



PHASE 1 HIA REPORT BLOUPAN, REMAINDER OF THE FARM ANNESLEY NO. 338, NORTHERN CAPE

PROPOSED SALT MINE ON BLOUPAN, LOCATED ON THE
REMAINDER OF THE FARM ANNESLEY NO. 338,
DAWID KRUIPER LOCAL MUNICIPALITY,
Z.F. MGCAWU DISTRICT MUNICIPALITY,
NORTHERN CAPE.

PREPARED FOR:

VAN ZYL ENVIRONMENTAL CONSULTANTS CC

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Version 2

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For this project, Mr Engelbrecht was responsible for the field survey of the development footprint, identification of heritage resources, and recommendations. Ms Fivaz was responsible for research and report compilation.

Declaration of independence:

We, Jan Engelbrecht and Heidi Fivaz, partners of UBIQUE Heritage Consultants, hereby confirm our independence as heritage specialists and declare that:

- we are suitably qualified and accredited to act as independent specialists in this application;
- we do not have any vested interests (either business, financial, personal or other) in the proposed development project other than remuneration for the heritage assessment and heritage management services performed;
- the work was conducted in an objective and ethical manner, in accordance with a professional code of conduct and within the framework of South African heritage legislation.



Signed:
J.A.C. Engelbrecht & H. Fivaz
UBIQUE Heritage Consultants

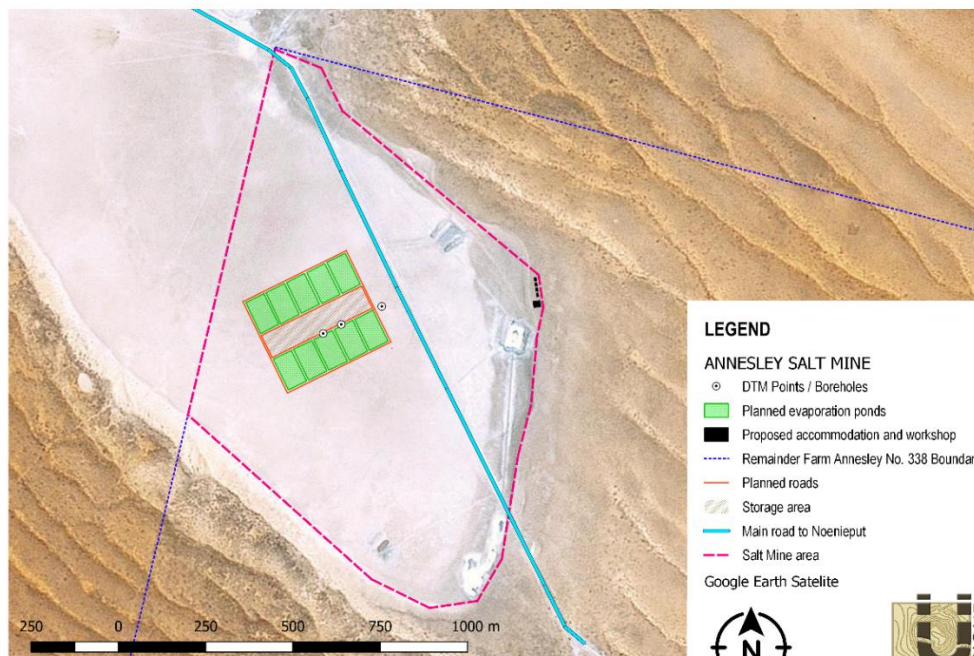
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EXECUTIVE SUMMARY

Technical summary

Project description	
Project name	PROPOSED SALT MINE ON BLOUPAN, LOCATED ON THE REMAINDER OF THE FARM ANNESLEY NO. 338, SITUATED WITHIN THE DAWID KRUIPER LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALTY, NORTHERN CAPE PROVINCE.
Description	Application for the proposed mining of salt on a portion of the Remainder of the Farm Annesley no. 338 in the Kalahari West, Northern Cape.
Developer	
Annesley Salt (Pty) Ltd	
Consultants	
Environmental	Van Zyl Environmental Consultants cc.
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu District Municipality
Local municipality	Dawid Kruiper Local Municipality
Topo-cadastral map	2720CB
Farm name	Remainder of Farm Annesley No. 338
Closest town	Noenieput
GPS Co-ordinates	latitude -27.588867 ° ; longitude 20.489743 °
Development footprint size	100 ha



PHASE 1 HIA PROPOSED SALT MINE ON BLOUPAN, REMAINDER OF THE FARM ANNESLEY NO. 338, DAWID KRUIPER LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALTY, GORDONIA, NORTHERN CAPE.

