, F.J Jansen, in 1915. This site is close to the current day Victoria West (Smith 1919).

On the farm Modderfontein some 11 kilometers to the south of the study area numerous rock engraving associated with herder as well as colonial era inhabitants were discovered (PGS, 2010)

1.2.3. Possible heritage finds

Evaluation of aerial photography has indicated areas in the supporting infrastructure corridor that may be sensitive from a heritage resources perspective. Archaeological surveys and studies in the Northern Cape have shown rocky outcrops, dry river, riverbanks and confluence to be prime localities for archaeological finds and specifically Stone Age sites(Orton, 2012; Fourie, 2015).

Based on aerial photography, the following have been referenced as having possible heritage sensitivity (shown in Figure 3 below):

Drainage lines
Drainage lines, such as dry river beds, erosion dongas as well as sheet erosion has been shown to yield rich archaeological deposits due to the exposure of archaeological material as well as the fact that human settlement is drawn to water sources in arid regions (Kruger 2012; Orton 2012; PGS 2012).

Farmsteads
Most of the farmsteads in the study area date from the mid to late 1800's and are of great historical and significance (Kruger 2012; Orton 2012; PGS 2012).

Pans
Previous research in the Northern Cape has shown that as with drainage line and rivers, human occupation is drawn to pans and ephemeral water sources by the chance of water and of hunting due to the availability of game in such areas.

Ridges
Numerous ridges, koppies and mountains have been identified in the study area and are associated with human settlement and activity. Stonewalling from herders, rock engravings and knapping sites associated with Later Stone Age manufacturing technology is known to occur in these areas (Arthur, 2008, Kruger 2012; Orton 2012; PGS 2011 and 2012, Van Ryneveld 2008).

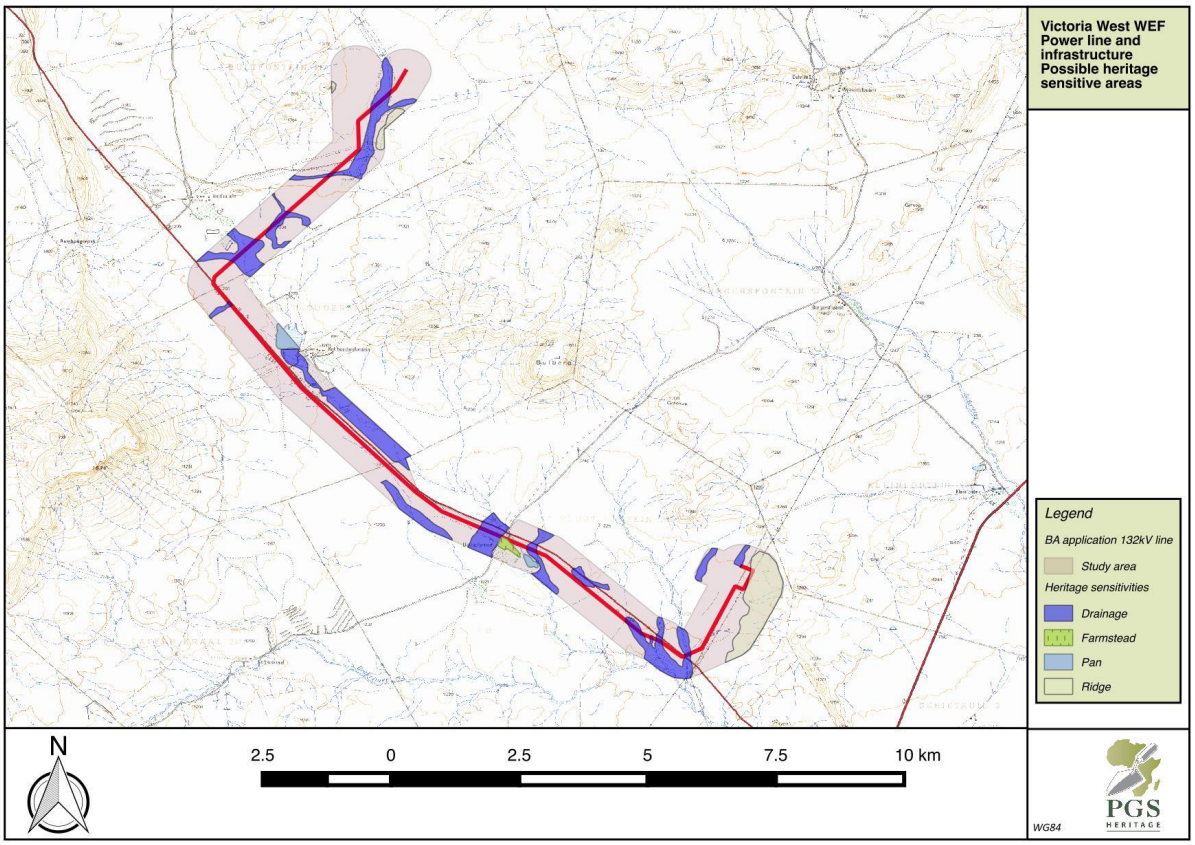

Figure 3: Possible heritage sensitive landscapes

1.2.4. Palaeontological background

The palaeontological desktop assessment completed for the WEF by Dr. John Almond (2010) covered the study area for the proposed powerline alignment and infrastructure. The study concludes that:

"*Bedrock excavations made during construction of the proposed WEF southeast of Victoria West will primarily affect continental sediments of the Late Permian Beaufort Group (Teekloof Formation). These sediments underlie the great majority of the study area and are renowned for their rich fossil heritage of terrestrial vertebrates (most notably mammal-like reptiles or therapsids), as well as fish, amphibians, molluscs, trace fossils (e.g. trackways) and plants (e.g. petrified wood). The Teekloof Formation stratigraphic interval represented in the study area is of special palaeontological significance in that it contains a record of the disastrous End-Guadalupian Mass Extinction Event some 260.4 million years ago. The palaeontological sensitivity of these Beaufort Group rocks is therefore considered to be very high. Caenozoic surface sediments in the study area (e.g. alluvium, colluvium) are generally of low palaeontological sensitivity, but local concentrations of scientifically valuable fossils (e.g. mammalian bones, teeth) may also occur here."* (Figure 4))

