



PGS HERITAGE

NTCSA Tx Delphi Substation Extension, near Komani, Eastern Cape Province

Heritage Impact Assessment

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REVISION HISTORY

Version	Issue Date	Description of Changes
01	25 June 2024	First draft
02	16 July 2024	Update on comments and layout

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Declaration of Independence

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

Disclosure of Vested Interest

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

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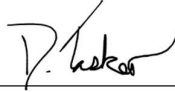

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ACKNOWLEDGEMENT OF RECEIPT

Report Title	NTCSA Tx Delphi Substation Extension, near Komani, Eastern Cape Province Heritage Impact Assessment		
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The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii of Report – Contact details and company
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix C
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1
(cA) An indication of the quality and age of base data used for the specialist report	N/A
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 5
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 4.4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Appendix A and B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4
(g) An identification of any areas to be avoided, including buffers	Section 4
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 4.3
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
(k) Any mitigation measures for inclusion in the EMPr	Section 6
(l) Any conditions for inclusion in the environmental authorization	Section 6
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorization	Section 6
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 6 and 7
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
(o) A description of any consultation process that was undertaken during the course of carrying out the study	Informal consultation in fieldwork.
(p) A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.	Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No protocols or minimum standards for HIAs or PIAs

EXECUTIVE SUMMARY

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PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed National Transmission Company South Africa (NTCSA) Tx Delphi Substation Extension, near Komani, Eastern Cape Province.

During the fieldwork only one heritage feature/resource was identified (**Figure 16**). The site is a Stone Age lithic artefact exposure (**DE001**). See **Figure 15** and the individual site description as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

Archaeological Site

DE001 is a Stone Age lithic exposure of local low significance. The numerous artefacts were found eroding out of a pathway and an adjacent cutting in the soil profile.

Mitigation measures

Mitigation measures are described in **Table 8** of this report.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on the identified heritage resource rated being of low heritage significance.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

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

Cultural significance

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

Development

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

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

Early Stone Age

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

Fossil

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

Heritage

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

Heritage resources

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

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

Holocene

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

Late Stone Age

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

Late Iron Age (Early Farming Communities)

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

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

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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.

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
ECO	Environmental Control Officer
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
NTCSA	National Transmission Company South Africa
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
PHS	Provincial Heritage Site
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

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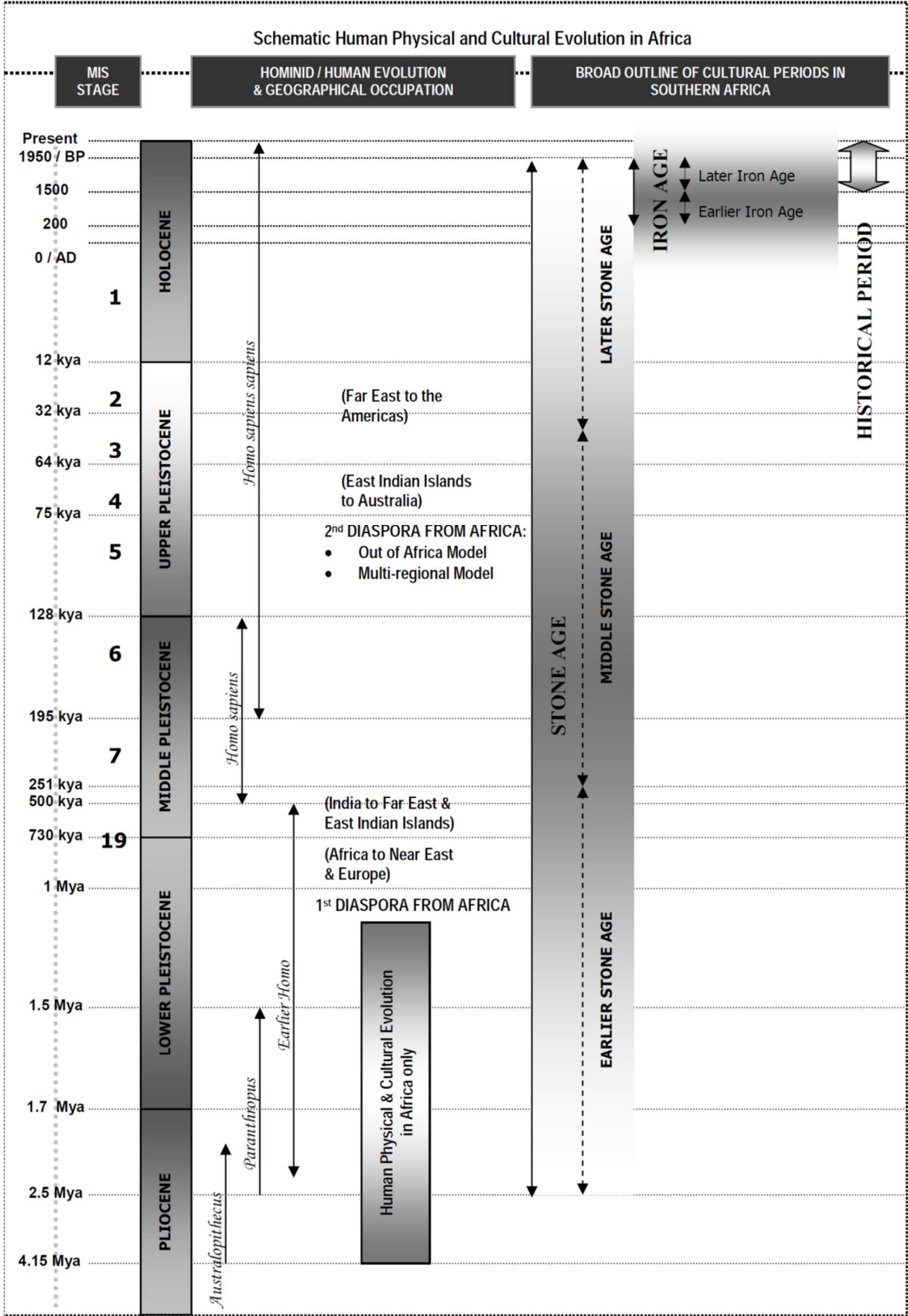


Figure 1 – Human and Cultural Timeline in Africa

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1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed National Transmission Company South Africa (NTCSA) Delphi Substation Extension, near Komani, Eastern Cape Province.

1.1 Scope of the Study

The aim of the study is to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the BA 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

This HIA Report was compiled by PGS Heritage (PGS).

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

Daniel Tasker, author of this report is a MSc (Archaeology) graduate from the University of the Witwatersrand, South Africa, specialising in the Stone Age. He is a registered professional archaeologist with the Association of Southern African Professional Archaeologists (ASAPA).

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

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including

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the subterranean nature of some archaeological sites and existing vegetation cover. It should be noted most of the study area was accessible for the fieldwork survey.