Figure 1 Proposed Salt Mine, Bloupan, Remainder of the Farm Annesley No 338. Based on kmz. file provided by Van Zyl Environmental Consultants cc.

Project description

UBIQUE Heritage Consultants were appointed by Van Zyl Environmental Consultants cc. as independent heritage specialists in accordance with Section 38 of the NHRA, to conduct a cultural heritage assessment to determine the impact of the proposed salt mining development on Bloupan, situated on Remainder of the Farm Annesley no. 338, on any sites, features, or objects of cultural heritage significance. The site is located approximately 120 km northwest of Upington, and approximately 35 km southeast of Noenieput, within the Dawid Kruiper Local Municipality, Z.F. Mgcawu District Municipality, Northern Cape Province.

Findings and Impact on Heritage Resources

Description	Period	Location	Field rating/ Significance
Stone Age			
1. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 51.8" S 20° 29' 42.6" E	Field Rating IV C Low significance
2. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 51.2" S 20° 29' 39.5" E	Field Rating IV C Low significance
3. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 45.3" S 20° 29' 26.5" E	Field Rating IV C Low significance
4. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 30.7" S 20° 29' 24.8" E	Field Rating IV C Low significance
5. MSA Chunks	Early LSA/MSA	27° 35' 36.7" S 20° 29' 23.4" E	Field Rating IV C Low significance
6. MSA Flakes	Early LSA/MSA	27° 35' 57.3" S 20° 29' 21.1" E	Field Rating IV C Low significance
7. MSA flake and chunks, possible knapping site, low density (n=/ <5 per m ²)	Early LSA/MSA	27° 35' 57.8" S 20° 29' 22.0" E	Field Rating IV C Low significance
8. MSA Chunk	Early LSA/MSA	27° 35' 55.8" S 20° 29' 22.8" E	Field Rating IV C Low significance
9. MSA Chunks and flakes	Early LSA/MSA	27° 35' 59.6" S 20° 29' 24.1" E	Field Rating IV C Low significance
10. MSA Debitage (chips and flakes)	Early LSA/MSA	27° 35' 52.0" S 20° 29' 14.7" E	Field Rating IV C Low significance
Historical			
11. No historical features were identified.			N/A
Graves			

12. No formal or informal graves were identified.			N/A
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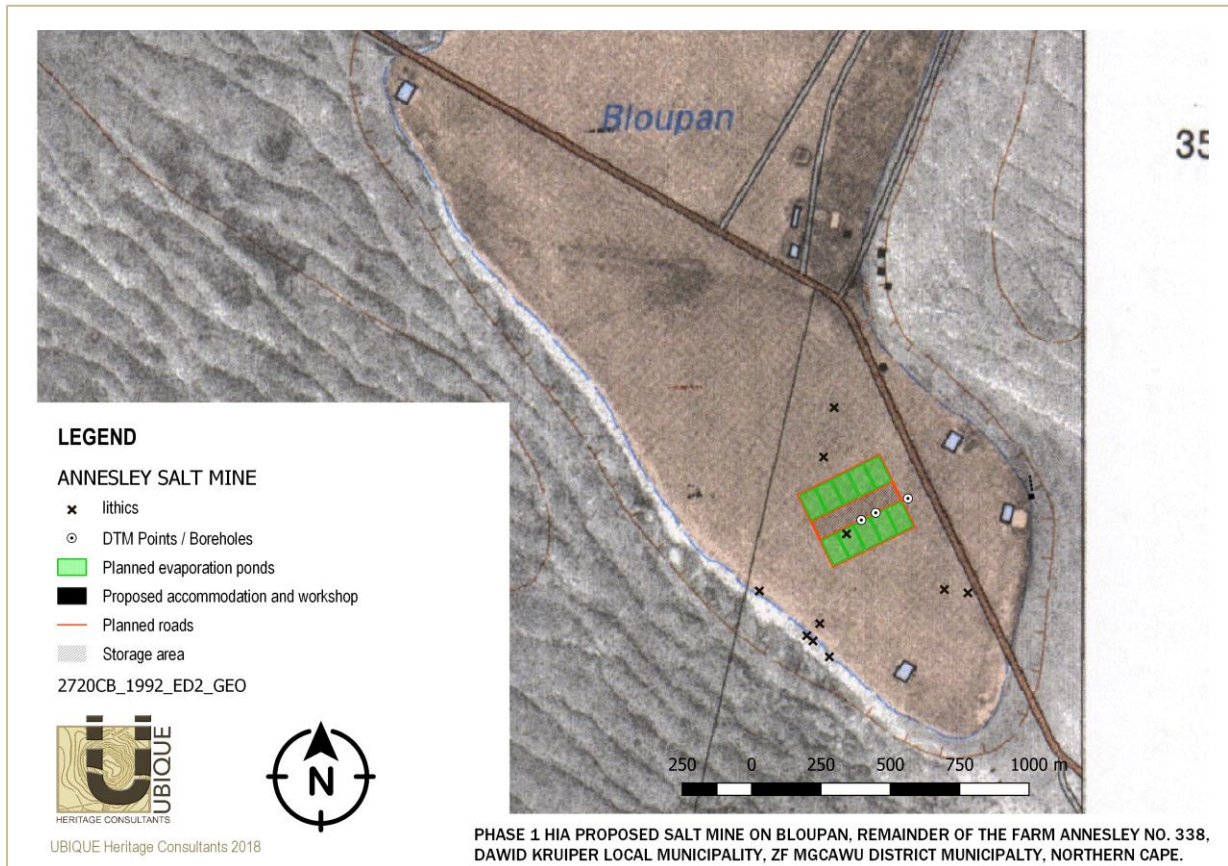