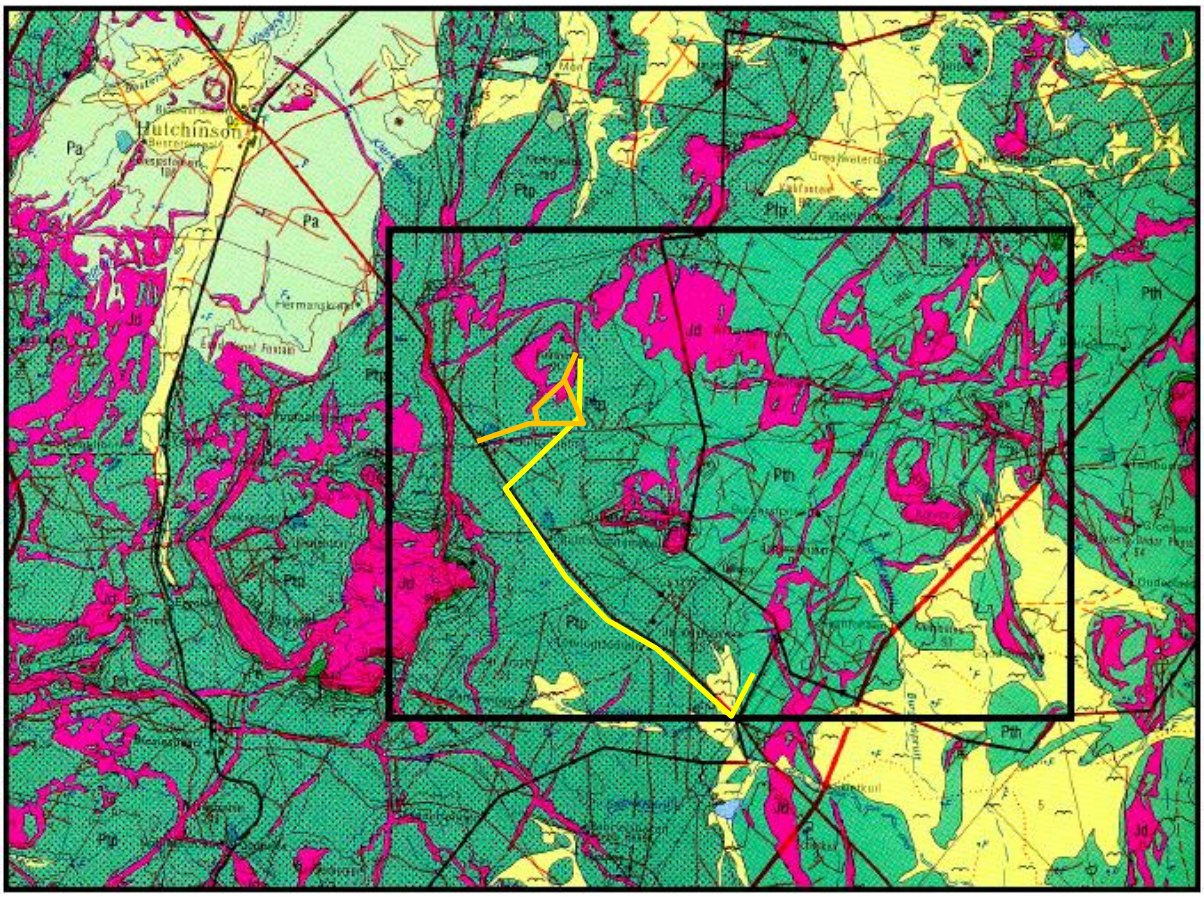

Figure 4: Extract from 1: 250 000 geology sheet 3122 Victoria West showing geology of the study region (black rectangle) southeast of Hutchinson, on the northwest side of the N1 national road (Almond, 2011) – *project layout indicated in yellow and orange line*

1.2.5. Results of the Field Study

The field work was completed on the 29th of February 2016 by a team of archaeologists form PGS. The fieldwork consisted of a walk down of the centre alignment of the corridor and deviations where possible heritage features were identified in the landscape. The fieldwork activity was tracklogged and a map with the field tracklogs depicted is attached in **Appendix C**.

During the fieldwork only two site of heritage significance as identified. The sites are that of a farmstead (**VW001**) situated in the central part of the alignment just south of the R63 and a high density LSA scatter (**VW002**) close to the Option 2 substation on the proposed access road to the substation.

VW001

GPS coordinate: S31° 40' 20.5" E23° 21' 49.1"

The Uitvlugtfontein farmstead (**VW001**), now abandoned, consisting of a main residential house, shed, barn (waenhuis) and associated stock pens. The farmstead is shielded by trees on the north-western and southern sides, excluding the stock pens and its associated barn. The main residence, although abandoned, is still in good order and an example of the vernacular Karoo farmstead. The out buildings, sheds and stocks pens have retained their original function and construction and are estimated to be older than 60 years. The SG diagram (**Figure 5**) dating from 1835 shows the original farmstead some 900 meters to the south of the current farmstead, which most probably replaced the original farmstead.