Fieldwork was also focussed on area that was not previously ploughed or disturbed by farming activity, thus focussing on areas with the highest potential to yield heritage resources.

Therefore, should any heritage features and/or objects be located or observed outside the identified heritage sensitive areas during the construction activities, a heritage specialist must be contacted immediately. Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

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:

- Government Notice (GN) 320 of the Government Gazette 45421- Procedures for assessment and minimum criteria for reporting on identified environmental themes when applying for environmental authorisation (20 March 2020);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), with specific reference to Appendix 6 of the EIA Regulations (2014, as amended); and
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

1.4.1 Notice 320 of the Government Gazette 430110

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by the South African Heritage Resources Agency (SAHRA), GN 320 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN are listed in **Table 1** and the applicable section in this report noted.

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Table 1: Reporting Requirements for GN 320

GN 320	Relevant section in report	Where not applicable in this report
1.2 (a) a desktop analysis, using satellite imagery;	Section 4.3	-
1.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	Section 4.1	-
1.3 (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool;	Section 4.2.3	-
1.3 (b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 4.1	-

1.4.2 Requirements of Appendix 6 of the NEMA EIA Regulations (as amended)

The HIA process considers the NEMA EIA Regulations (as amended) Appendix 6 requirements for specialist reports, as indicated in the table on **page v** of this report.

1.4.3 The National Heritage Resources Act

Applicable sections of the NHRA include:

- The Protection of Heritage Resources – Sections 34 to 36; and
- Heritage Resources Management – Section 38.

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

The proposed Delphi Substation Extension is located 30 km to the South of the town of Komani and 11km North of McBride Village along the R67 provincial road, in the Chris Hani District Municipality, Eastern Cape Province (**Figure 2**).

2.1.1 Site Description

The application extension area is situated on the farm Cathcart's Gift 311 with a footprint area of approximately 5ha (**Figure 2**).

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2.2 Technical Project Description

2.2.1 Project description

The following project background was provided by the NTCSA:

“This project forms part of an initiative to unlock Grid capacity by connecting renewable energy generation by year 2027.

The 2022 TDP generation assumptions forecasts that 31 095 MW of PV and wind generation will be required by 2030 of which 16 604 MW will be required as early as 2027.

Currently there is limited or no capacity available in many of the Transmission supply areas.

Those areas have already been identified by analysing applications processed in bid window 5 (BW5) and those received for bid window 6 (BW6) as well as by conducting an industry survey amongst various RE associations.

Several additional transformer capacity at substations that lie within the future areas of interest for RE generation were identified and Delphi is one of those identified substations for this initiative.

A 500 MVA 400/132 kV transformer is required at Delphi Substation to make provision to connect an additional 300 MW to the 100 MW which has already been approved up to BW5.

The total of 400 MW will be connected at an N-1 level of network redundancy.”

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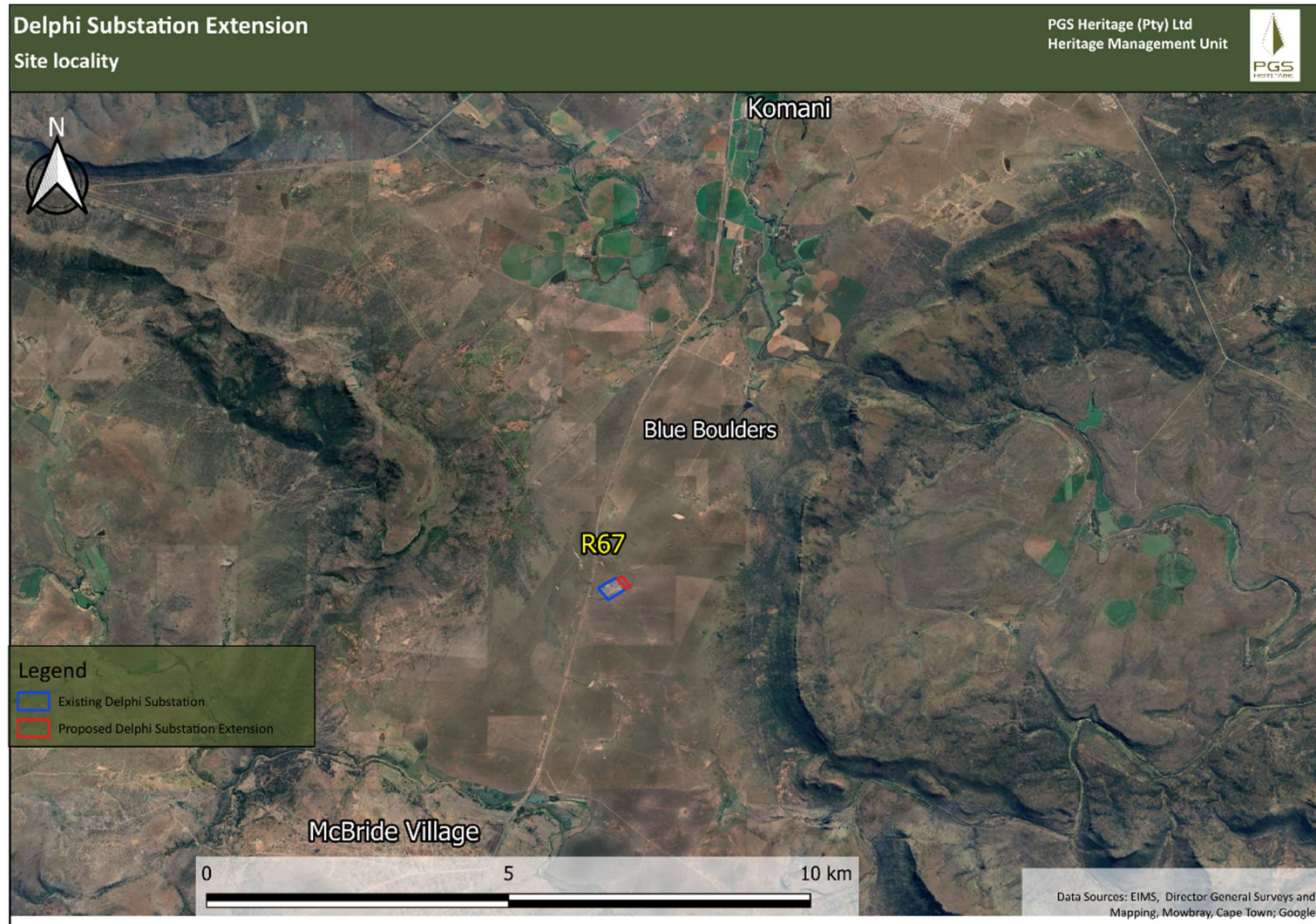


Figure 2 - Regional Locality of study area (blue and red polygons).

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3 ASSESSMENT METHODOLOGY

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

3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed Delphi Substation Expansion. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Literature Review and initial site analysis: The background information to the field survey relies greatly on the Heritage Background Research which was undertaken through archival research and evaluation of satellite imagery and topographical maps of the study area.