Figure 2 Lithic occurrences across the study area, indicated on Topo-cadastral map 2720CB, Surveyor General.

Recommendations

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No further mitigation is required. Therefore, from a heritage point of view we recommend that the proposed development can continue.
2. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. If fossil remains are discovered during any phase of construction, either on the surface or unearthed by fresh excavations, the ECO in charge of these developments ought to be alerted

immediately. These discoveries ought to be protected (preferably in situ) and the ECO must report to SAHRA so that appropriate mitigation (e.g. recording, collection) can be carried out by a professional palaeontologist (Butler 2018). A protocol for finds has been included within this report.

3. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

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ABBREVIATIONS

AIA:	Archaeological Impact Assessment
ASAPA:	Association of South African Professional Archaeologists
BIA:	Basic Impact Assessment
CRM:	Cultural Resource Management
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment*
EIA:	Early Iron Age*
EMP:	Environmental Management Plan
ESA:	Earlier Stone Age
GPS:	Global Positioning System
HIA:	Heritage Impact Assessment
LIA:	Late Iron Age
LSA:	Later Stone Age
MEC:	Member of the Executive Council
MIA:	Middle Iron Age
MPRDA:	Mineral and Petroleum Resources Development Act
MSA:	Middle Stone Age
NEMA:	National Environmental Management Act
NHRA:	National Heritage Resources Act
OWC:	Orange River Wine Cellars
PRHA:	Provincial Heritage Resource Agency
SADC:	Southern African Development Community
SAHRA:	South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations it must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological:	<p>material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;</p> <ul style="list-style-type: none">– 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 is older than 100 years (as defined and protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999) including any area within 10 m of such representation;– wrecks, being any vessel or aircraft, or any part thereof, which were wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), 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 sites on which they are found.
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Stone Age:	The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.
Earlier Stone Age:	>2 000 000 - >200 000 years ago
Middle Stone Age:	<300 000 - >20 000 years ago
Later Stone Age:	<40 000 - until the historical period
Iron Age:	(Early Farming Communities). Period covering the last 1800 years, when immigrant African farmer groups brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age. Early Iron Age: AD 200 - AD 900 Middle Iron Age: AD 900 - AD 1300 Later Iron Age: AD 1300 - AD 1850
Historic:	Period of arrival of white settlers and colonial contact. AD 1500 to 1950
Historic building:	Structures 60 years and older.
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:	These mean any place or object of cultural significance, tangible or intangible.
Holocene:	The most recent geological period that commenced 10 000 years ago.
Palaeontology:	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site that contains such fossilised remains or traces
Cumulative impacts:	“Cumulative Impact”, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.
Mitigation:	Anticipating and preventing negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.
A ‘place’:	a site, area or region;

- a building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- a group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- an open space, including a public square, street or park; and
- in relation to the management of a place, includes the immediate surroundings of a place.