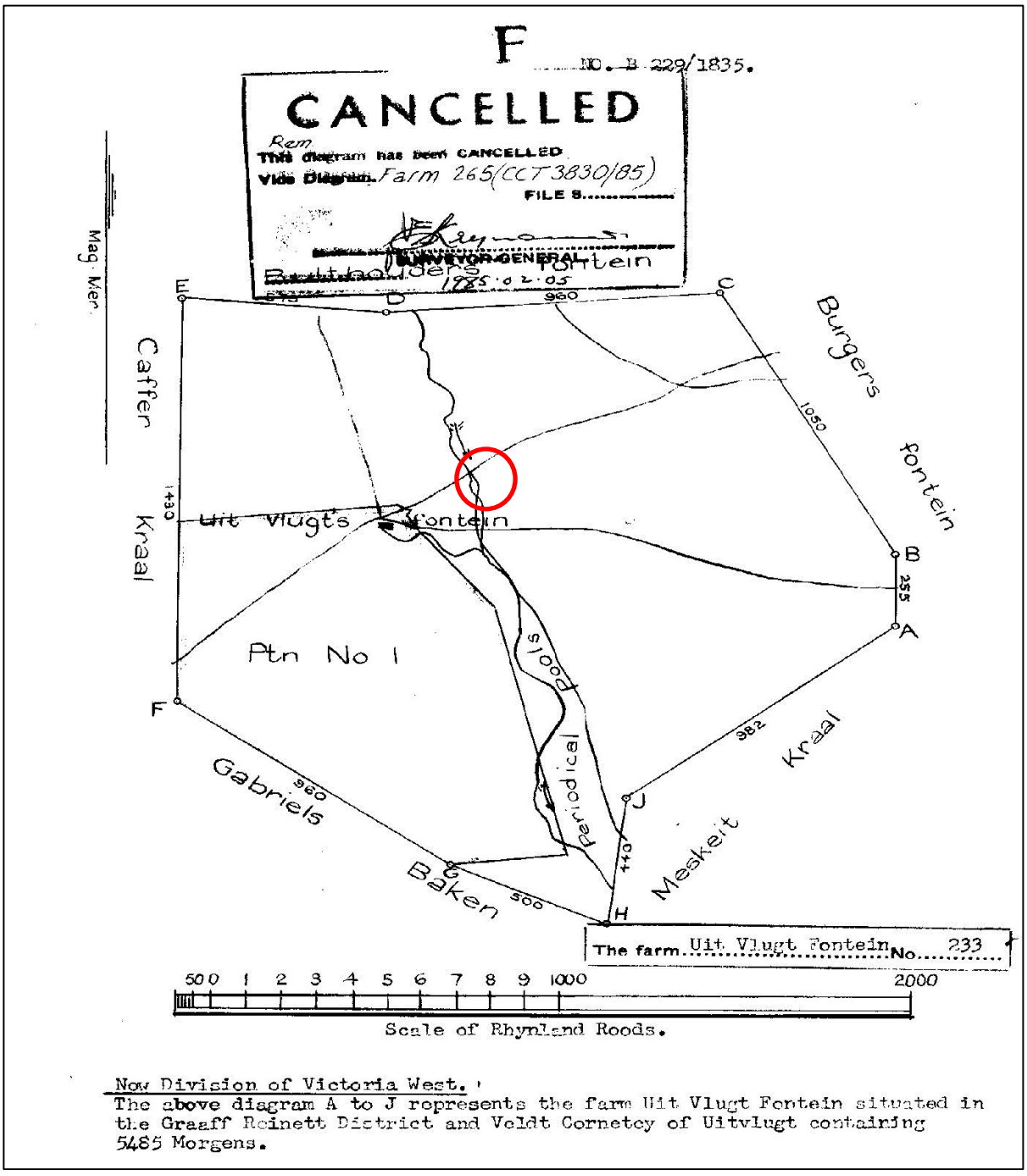

Figure 5: 1835 SG diagram of the farm Uit Vlugt's Fontein (position of VW001 indicated with red circle)

The farmstead is provisionally graded with a heritage significance of having medium heritage significance - 4A (locally significant).

Figure 6: View of farm house with outbuilding

Figure 7: Old storage

Figure 8: Live stock enclosure

Figure 9: Barn (waenhuis)

VW002

GSP coordinate: S31° 34' 26.7" E23° 19' 52.4"

A medium density scatter of lithics was identified here (±15-20 artefacts in 2x2m). The site was situated within the wildlife camp on a flat sandy plain which is arched north east to north west by a dried river, the shortest distance from the river being about 280m to the north. The heavily patinated MSA stone tool consisted of blades, side scrapers and cores with many chips all from hornfels.

Figure 10: General view of VW002

Figure 11: Sample of lithics found at VW002

The site is graded as Grade 4C (locally significant of low heritage significance)

1.3. APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

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:

- National Environmental Management Act (NEMA) (Act No. 107 of 1998)
- National Heritage Resources Act (NHRA) (Act No. 25 of 1999)
- Minerals and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002)

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

- GNR 982 of 2014 (Government Gazette 38282) promulgated under the (NEMA):
    - Basic Assessment Report (BAR) – Regulations 19 and 23
    - Environmental Scoping Report (ESR) – Regulation 21
    - Environmental Impacts Report (EIR) – Regulation 23
    - Environmental Management Programme (EMPr) – Regulations 19 and 23
- NHRA:
    - Protection of Heritage Resources – Sections 34 to 36; and
    - Heritage Resources Management – Section 38
- MPRDA:
    - Section 39(3)
- The Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) promulgated under the National Health Act (Act No. 61 of 2003)
- Exhumation and Reburial of Human Remains - Regulations 26, 27 and 28

The NHRA stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA) 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 and the GNR 982 of 2014 state that, “the objective of an environmental impact assessment process is to … identify the location of the development footprint within the preferred site … focusing 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 compliant HIA report is compiled.

1.4. IDENTIFICATION OF IMPACTS

1.4.1. The potential impacts identified during the assessment

1.4.2. Construction Phase

- Impact on unidentified heritage resources
- Impact on historical structures
- Impact on cultural landscape

1.4.3. Operational Phase

- None

1.4.4. Decommissioning Phase

- None

1.4.5. Cumulative impacts

- Impact on unidentified heritage resources
- Impact on cultural landscape

1.5. ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

The following section provides a discussion on the possible impacts and the proposed mitigation measures.

1.5.1. Impact on unidentified heritage resources – construction phase

Due to the nature of heritage resources that occur in the vast majority of cases subsurface or as feint markers in the landscape the possibility of finding previously unidentified heritage resources such as archaeological material, graves and fossils do exist. Heritage resources are seen as irreplaceable and the impact on such resources without mitigation measures can be seen as **low**, depending on the type and rarity of such a resource.