Step II – Physical Survey: A physical survey was conducted by a combination of vehicle and pedestrian access through the proposed project area by one qualified heritage specialist (on the 23rd of May), 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 heritage resources identified in the physical survey, the assessment of these resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites is 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 - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- Uniqueness; and
- Potential to answer present research questions.

3.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA

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for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2021) is implemented in this report.

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 2** and **Table 3**).

Table 2: Rating system for archaeological resources

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

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Table 3: Rating system for built environment resources

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

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

3.2 Methodology used in determining the significance of environmental impacts

The methodology used to determine the environmental impact significance was provided by EIMS and is explained in **Appendix B**.

4 CURRENT STATUS QUO

4.1 Site Description

The proposed Delphi Substation Expansion footprint area is characterised by flat grassland divided by a wetland/stream in the southern corner (**Figure 3**, **Figure 4** and **Figure 7**). Fossil imprints can be found on the sandstone outcrops across the property (**Figure 8**). The Delphi Substation contrasts the natural environment with its substation infrastructure, a footpath around the substation and oil dams (**Figure 5** and **Figure 6**).

The footprint is entirely characterised by Queenstown Thornveld, it is described in Mucina and Rutherford (2006:428) as:

“Distribution

Eastern Cape Province: From the vicinity of Queenstown in the east to the vicinity of Tarkastad in the west, and Sterkstroom in the north. Altitude 980–1 500 m.

Vegetation & Landscape Features

Flat bottomlands of intramountain basins with adjacent slopes supporting a complex of Acacia natalitia thornveld and grassland dominated by Aristida congesta, Cymbopogon

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pospischilii, Eragrostis curvula and Tragus koelerioides, with scattered shrubs and low Acacia in places (Hoare 1997, Hoare & Bredenkamp 1999).

Geology & Soil

Sedimentary rocks of the Tarkastad Subgroup (Beaufort Group, Karoo Supergroup) overlain with clay-loam soils typical of Da and Fc land types”



Figure 3 – View from the North of the property towards the South-East.



Figure 4 – View from the South of the property towards the North, wetland is visible.



Figure 5 – Delphi Substation



Figure 6 – An oil dam.



Figure 7 – The stream.



Figure 8 - Fossil imprints in sandstone outcrops in the property.

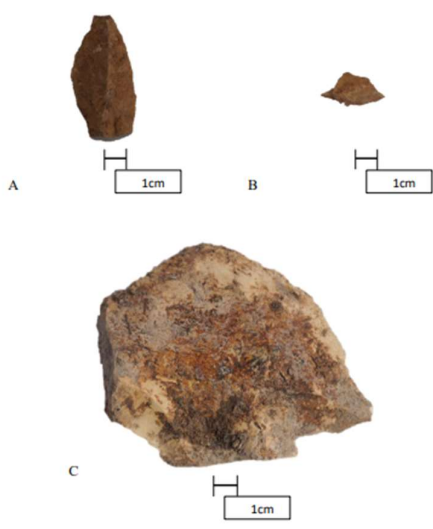
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4.2 Overview of the study area and surrounding landscape


The interior of the Eastern Cape holds great research opportunities, however a distinct lack of resources had created a sincere absence of research in the area, and a large focus has been shifted onto many coastal sites.

DATE	DESCRIPTION
2.5 million – 250 000 years ago	<p>The Earlier Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulean dates to approximately 1.5 million years ago.</p> <p><i>No published ESA sites are known from the direct vicinity of the study area.</i></p> <p>In a broader context two sites closer to Gqberha (some 450 odd kilometers South-West) known as Amanzi Springs (Butzer 1973) and Lower Sundays River Valley (Lotter & Kuman 2018), harbour large assemblages of Acheulean lithic artefacts.</p>
250 000 to 40 000 years ago	<p>The Middle Stone Age is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique.</p> <p><i>No published MSA sites are known from the direct vicinity of the study area.</i></p> <p>However, heritage surveys in the area have revealed a larger MSA presence (Van Ryneveld 2011; 2017) despite its underrepresentation in the literature. Oakleigh Shelter (25km North) has shown MSA elements within its deposits (Derricourt 1973) but remains understudied.</p> <p>Grassridge Rockshelter (90km North) has a well-researched MSA deposit dating back to 36000 years ago (Ames <i>et al.</i> 2020). Originally excavated in 1987 by Opperman the MSA deposit included flakes and blades with parallel convergent sides, unretouched points, and chunks larger than 10mm in dimension (Opperman 1988).</p>

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DATE	DESCRIPTION
	 <p><i>Figure 9 - Examples of MSA lithics from Grassridge Shelter (Mdludlu 2023).</i></p>
40 000 years ago to the historic past	<p>The Later Stone Age is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings.</p> <p>The archaeological LSA is dated from roughly 40kya onward, with a distinctive break in the lithic sequence around 25kya–12kya, dividing the LSA into an earlier and a later LSA (Mitchell 2002). It is the later LSA of ~25kya–12kya onward with a lithic and material record that are, or were until very recently, produced and practised by modern southern African hunter-gatherers—or the San/<i>Bushmen</i>, with their characteristic egalitarian social structure.</p> <p><i>No published LSA sites are known from the direct vicinity of the study area</i></p> <p>Grassridge Rockshelter (90km North) is a well-researched LSA deposit dating back to 7000-6000 years ago. 1987 excavations by Opperman Also found bone artefacts, ornaments of shell and 4707 ostrich eggshell beads from the LSA deposits (Opperman 1987)</p> <p>Previously mentioned, Oakleigh Shelter is more widely known for its LSA deposits, excavations revealed bone tools and lithic artefacts with a preference for lydianite, The Albany Museum has indicated that several rock art sites are also located in the wider area (Booth 2020).</p>
The LSA Khoe herders (~2000–c. 1850)	<p>LSA herders—the Khoe (Khoe/Khoi, shortened for Khoekoen/Khoikhoi)/<i>Hottentots</i>—are first evidenced in the archaeological record some 2 000 years ago, based on the presence of domesticated faunal remains at sites (Mitchell 2002; Sadr 2013).</p> <p>Previously mentioned, Oakleigh Shelter is more widely known for its LSA deposits, including excavated bones of cattle and sheep which may indicate stock theft (Derricourt 1977). It is also known for its finger paintings of possible Khoekhoen origin.</p>