‘Public monuments and memorials’: mean all monuments and memorials—

- erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government; or
- which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual;

‘Structures’: any building, works, device or other facility made by people and which are fixed to land, and include any fixtures, fittings and equipment associated therewith.

1. INTRODUCTION

1.1 Scope of study

The project involves the proposed salt mining development on Bloupan, situated on Remainder of the Farm Annesley no. 338. UBIQUE Heritage Consultants were appointed by Van Zyl Environmental Consultants cc as independent heritage specialists in accordance with the National Environmental Management Act 107 of 1998 (NEMA), and in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (NHRA), to conduct a cultural heritage assessment (AIA/HIA) of the development area.

The aim of the assessment is to identify and report any heritage resources that may fall within the development footprint; to determine the impact of the proposed development on any sites, features, or objects of cultural heritage significance; to assess the significance of any identified resources; and to assist the developer in managing the documented heritage resources in an accountable manner, within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

South Africa's heritage resources are both rich and widely diverse, encompassing sites from all periods of human history. Resources may be tangible, such as buildings and archaeological artefacts, or intangible, such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical, scientific, social, spiritual, linguistic, economic or technological values; their representation of a time or group; their rarity; and their sphere of influence.

The integrity and significance of heritage resources can be jeopardized by natural (e.g. erosion) and human (e.g. development) activities. In the case of human activities, a range of legislation exists to ensure the timely and accurate identification and effective management of heritage resources for present and future generations.

The result of this investigation is presented within this heritage impact assessment report. It comprises the recording of heritage resources present/ absent and offers recommendations for the management of these resources within the context of the proposed development.

Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, taking in account any proposed mitigation measures.

1.2 Assumptions and limitations

It is assumed that the description of the proposed project, as provided by the client, is accurate. Furthermore, it is assumed that the public consultation process undertaken as part of the Environmental Impact Assessment (EIA) is comprehensive and does not have to be repeated as part of the heritage impact assessment.

The significance of the sites, structures and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects. Cultural significance is site-specific and relates to the content and context of the site.

Although all possible care has been taken during the comprehensive field survey and intensive desktop study to identify sites of cultural importance within the development areas, it is important to note that some heritage sites may have been missed due to their subterranean nature, or due to dense vegetation cover. No subsurface investigation (i.e. excavations or sampling) were undertaken, since a permit from SAHRA is required for such activities. Therefore, should any heritage features and/or objects such as architectural features, stone tool scatters, artefacts, human remains, or fossils be uncovered or observed during construction, operations must be stopped, and a qualified archaeologist contacted for an assessment of the find. 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.

2. TERMS OF REFERENCE

An HIA/ AIA must address the following key aspects:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

In addition, the HIA/AIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency.

2.1. Statutory Requirements

2.1.1 General

The Constitution of the Republic of South Africa Act 108 of 1996 is the source of all legislation. Within the Constitution the Bill of Rights is fundamental, with the principle that the environment should be protected for present and future generations by preventing pollution, promoting conservation and practising ecologically sustainable development. With regard to spatial planning and related legislation at national and provincial levels the following legislation may be relevant:

- Physical Planning Act 125 of 1991
- Municipal Structures Act 117 of 1998
- Municipal Systems Act 32 of 2000
- Development Facilitation Act 67 of 1995 (DFA)

The identification, evaluation and management of heritage resources in South Africa are required and governed by the following legislation:

- National Environmental Management Act 107 of 1998 (NEMA)
- KwaZulu-Natal Heritage Act 4 of 2008 (KZNHA)
- National Heritage Resources Act 25 of 1999 (NHRA)
- Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA)

2.1.2 National Heritage Resources Act 25 of 1999

The NHRA established the South African Heritage Resources Agency (SAHRA) together with its Council to fulfil the following functions:

- co-ordinate and promote the management of heritage resources at national level;
- set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- provide for the protection and management of conservation-worthy places and areas by local authorities.