Mitigation measures:

- Undertake an archaeological and palaeontological walkdown of the final infrastructure alignment;
- Incorporate a chance finds protocol and heritage resources induction in to the EMPr of the project; and
- Document and implement further mitigation measures on heritage sites identified during the walk downs and also those discovered during construction.

By implementing the proposed measures, the impact significance post mitigation will be of reduced to **very low** significance.

1.5.2. Impact on historical structures – Construction phase

The farmstead at VW001 is very close to the proposed centreline of the corridor and thus in all likelihood close to the final power line alignment. During construction the possibility of damage from construction crew activity to the farmstead structure do exist. Such an impact is probable but seen as of **low** significance, pre-mitigation, due to the reversibility of the impact.

Mitigation measure:

- Demarcate the site as a no-go area during construction.

By implementing the proposed measure, the impact significance post mitigation can be reduced to **very low** significance.

1.5.3. Impact on the cultural landscape around VW001 – Construction phase

The farmstead at VW001 is very close to the proposed centreline of the corridor and thus in all likelihood close to the final power line alignment. During construction phase the possibility of impacting on the cultural landscape that includes the sense of place around the Uitvlugtfontein farmstead is seen as probable and of a **moderate** significance before implementation of mitigation measures.

Mitigation measure:

- Consider relocating the power line alignment as far as possible within the corridor, to the south of the current farmstead

By implementing the proposed measure, the screening effect of the vegetation on the cultural landscape of the farmstead and its werf, the impact significance post mitigation can be reduced to low significance.

1.5.4. Impact on unidentified heritage resources – Cumulative

Due to the nature of heritage resources that occur in the vast majority of cases subsurface or as feint markers in the landscape the possibility of finding previously unidentified heritage resources such as archaeological material, graves and fossils do exist. Heritage resources are seen as irreplaceable and the impact on such resources without mitigation measures can be seen as **low** within this project's context and depending on the type and rarity of such a resource.

The proposed additional infrastructure will probably not add to the cumulative impacts foreseen in the larger study area that includes the Victoria West WEF. By implementing the recommended mitigation measures as indicated for the construction phase the impact significance post mitigation can be reduced to **low**.

1.5.5. Impact on the cultural landscape – Cumulative impact

The proposed additional infrastructure will probably not add to the cumulative impacts foreseen in the larger study area that includes the Victoria West WEF. By implementing the recommended mitigation measures as indicated for the construction phase, the cumulative impact is seen as **very low**.

1.6. IMPACT ASSESSMENT SUMMARY

The assessment of impacts and recommendation of mitigation measures as discussed above a collated in **Table 4** and

Table 5.

Table 4: Impact assessment summary table for the Construction Phase

Construction Phase													
Direct Impacts													
Aspect/ Impact Pathway	**Nature of Potential Impact/ Risk**	**Status**	**Spatial Extent**	**Duration**	**Consequence**	**Probability**	**Reversibility of Impact**	**Irreplaceability**	**Potential Mitigation Measures**	**Significance of Impact and Risk**		**Ranking of Residual Impact/ Risk**	**Confidence Level**
										Without Mitigation/ Management	**With Mitigation/ Management (Residual Impact/ Risk)**		
Site clearing and construction of line infrastructure	Destruction of heritage resources	Negative	Site	Permanent	Moderate	Probable	Non-reversible	High	Walk down – Archaeological/ palaeontological Chance finds protocol Documentation and mitigation as required	Low	Low	4	Medium
Site clearing and construction of line infrastructure	Damage to Uitvlughtfontein farmstead buildings	Negative	Site	Long Term	Moderate	Probable	Moderate	Moderate	Re-alignment of power line further away from the site Declare no-go areas	Low	Very low	5	High
Site clearing and construction of line infrastructure	Impact to Uitvlughtfontein farmstead cultural landscape	Negative	Site	Long Term	Moderate	Probable	Moderate	Moderate	Re-alignment of power line further away from the site	Moderate	Low	4	High

Table 5: Cumulative impact assessment summary table

Cumulative Impacts													
Aspect/ Impact Pathway	**Nature of Potential Impact/ Risk**	**Status**	**Spatial Extent**	**Duration**	**Consequence**	**Probability**	**Reversibility of Impact**	**Irreplaceability**	**Potential Mitigation Measures**	**Significance of Impact and Risk**		**Ranking of Residual Impact/ Risk**	**Confidence Level**
										Without Mitigation/ Management	**With Mitigation/ Management (Residual Impact/ Risk)**		
Site clearing and construction of line infrastructure	Destruction of heritage resources	Negative	Local	Permanent	Moderate	Probable	Non-reversible	High	Walk down – Archaeological/ palaeontological Chance finds protocol Document need finds and provide appropriate mitigation	Low	Very Low	4	Medium
Site clearing and construction of line infrastructure	Impact on cultural landscape	Negative	Local	Long Term	Moderate	Probable	Moderate	Moderate	Re-alignment of power line further away from the site	Low	Very Low	4	High

1.7. INPUT TO THE ENVIRONMENTAL MANAGEMENT PROGRAM

The following mitigation measures need to be included in the EMPr for the project. The summary table in **Appendix D** provides detailed implementation criteria.

- An archaeological and palaeontological walkdown of the final infrastructure alignment;
- Incorporate a chance finds protocol and heritage resources induction in to the EMPr of the project;
- Document and implement further mitigation measures on heritage sites identified during the walk downs and also those discovered during construction;
- Demarcate the site VW001 as a no-go area during construction; and
- Consider relocating the power line alignment as far as possible within the corridor, to the south of the current farmstead.

1.8. CONCLUSION AND RECOMMENDATIONS

The HIA has shown that the proposed infrastructure corridor may have heritage resources present on the property. This has been confirmed through archival research, evaluation of aerial photography of the sites and a site visit. Following the implementation of the proposed mitigation measures outlined within the report, all impacts identified would be considered to have a low to very low negative significance.

Taking the evaluation of the possible impacts in to account, there is no reason why the proposed development of supporting infrastructure should not be authorised with the implementation of the recommended mitigation measures.