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DATE	DESCRIPTION
	 <p><i>Figure 10 - The main panel at Oakleigh Shelter (Woodhouse 1993).</i></p>
Early Iron Age AD 500- 1200	<p>Between 500 to 1200 years ago the movement of Bantu speaking people from the Great lakes area of Central Africa reached the Eastern Cape Region of South Africa (Huffman, 2007). The Xhosa speaking people that settled on the south eastern coast of Southern Africa consist of 12 tribes.</p> <p><i>No published EIA sites are known from the direct vicinity of the study area.</i></p>
Late Iron Age AD 1100- 1840	<p>Late Farmer societies developed extensive stone settlements around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal and Steelpoort (Delius & Hay, 2009). While near our study area in the Transkei, they mainly comprised of settlements that were constructed of organic materials, mainly thatch and poles, with both their pottery and iron working to have been poorly development (Maggs 1980). Due to the organic nature of the construction material used in these settlements, sites are difficult to locate in this area as there are few detectable traces of these settlements remaining (Maggs 1980).</p> <p>With regard to dating, the beginning of the Late Iron Age in this region is obscure. At the time of Maggs' article there were few sites known that were intermediate in age between the Early Iron Age sites and Late Iron Age sites. However, according to dates from a handful of Late Iron Age sites in the Eastern Cape, these late Iron Age Farmers settled in this region as early as 1100 A.D. (Maggs 1980).</p> <p><i>No published LIA sites are known from the direct vicinity of the study area.</i></p>
1488	<p>The first Europeans to visit the area were the Portuguese explorers Bartholomew Dias, who landed on St Croix Island in Algoa Bay in 1488, and Vasco da Gama who noted the nearby Bird Island in 1497. For centuries, the area was simply marked on navigation charts as "a landing place with fresh water" (http://www.port-elizabeth.org.za/history.html). According to Erasmus (2014), the name Algoa Bay comes from the name, Bahia de Lagoa (bay of the lagoon) given by an explorer, Manuel de Perestrelo, who followed in the footsteps of Bartholomew Dias in 1576.</p>
1700	<p>From about 1700, emaXhoseni, the place of the Xhosa or Xhosaland, stretched roughly along the seaboard of South Africa between the Mbashe River and the Sundays River, from the slopes of the Khahlamba, Amathole and Winterberg mountains down the coast.</p> <p>(http://v1.sahistory.org.za/pages/libraryresources/articles_papers/forts_of_ec/preface.html)</p>
1776 - 1820	<p>The first occupation by European farmers occurred around 1776 and this became the permanent settlement (Erasmus, 2014). In 1799, during the first British</p>

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DATE	DESCRIPTION
	<p>occupation of the Colony during the Napoleonic Wars, a wooden structure was built to protect against a possible landing of French troops, overlooked the site of what later became Port Elizabeth and is now a monument (Erasmus, 2014; http://www.port-elizabeth.org.za/history.html).</p> <p>By 1819 there were 39 white residents and a tannery and a blacksmith's shop. Later, a stone fort was built on a hill above the wooden structure and named Fort Frederick for the Duke of York, who was the commander in chief of the British army. Port Elizabeth was formally founded in 1820 when the British settlers landed in Algoa Bay. Sir Rufant Donkin, the acting governor at the Cape, visited the area on 6 June to welcome the settlers and gave instructions that a village and port be developed there. He named the new settlement in honour of his wife Elizabeth who had died in India in 1818 (Erasmus, 2014; http://www.port-elizabeth.org.za/history.html).</p>
c. 1815–1835	<p>The early 1800s in the surroundings of the study area were characterised by the gradual end of the Iron Age and the start of the historic or colonial period. It is during these years of rapid change that the Difaqane (Sotho) or Mfecane (Nguni) took place, which represented a period of conflict and migration among the various people and communities living in the interior of South Africa at the time.</p> <p>In 1818 Hintsa, chief/king of the Gcaleka (Xhosa), upon his return from the Battle of Amalinde (Ngqika vs Ndlambe), was informed that strangers seeking refuge from the <i>difaqane</i> (c. 1815–1835)—or Shaka's War—had entered Gcalekaland. The strangers, scatters of tribes led by the Zizi, Hlubi, Bhele, and Ntlangwini were afforded refuge and named the amaMfengu—meaning <i>the wanderers</i> (Bikitsha 2019).</p>
1828	The Shiloh Mission station is founded by the Moravian Missionary Society on the banks of the Klipplaats River to Serve the abaThembu people (Van Averbeke <i>et al.</i> 1998). This was the first major settlement of the northern Ciskei and led to 150km of irrigation channels being dug in its first two years (Van Averbeke <i>et al.</i> 1998).
1833	The Great Trek inland into South Africa took place, in response to British rule and the banning of slavery (https://en.wikipedia.org/wiki/Slavery_Abolition_Act_1833);).
1853	<p>Queenstown was founded in 1853 as a British military outpost during Frontier times (www.queenstown.co.za). It was designed in a hexagonal shape for defence purposes but never used. Large sandstone buildings (The Hexagon, Town Hall, Frontier Museum and Queens College) built between 1880's-1920's mark its prosperous history.</p> 

Figure 11 - Town hall (www.wikipedia.org)

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DATE	DESCRIPTION
1856	After British attempts to disposition Sandile, Chief of the Rharhabe Ngqika (Xhosa in the Eighth Xhosa/Frontier War (1850–1853), The Xhosa turned to spirituality and religion for deliverance. In British Kaffraria (between the Great Kei and Keiskamma Rivers)—the former Rharhabe lands—many a prophet and prophetess divined assistance and explanations. Between 1856–1857, spearheaded by the prophecies of Nongqawuse who told of the spirits of their great deceased chiefs would come to the aid of the Xhosa. She advocated for the mass killing of Xhosa cattle and the destruction of their agricultural fields, some 40 000 Xhosa died by starvation, about 40 000 survived, while another 40 000 of them were relocated westward and employed on government projects further afield in the Cape Colony. Many, however, fled and took up informal positions on farms in the colony (https://www.sahistory.org.za/article/cattle-killing-movement).
1881	Besides the mission settlements, African communities were clustered in two primary regions: One was Glen Grey, situated northeast of Queenstown, where the abaThembu people resided and received separate magisterial status in 1881. The other area was Oxkraal and Kamastone, located southwest of the town, designated for the colonial Mfengu people (Wotshela 2004).
1921	The Bulhoek Massacre of 1921 stemmed from Enoch Mgijima's leadership among the Israelites, a group with roots in the Church of God and Saints of Christ. Initially gathering in Ntabelanga, tensions escalated when authorities sought their removal for squatting on British land. Despite negotiations and warnings, a violent clash ensued as police forces moved in. Around 200 Israelites were killed, over 100 wounded, and 141 arrested, including Mgijima. Their subsequent trial in Queenstown resulted in harsh sentences during South Africa's segregationist era (www.sahistory.org.za).
1937	In 1937, the Northern Ciskei area was formally established administratively. During this time, the Oxkraal and Kamastone mission settlements, along with the quitrent settlement of Shiloh and its surrounding outstations, were separated from the Queenstown district. They were then incorporated into the Ciskei administrative area known as Hewu (Wotshela 2004).
1960's	The town of Ezibeleni was established in an effort by the Apartheid government to rehome the Black population into "homelands" (www.queenstown.co.za)

4.2.1 Archival and historical maps

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

Historical topographic maps (1:50 000) for various years (1964 and 1980) were available for utilisation in the background study. These maps were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

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Figure 12 and **Figure 13** below indicate the complete lack of land-use on the Delphi Substation property throughout the years. Neighbouring properties see agricultural land-use however, the study area remains barren of those activities or any others, until the substation was built.