2.1.3 Heritage Impact Assessments/Archaeological Impact Assessments

Section 38(1) of the NHRA of 1999 requires **the responsible heritage resources authority to notify the person who intends to undertake a development that fulfils the following criteria to submit an impact assessment report if there is reason to believe that heritage resources will be affected by such development:**

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity that will change the character of a site—
 - exceeding 5000m² in extent; or
 - involving three or more existing erven or subdivisions thereof; or
 - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the re-zoning of a site exceeding 10 000m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

2.1.4 Definitions of heritage resources

The NHRA defines a heritage resource as any place or object of cultural significance, i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. These include, but are not limited to, the following wide range of places and objects:

- living heritage as defined in the National Heritage Council Act No 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- Eco facts (non-artefactual organic or environmental remains that may reveal aspects of past human activity; definition used in KwaZulu-Natal Heritage Act 2008);
- places, buildings, structures and equipment;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds;
- public monuments and memorials;
- sites of significance relating to the history of slavery in South Africa;
- movable objects, but excluding any object made by a living person; and
- battlefields.

Furthermore, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; and
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.

2.1.5 Management of Graves and Burial Grounds

- **Graves younger than 60 years** are protected in terms of Section 2(1) of the Removal of Graves and Dead Bodies Ordinance 7 of 1925 as well as the Human Tissues Act 65 of 1983.
- **Graves older than 60 years, situated outside a formal cemetery administered by a local Authority** are protected in terms of Section 36 of the NHRA as well as the Human Tissues Act of 1983. Accordingly, such graves are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of NHRA) is applicable to graves older than 60 years that are situated outside a formal cemetery administered by a local authority. Graves in the category located inside a formal cemetery administered by a local authority will

also require the same authorisation as set out for graves younger than 60 years over and above SAHRA authorisation.

The **protocol for the management of graves older than 60 years situated outside a formal cemetery administered by a local authority** is detailed in Section 36 of the NHRA:

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

3. STUDY APPROACH AND METHODOLOGY

3.1 Desktop study

The first step in the methodology was to conduct a desktop study of the heritage background of the area and the site of the proposed development. This entailed the scoping and scanning of historical texts/records as well as previous heritage studies and research around the study area.

By incorporating data from previous CRM reports done in the area and an archival search, the study area is contextualised. The objective of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

No archaeological site data was available for the project area. A concise account of the archaeology and history of the broader study area was compiled from sources including those listed in the bibliography.

3.1.1 Literature review

A survey of literature was undertaken to obtain background information regarding the area. Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined that several other archaeological or historical studies have been performed within the wider vicinity of the study area. Sources consulted in this regard are indicated in the bibliography.

3.2 Field study

The Phase 1 (AIA/HIA) requires the completion of a field study to establish and ensure the following:

3.2.1 Systematic survey

A systematic survey of the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest, was completed.

UBIQUE Heritage Consultants inspected the proposed development and surrounding areas on the 11th of October 2018 and completed a controlled-exclusive, pre-planned, pedestrian survey. We conducted an inspection of the surface of the ground, wherever the surface was visible. This was done with no substantial attempt to clear brush, sand, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposures fortuitously observed.

3.2.2 Recording significant areas

GPS points of identified significant areas were recorded with a handheld Garmin global positioning unit (Garmin eTrex 10). Photographs were taken with a Sony Coolpix 10-megapixel camera. Detailed fieldnotes were taken to describe observations. The layout of the area and plotted by GPS points, tracks and coordinates, were transferred to Google Earth and QGIS, and maps were created.

3.2.3 Determining significance

Levels of significance of the various types of heritage resources observed and recorded in the project area will be determined to the following criteria:

Cultural significance:

- Low A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
- Medium Any site, structure or feature being regarded less important due to several factors, such as date and frequency. Likewise, any important object found out of context.
- High Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Likewise, any important object found within a specific context.

Heritage significance:

- Grade I Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III Other heritage resources of local importance and therefore worthy of Conservation

Field ratings:

- i. National Grade I significance should be managed as part of the national estate
- ii. Provincial Grade II significance should be managed as part of the provincial estate
- iii. Local Grade IIIA should be included in the heritage register and not be mitigated (high significance)
- iv. Local Grade IIIB should be included in the heritage register and may be mitigated (high/ medium significance)
- v. General protection A (IV A) site should be mitigated before destruction (high/ medium significance)
- vi. General protection B (IV B) site should be recorded before destruction (medium significance)
- vii. General protection C (IV C) phase 1 is seen as sufficient recording and it may be demolished (low significance)

Heritage value, statement of significance:

- a. its importance in the community, or pattern of South Africa's history;

- b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d. its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i. sites of significance relating to the history of slavery in South Africa.