1.9. REFERENCES

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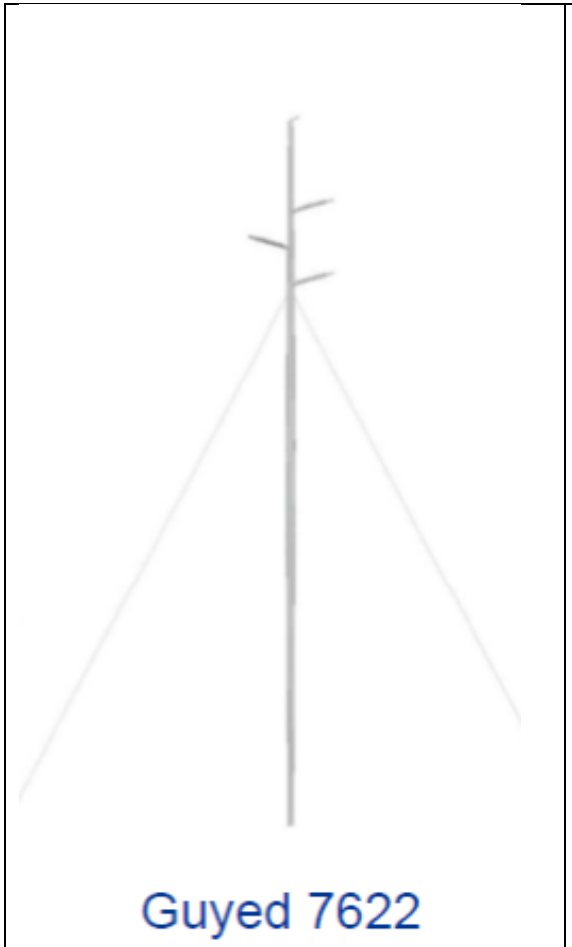