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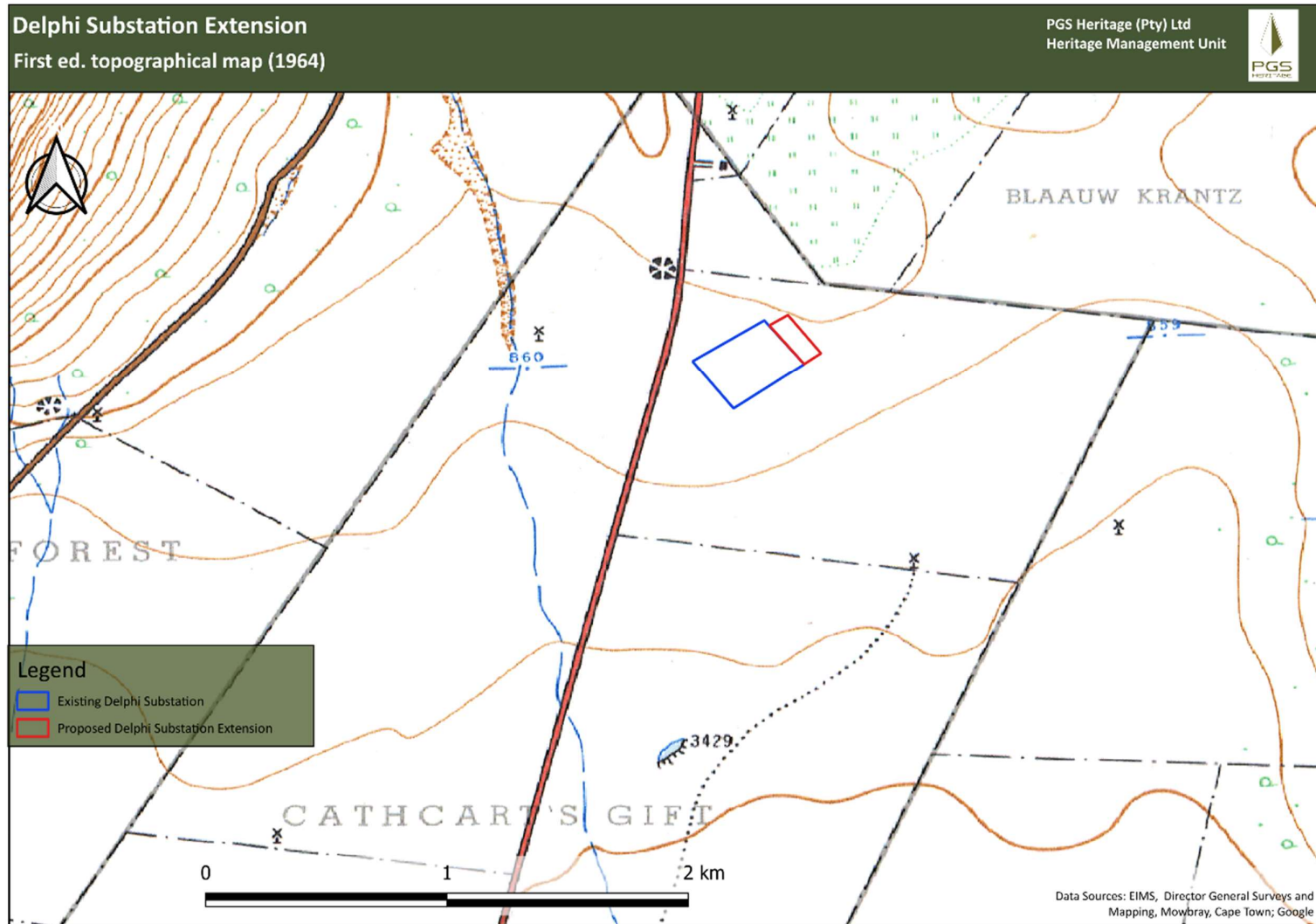


Figure 12 - First edition topographical map 3226BB (1964).

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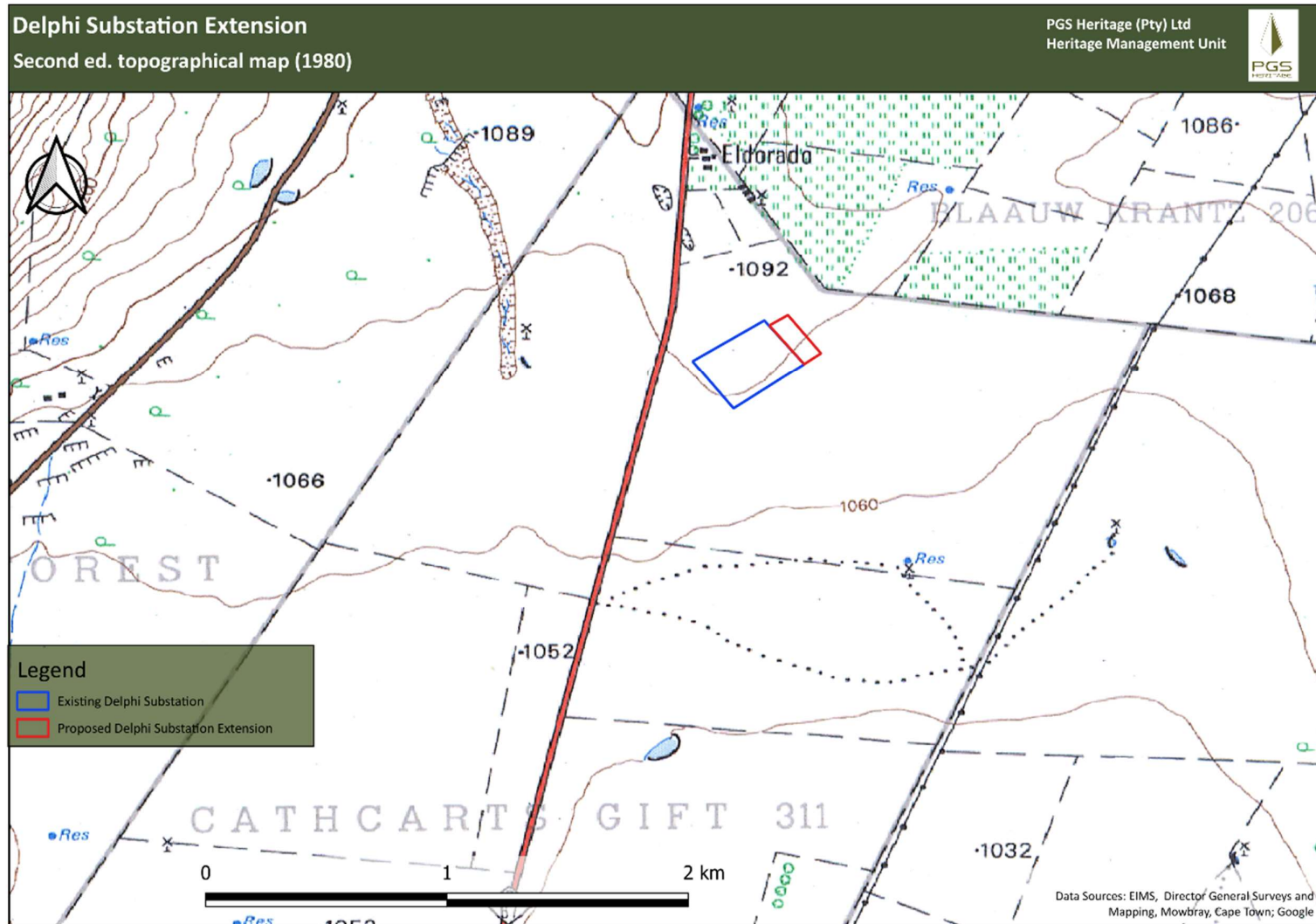


Figure 13 - Second edition topographical map 3226BB (1980).

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4.2.2 Previous heritage impact assessment reports from the study area and surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed below in ascending chronological order:

- Van Ryneveld, K. 2011. Phase 1 Archaeological Impact Assessment – The Xashimba Abattoir, near Queenstown, Eastern Cape, South Africa. **Significant MSA/LSA deposits were identified.**
- Van Ryneveld, K., 2015. Phase 1 Archaeological Impact Assessment – Spectra Foods Broiler Houses and Abattoir, Farms 170 and 171, Queenstown, Lukhanji Municipality, Eastern Cape. **No archaeological or heritage resources were documented.**
- Van Ryneveld, K., 2016. Phase 1 Archaeological & Cultural Heritage Impact Assessment – Galla Hills Quarry, Farm Roode Krantz RE/203, Queenstown, Lukhanji Local Municipality, Eastern Cape. **Here a low density MSA occurrence was noted and documented.**
- Van Ryneveld, K., 2016. Archaeological & Cultural Heritage Statement [for a proposed development under the National Heritage Resources Act (NHRA) 1999, Section 38(1) footprint] – Ezibeleni Waste Buy-Back Centre (Near Queenstown), Enoch Mgijima Local Municipality, Eastern Cape. **No archaeological or heritage resources were documented.**
- Van Ryneveld, K., 2017. Phase 1 Archaeological & Cultural Heritage Impact Assessment – Belvoir Aggregate Quarry II, Portion 7 of Farm Maidenhead 169, Division of Queenstown, Enoch Mgijima Local Municipality, Eastern Cape. **Here also a low density MSA and LSA scatter across the landscape was noted and documented.**
- Booth, C., 2020. A Phase 1 Archaeological Impact Assessment for the Proposed Hewu Ph9 Raw Water Supply to Sada Water Treatment Works (Wtw), Enoch Mgijima Local Municipality, Eastern Cape Province. **No archaeological or heritage resources were documented.**

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- Van Ryneveld, K., 2020. Letter of Recommendation for Exemption from a Full Phase 1 Archaeological and Cultural Heritage Impact Assessment (AIA) – Maidenhead Farming Development, Farm Maidenhead 170, Remainder of Portion 5 of Farm Ashby Manor 171 and Portion 9 of Farm Maidenhead 169, near Queenstown, Chris Hani District Municipality, Eastern Cape. **No archaeological or heritage resources were documented.**

4.2.3 *Heritage screening*

A heritage screening report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the heritage screening report, the project area has a Low Heritage Sensitivity (**Figure 14**). The fieldwork has shown that some archaeological and heritage resources were present in the area and thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data that the screening data is based on.