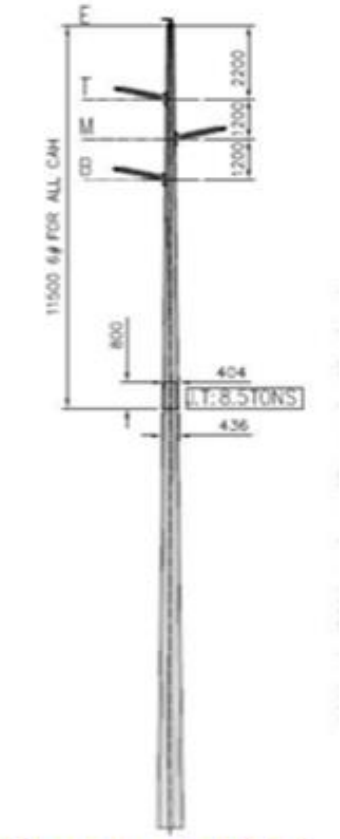
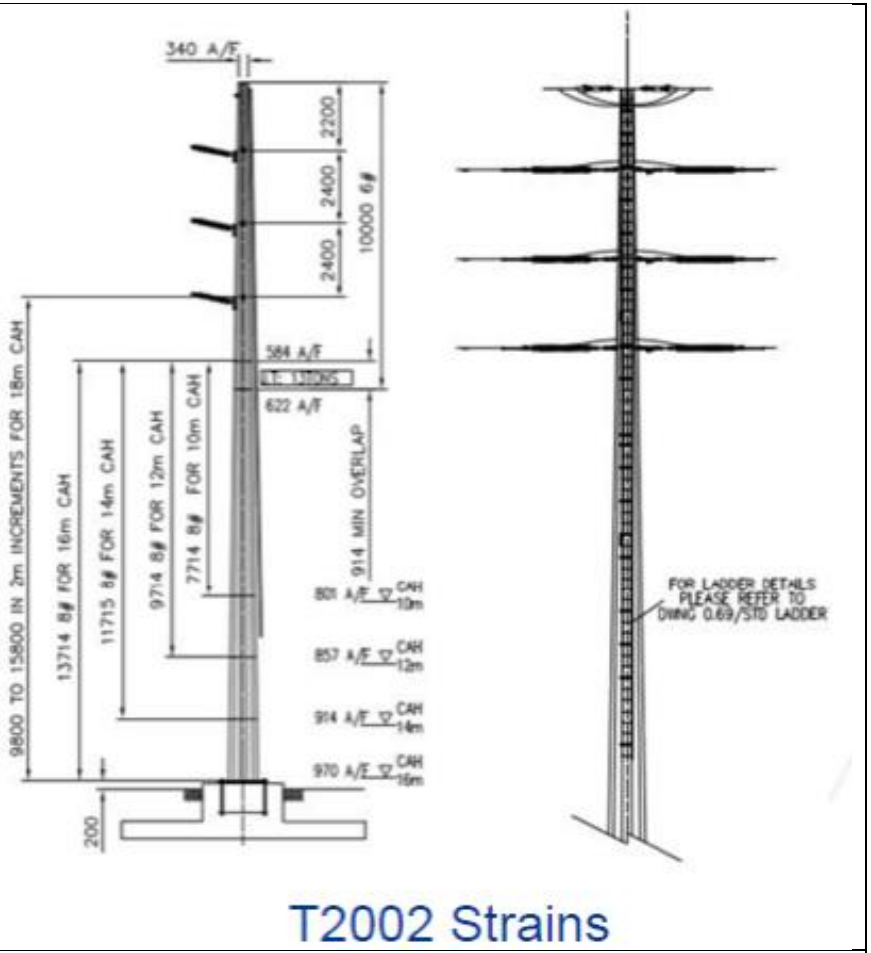
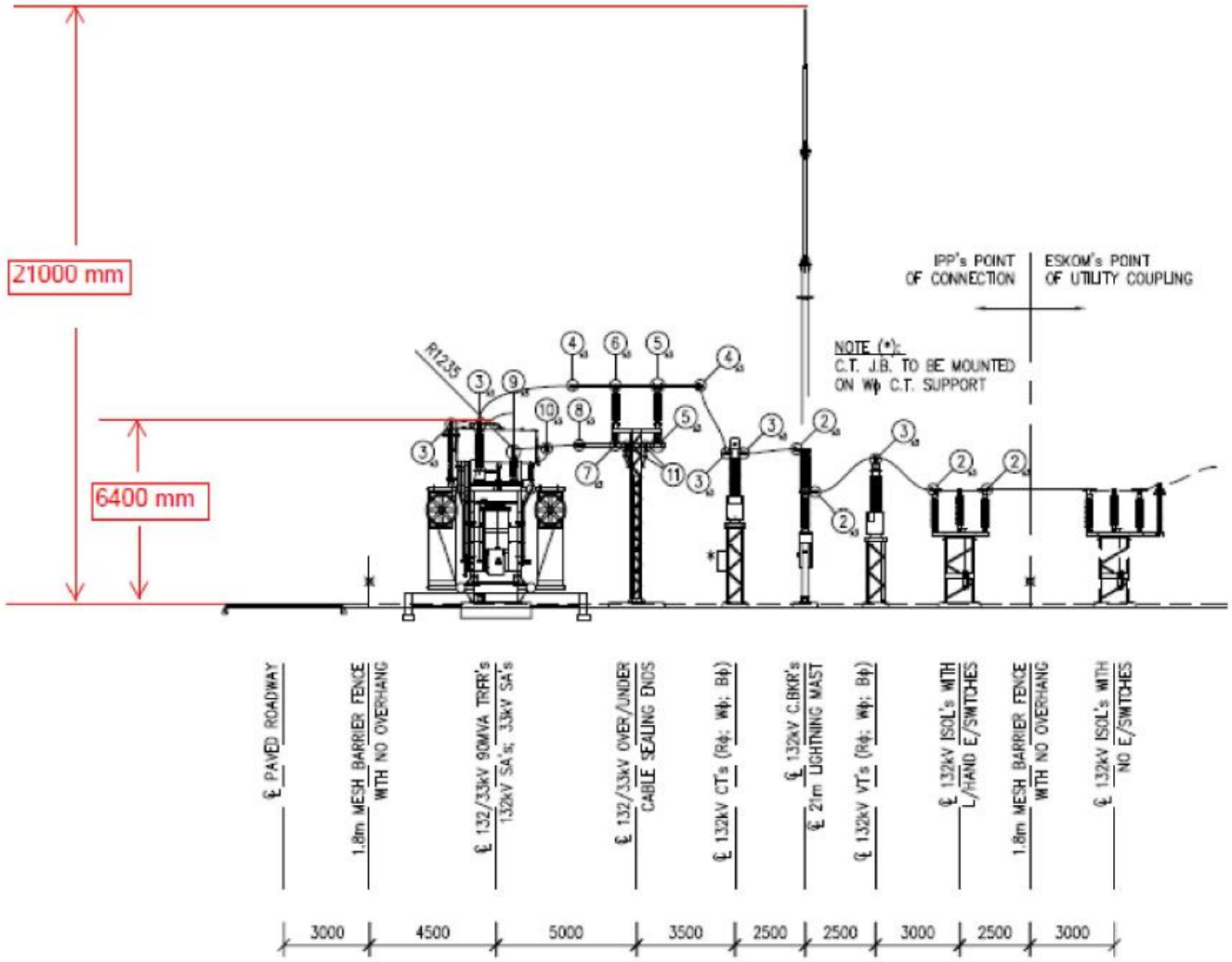
1.10. APPENDICES