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Screening Report Map

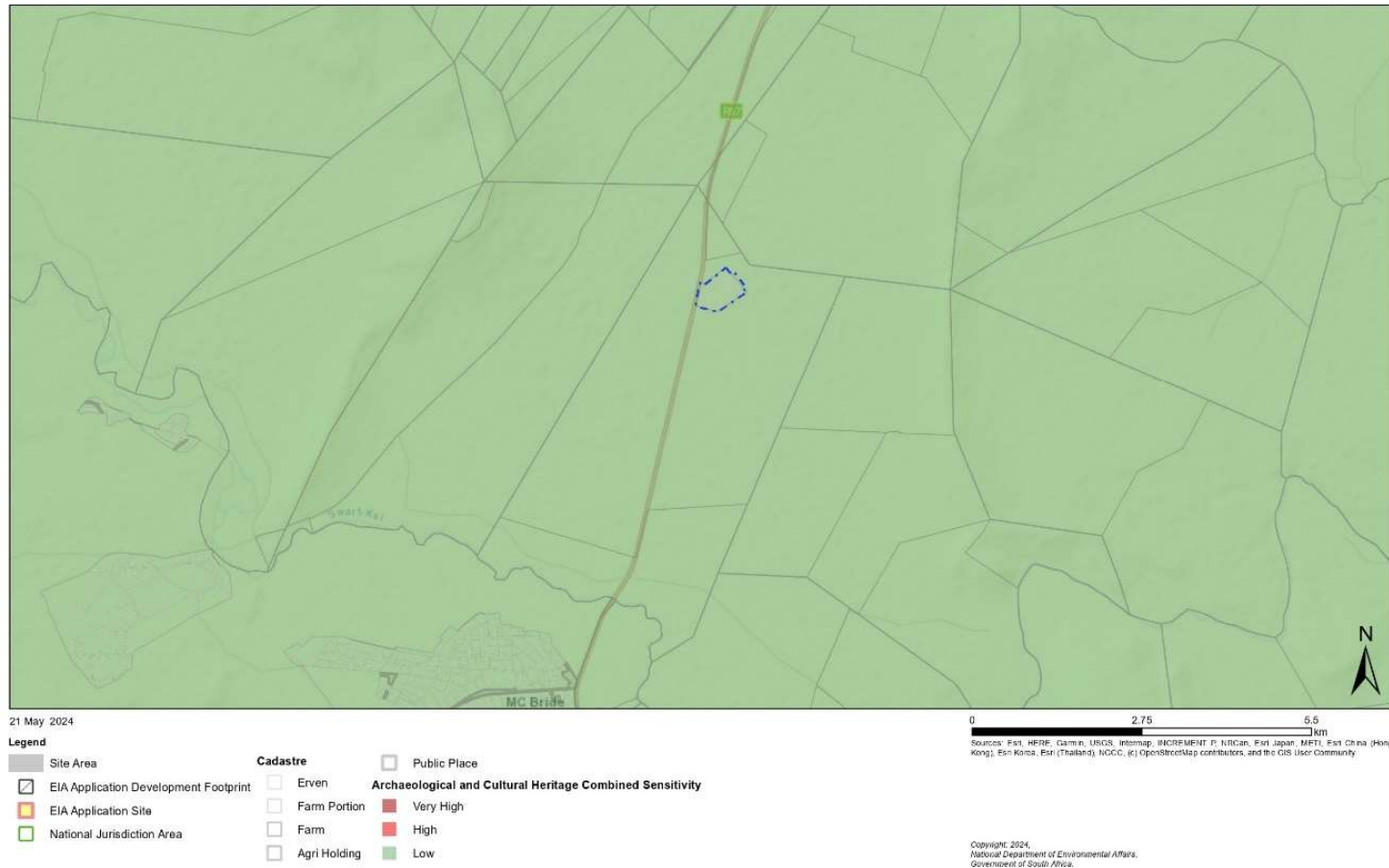


Figure 14 - Screening tool map indicating a low sensitivity rating for archaeology and heritage

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4.2.4 Heritage sensitivity

Analysis of maps and satellite imagery enabled the identification of possible heritage sensitive areas. By superimposition and analysis, it was possible to rate these structures according to age and thus their level of protection under NHRA. **Table 4** lists the possible tangible heritage sites identified in the vicinity of the study area and the relevant legislative protection.

Table 4: Tangible heritage site in the study area.

Name	Description	Legislative protection
Archaeology	Older than 100 years	NHRA Sections 3 and 35
Structures	Possibly older than 60 years	NHRA Sections 3 and 34
Burial grounds	Graves	NHRA Sections 3 and 36 and MP Graves Act

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix (**Table 5**).

Table 5: Landform type to heritage find matrix

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements
Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Water holes/pans/rivers	MSA and LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements

4.3 Fieldwork findings

A field team of PGS heritage conducted the fieldwork on 23 May 2024. Their movement on site was tracked by GPS, and a tracklog map can be seen in **Figure 15**.

During the fieldwork only one heritage feature/resource was identified (**Figure 16**). The site is a Stone Age lithic artefact exposure (**DE001**). See **Figure 15** and the individual site description as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

The Stone Age exposure of **DE001** (**Figure 16**) is of a total of 26 lithic artefacts seen in a 3x3m radius. Here, the erosion through a footpath and a cutting in the soil profile (probably through the original building and levelling of the substation) have led to the exposure of lithics mostly made on

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basalt. The lithics appear to have been mostly edge-rolled (indicating alluvial transport) but some have fresher edges. The site may, in fact, be an alluvial gravel deposit from occupation of the landscape some 300,000-30,000 years ago, and the assemblage could possibly be attributed to the Middle Stone Age techno-complex, but further research is necessary. Due to the sites quantity and possible subterranean context it was given a low local significance.

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Figure 15 - Fieldwork tracklogs (track in green, study area in red and blue)

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Figure 16 - Identified heritage resources within the Delphi Substation extension development area.

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5 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix B**.

The following section provides an analysis of the impact of the proposed project area on heritage resources identified within the Delphi Substation Expansion.

5.1 Details of all alternatives considered

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project.

The “no-go” alternative refers to the option of not going ahead with the proposed project. This will entail maintaining the current status quo with no impact from the project.

5.1.1 Archaeological resources

The archaeological site at **DE001** has a low local heritage significance with a heritage grading of III-C. The possibility of the archaeological resources impacted by the proposed SF cannot be excluded and the project can potentially have a MEDIUM negative impact without and LOW negative with mitigation.

5.2 Impact assessment summary table

Implementing the impact assessment methodology as supplied by the EIMS (**Appendix A**) provides a quantitative assessment of the impacts of the proposed Delphi Substation Expansion. Refer to **Table 6**.

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Table 6: Impact Table – Archaeological sites

IMPACT DESCRIPTION				Pre-Mitigation							Post Mitigation								Priority Factor Criteria				
Identifier	Impact	Alternative	Phase	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Pre-mitigation ER	Nature	Extent	Duration	Magnitude	Reversibility	Probability	Post-mitigation ER	Confidence	Public response	Cumulative Impact	Irreplaceable loss	Priority Factor	Final score
DE001	Archaeological site disturbed	Alternative 1	Construction	-1	2	5	2	5	4	-14	-1	2	5	1	5	1	-3,25	Medium	1	1	2	1,17	-3,79

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6 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

The following section must be read in conjunction with **Table 8** of this report.

6.1 Construction and operational phases

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

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

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

6.2 Chance finds procedure

- A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts **during the implementation of the EMPr.**
- An appropriately qualified heritage practitioner / archaeologist must be identified to be called upon if any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction, the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

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6.3 Possible finds during construction

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

- Stone Age sites

6.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. **Table 7** gives guidelines for lead times on permitting.

Table 7: Lead times for permitting and mobilisation

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

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6.5 Heritage Management Plan for EMP implementation

Table 8: Heritage Management Plan for EMP implementation

Area and site no.	Mitigation measures	Phase	Timeframe	The responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement a chance to find procedures in case where possible heritage finds are uncovered.	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34-36 and 38 of NHRA	ECO Monthly Checklist/Report
Archaeological sites	<p>DE001 to be given a 30m no-go buffer. If it is not possible the site must be recorded with a permit from the Eastern Cape provincial Heritage Authority (ECPHRA) in accordance with s35 of the NHRA. Test pits will be dug following the permit.</p> <p>Before construction commences an application for destruction of the archaeological site must be submitted to the ECPHRA with the backing of the mitigation report.</p> <p>Monitoring during site clearing in a 20-meter radius from the identified archaeological sites through the implementing of an archaeological watching brief.</p> <p>Upon completion a destruction permit must be applied for from the ECPHRA with the backing of the mitigation report.</p>	Construction	Construction	Applicant Archaeologist SAHRA ECPHRA	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Report after construction

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7 CONCLUSIONS AND RECOMMENDATIONS

PGS was appointed by EIMS to undertake an HIA that forms part of the Basic Environmental Assessment (BA) for the proposed NTCSA Transmission x Delphi Substation Extension near Komani, Eastern Cape Province.

During the fieldwork, only one heritage feature/resource was identified (**Figure 16**). The site is a Stone Age lithic artefact exposure (**DE001**). See **Figure 15** and the individual site description as contained in **Appendix C**. The field description forms were collected with ArcGIS Survey123 in field software.

Archaeological Site

DE001 is a Stone Age lithic exposure of local low significance. The numerous artefacts were found eroding out of a pathway and an adjacent cutting in the soil profile.

Mitigation measures

Mitigation measures are described in **Table 8** of this report.

Conclusion

It is the combined considered opinion of the heritage specialists that the proposed project will have a direct impact on the identified heritage resource rated being of low heritage significance.

With the implementation of recommended mitigation measures the overall impact on heritage resources will be reduced to acceptable levels during the activities of the project.

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8.4 Google Earth

All the aerial depictions and overlays used in this report are from Google Earth.

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APPENDIX A

ENVIRONMENTAL IMPACT METHODOLOGY

EIMS: IMPACT ASSESSMENT METHODOLOGY

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1. Purpose

The purpose of this procedure is to guide the undertaking of an impact and risk assessment process, as required under the regulations promulgated under the National Environmental Management Act (Act 107 of 1998 - NEMA).

2. Scope

This procedure provides the methodology to be applied to environmental impacts and risks identified during the Environmental Impact Assessment Process. The methodology ensures that consistent impact assessment rating is carried out that is legally compliant and aligned with EIMS's objective of providing a quality service.

3. References

GNR. 982 National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations, 2014 – hereafter referred to as the Regulations.

4. Additional Guidelines and References

Guidelines and Reference Docs (not exhaustive – please verify with the applicable competent authority).

Compulsory Compliance: GNR. 982 National Environmental Management Act (Act No. 107 of 1998 - NEMA): Environmental Impact Assessment Regulations, 2014.	National
Companion Guideline for Implementation: Environmental Management Assessment Regulations, 2010 - GN 805/2012 (NEMA)	National
DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria	National

5. Definitions and Abbreviations

Refer to Chapter 1 of the Regulations.

6. Procedure

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. The ER is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S). The impact assessment will be applied to all identified alternatives.

a. Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 1 below.

Table 1: Criteria for Determining Impact Consequence

Aspect	Score	Definition
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Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary)
	3	Local (i.e. the area within 5 km of the site)
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts)
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible impact.

Once the C has been determined, the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 2.

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Table 2: Probability Scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 3: Determination of Environmental Risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
	Probability	1	2	3	4	5

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 4.

Table 4: Environmental Risk Scores

ER Score	Description
<9	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
≥9 ≤17	Medium (i.e. where the impact could have a significant environmental risk/ reward),
>17	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

b. Impact Prioritisation

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the

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decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 5: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 5. The impact priority is therefore determined as follows:

$$Priority = CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (Refer to Table 6).

Table 6: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

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Table 7: Final Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e. where the impact could influence the decision to develop in the area).
>-9, <0	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
0	No impact
>0, <9	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e. where the impact could influence the decision to develop in the area).
>17	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

7. Responsibilities

It is the responsibility of each EIMS employee and each external Specialist appointed by EIMS to ensure that this procedure is carried out as described. All the personnel within the organization have the responsibility to report any deviations/changes from the procedures to management. This is to ensure that the necessary changes are documented after approval.

It is the responsibility of the senior/ junior consultant (as applicable) assigned with the task of report compilation to ensure that this methodology/ procedure is strictly applied. It is the responsibility of the assigned Senior Consultant or Quality Reviewer to review and verify that the procedure has been complied with, and such documented at the specified quality check intervals.

8. Records

RECORD	STORAGE LOCATION	STORAGE SYSTEM	RESPONSIBLE PERSON	RETENTION PERIOD
Significance Rating Input Spreadsheet	Project File - /Server/assignments/ Job#/Records	Electronic- Scanned PDF	Project Manager	10 Years

9. Record of Changes, Revisions and Cancellations

RECORD OF CHANGES, REVISIONS AND CANCELLATIONS		
DATE	NATURE / DETAIL OF CHANGE	REV No.

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APPENDIX B
SITE DESCRIPTION FORMS

Site coordinates		
site_nr	X	Y
DE001	-32.01058	26.80738

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Site Number	X	Y	Brief Site Description	Significance	Heritage Rating
DE001	-32.01058	26.80738	3x3m sample collection of MSA stone tools. Scrapers seen. Foot path and leveling of the original power plant left slopes with exposures of stone tools. 26 in total with mostly rolled edges so transported down stream. A few had sharp edges still so possibly locally produced. All possibly made on basalt.	Low	Grade 3 - C (IIIC)

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Figure 17 - Footpath where tools eroded from.



Figure 18 - Cutting where tools eroded from.

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Figure 19 - A general view of the cutting from levelling during the construction of Delphi Substation.



Figure 20 - Dorsal side of the 26 artefacts.

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Figure 21 - Ventral side of the 26 artefacts.



Figure 22 - Rounded edges from alluvial transport.

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Figure 23 - Fresher edges of a scraper.

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APPENDIX C

PGS TEAM CVS

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DANIEL TASKER

Professional Archaeologist

PROFILE

Junior Archeologist- holds a Masters degree in Archaeology specialising in the Early Stone Age and is registered with the Association of Southern African Professional Archaeologists as a Professional Archaeologist.

My work focuses on the process of heritage management through Heritage Impact Assessments, mitigation projects and artefact analysis. I currently work all over South Africa on numerous projects.

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PGS
HERITAGE

EDUCATION

University of the Witwatersrand

2014 - 2016

BA Degree - Majors in Archaeology and Geography

University of the Witwatersrand

2017

BSc Hon Archaeology, with GIS.

University of the Witwatersrand

2018 - 2020

MSc by research in Archaeology, specialising in the Early Stone Age. (Golden Key member)

WORK EXPERIENCE

PGS Heritage -

Junior Archaeologist

2023- present

I am responsible for conducting heritage and archaeological impact studies, material analysis and archaeological excavations.

The University of the Witwatersrand, Origins Centre - Museum Tour Guide

2016 - 2019

Tour guiding of the human origins across Africa.

PROFESSIONAL AFFILIATION

Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists -
Since 2018

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WOUTER FOURIE

Professional Heritage Practitioner

PROFILE

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

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

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EDUCATION

University of Pretoria

1993-1996

BA Degree - Majors in Archaeology, Anthropology and Geography

University of Pretoria

1997

BA Hon Archaeology, with further specialisation in environmental management.

University of Cape Town

2016 - present

MPhil Conservation of the Built Environment

WORK EXPERIENCE

PGS Heritage Group of Companies

(South Africa, Lesotho, Mozambique, and Portugal)

Director - Heritage Specialist

2003- present

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

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

2007-2008

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

Matakoma Consultants - Director - Heritage Specialist

2000 - 2008

Heritage specialist and Director responsible for heritage and archaeological impact studies

Randfontein Estate Gold Mine - Environmental Coordinator

Oct 1998- Feb 2000

Coordinating all environmental Rehabilitation work

Department of Minerals and Energy Environmental Officer

Oct 1997 - Sept 1998

PROFESSIONAL AFFILIATION

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Association of Professional Heritage Practitioners
Since 2014

Accredited Professional Archaeologist

Association of Southern African Professional Archaeologists -
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