Appendix A – Monopole designs
Appendix B – Collector substation and the line
Appendix C – Heritage Maps
Appendix D – Heritage Management Plan for EMPr implementation

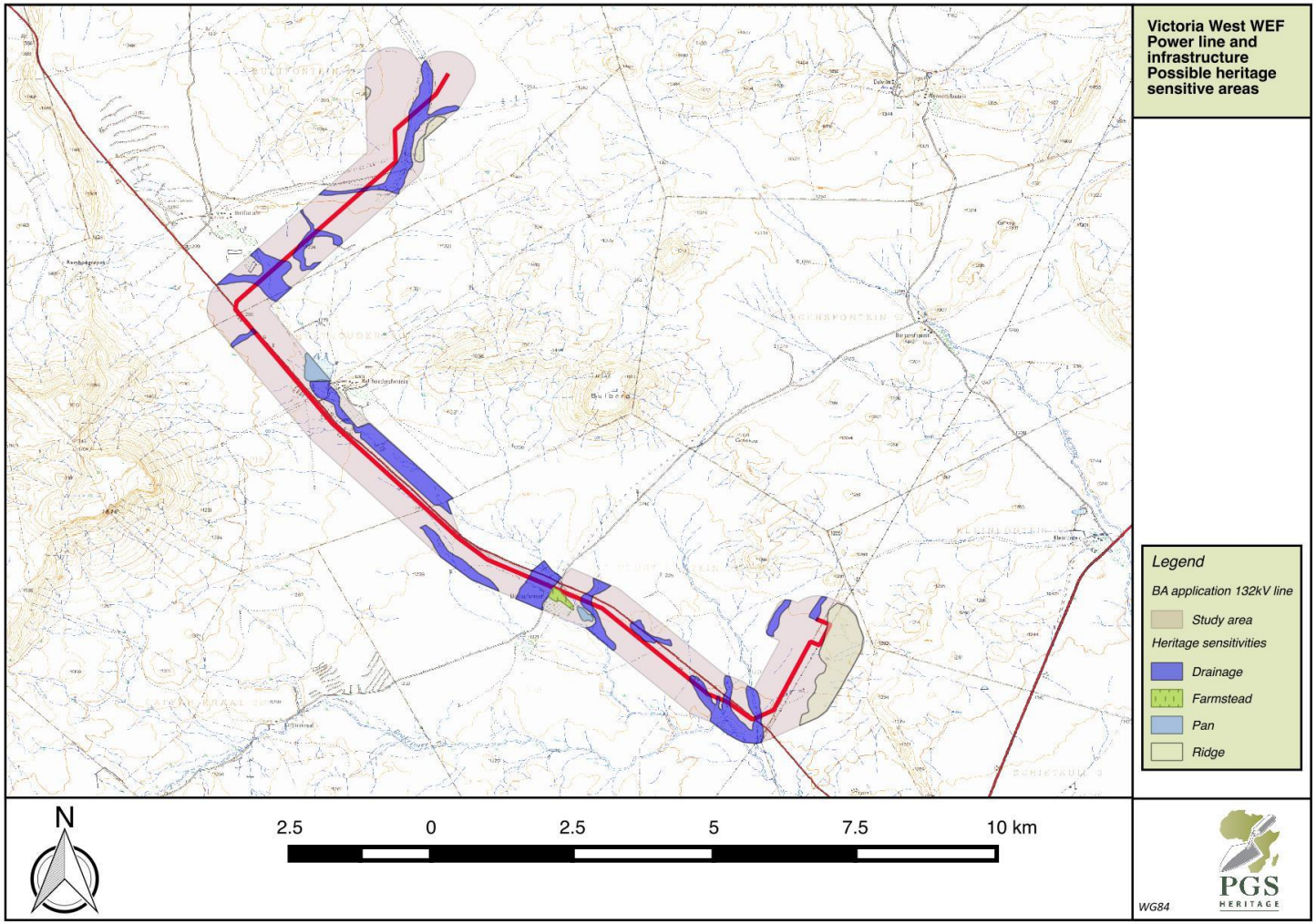
Appendix A – Monopole designs

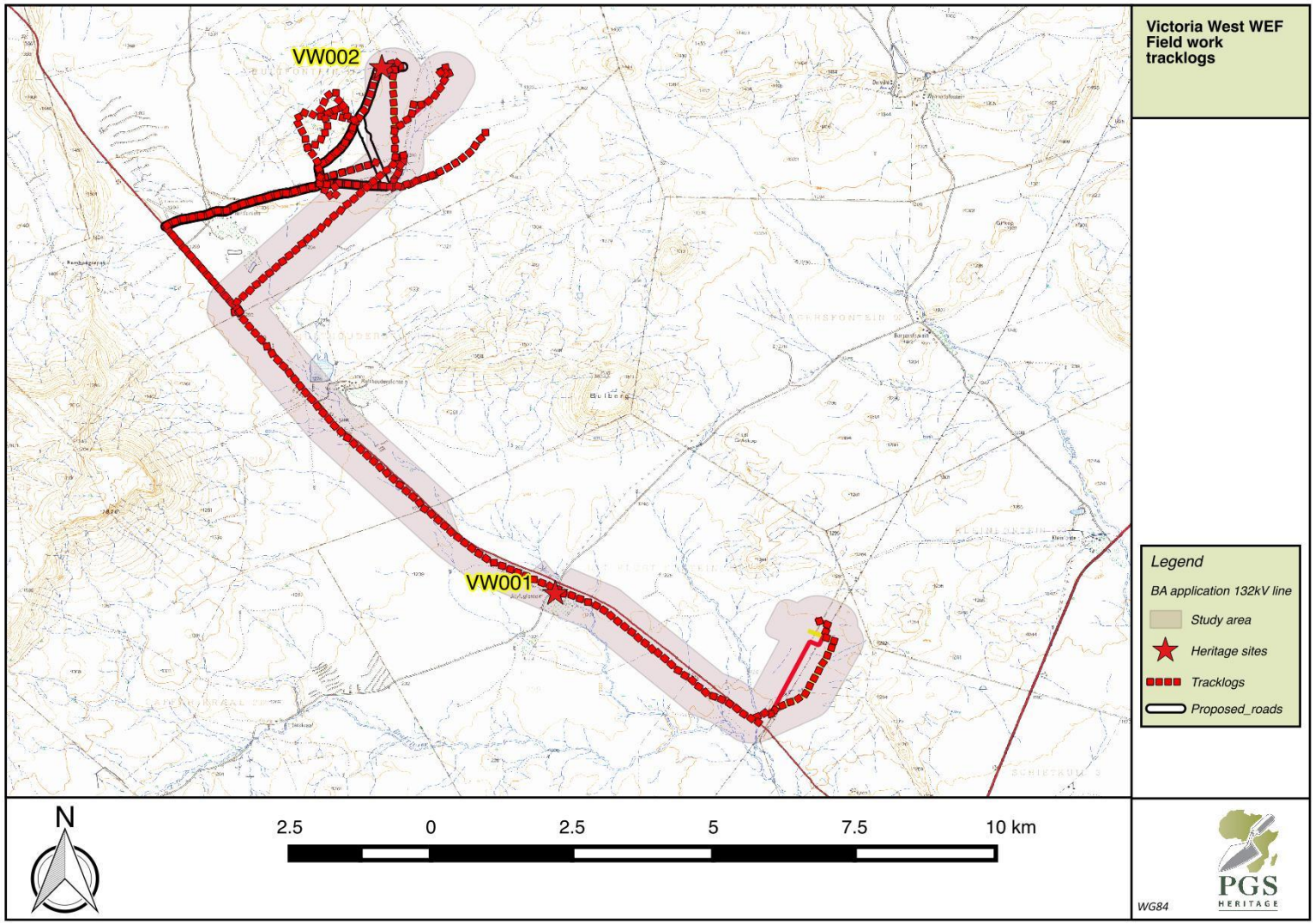
		
Option A: Hybrid Monopoles (aka Guyed Monopoles)	Option B: Self-Supporting Monopoles	The strain structures are still the same for both options of monopoles (132kV)

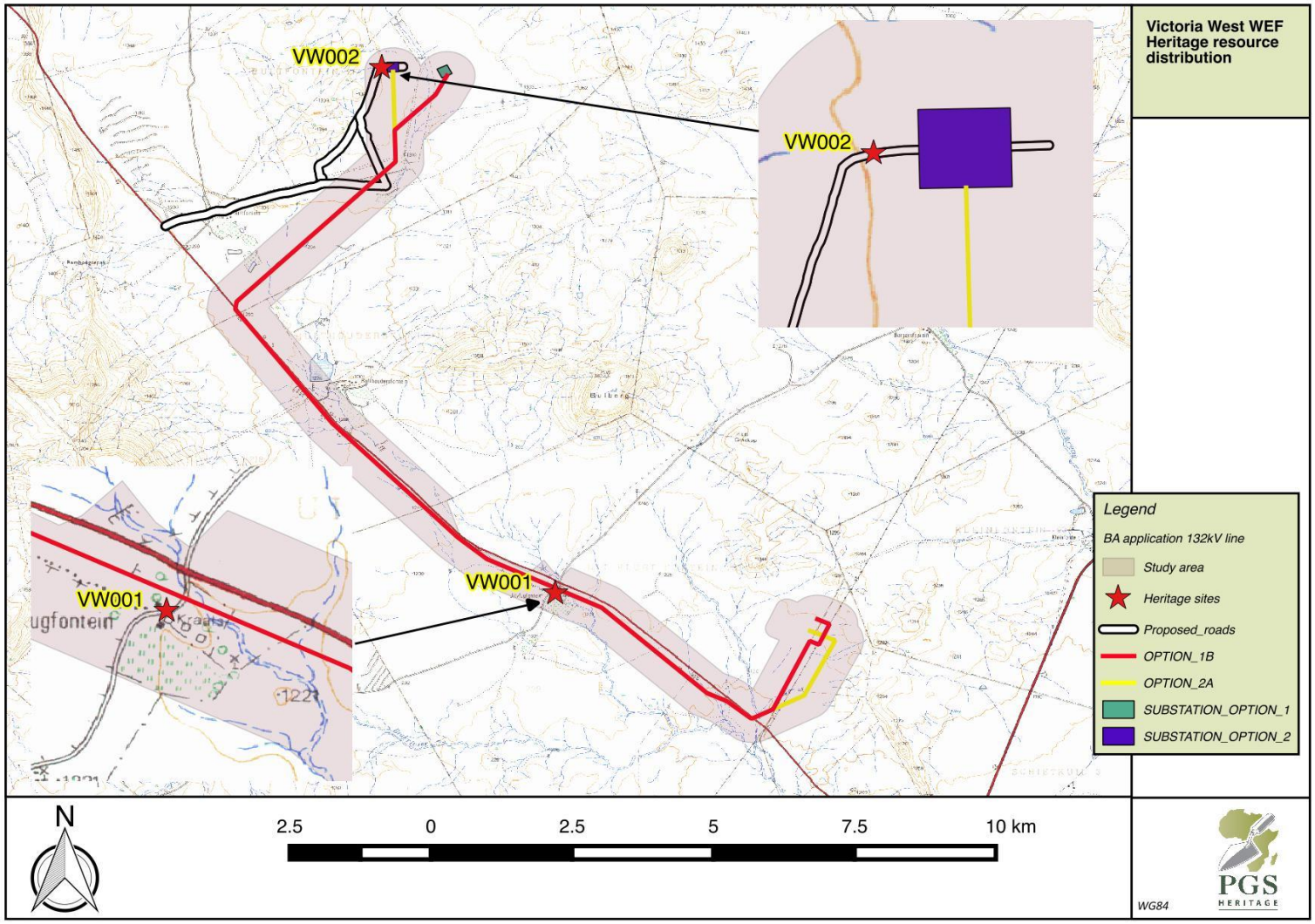
Appendix B – Collector substation and the line



Appendix C – Heritage Maps




Victoria West WEF
Field work
tracklogs
VW002
VW001
Legend
BA application 132kV line
Study area
Heritage sites
Tracklogs
Proposed_roads
N
2.5
0
2.5
5
7.5
10 km
WG84
PGS
HERITAGE


Victoria West WEF
Heritage resource distribution
VW002
VW002
VW001
VW001
Legend
BA application 132kV line
Study area
Heritage sites
Proposed_roads
OPTION_1B
OPTION_2A
SUBSTATION_OPTION_1
SUBSTATION_OPTION_2
N
2.5
0
2.5
5
7.5
10 km
WG84
PGS
HERITAGE

Appendix D – Heritage Management Plan for EMP implementation

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	**Monitoring Party (Frequency)**	**Responsible Party for Implementation**
Impact on cultural landscape	Limit impact on cultural landscape at VW001	Re-align power line to the south of VW001 moving pylons as far as possible away from the line of sight of the Uit Vlugt Fontein farmstead.	Adjust final alignment during design as far as possible south	Prior to construction	Applicant
Impact on cultural landscape	Limit direct impact on VW001 during construction	Demarcate VW001 as no-go area during construction Ensure compliance with relevant legislation and recommendations from SAHRA under Section 38 of NHRA	Include VW001 as no-go area in EMPr	ECO to evaluate compliance specifically during construction time close to VW001 (weekly)	Applicant ECO
Impact on undiscovered heritage resources	• Implement walk down of final alignment on power line alignment • Implement heritage mitigation where required on identified heritage resources during walkdown	• A walkdown of the final alignment of the footprint areas of the pylon foot prints and access routes to identify possible heritage resources and confirm the required mitigation measures for each identified site. • Implement mitigation as required for each of the identified site through applying for the necessary mitigation permits under section 34-36 of the NHRA. • Complete the necessary mitigation measures and apply for destruction or alteration permits under section 34-36 of the NHRA before construction	Completion and development of mitigation measures prior to construction commencement	Once off	Applicant ECO Heritage Specialist

		can commence in the specific heritage site areas.			
Impact on undiscovered heritage resources	Reduce the chance of impacts on undiscovered heritage resources	• Include section on possible heritage finds in induction prior to construction activities take place • Implement chance find procedures in case where possible heritage finds area made • Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	• Archaeologist to provide induction training of staff prior to construction work commence by staff as part of general environmental induction training • Develop chance find procedures for inclusion in EMPr and instruction during induction training	ECO (Monthly)	Applicant ECO Heritage Specialist