3.3 Oral history

Where possible, people from local communities will be interviewed to obtain information relating to the surveyed area.

3.4 Report

The results of the desktop research and field survey are compiled in this report. The identified heritage resources and anticipated and cumulative impacts that the development of the proposed project may have on the identified heritage resources will be presented objectively. Alternatives, should any significant sites be impacted adversely by the proposed project, are offered. All effort will be made to ensure that all studies, assessments and results comply with the relevant legislation and the code of ethics and guidelines of the Association of South African Professional Archaeologists (ASAPA). The report aims to assist the developer in managing the documented heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

4. PROJECT OVERVIEW

UBIQUE Heritage Consultants were appointed by Van Zyl Environmental cc. on behalf of Annesley Salt (Pty) Ltd, as independent heritage specialists in accordance with Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA), to conduct a cultural heritage assessment to determine the impact of the proposed salt mining development on Bloupan, situated on Remainder of the Farm Annesley no. 338, on any sites, features, or objects of cultural

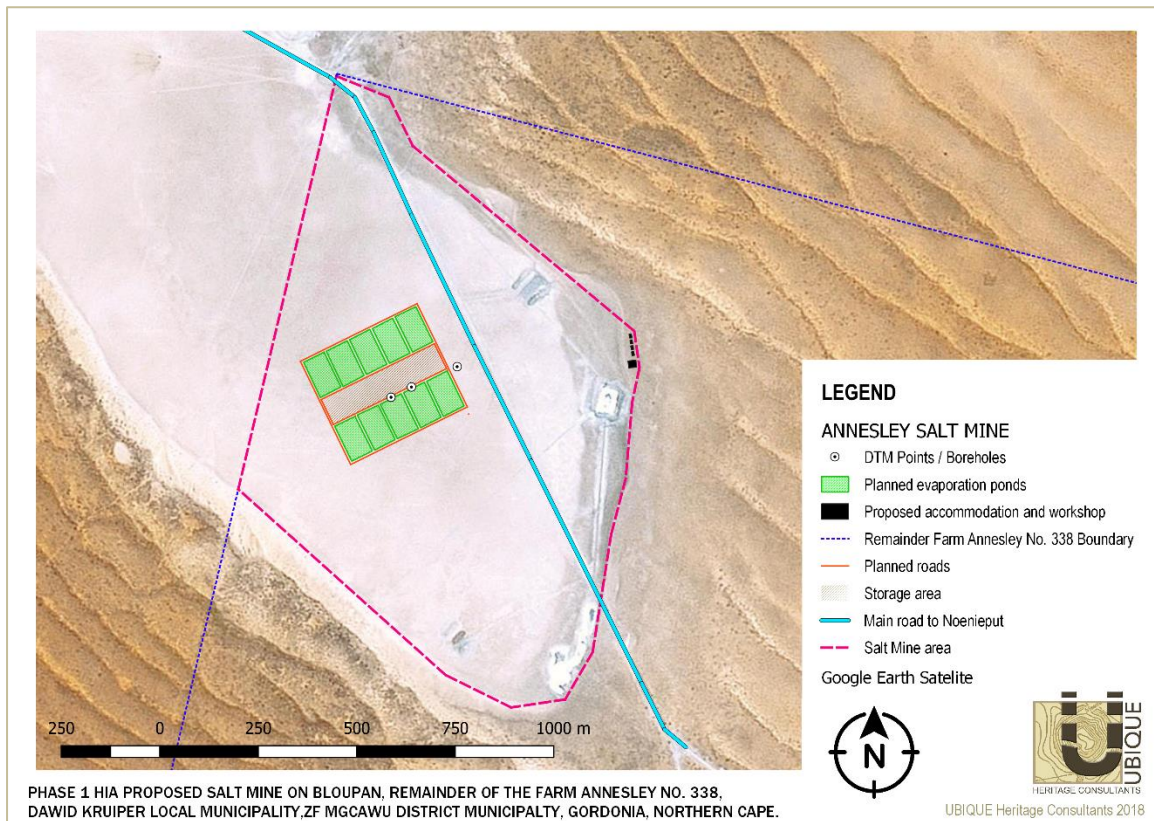
heritage significance. The site is located approximately 120 km northwest of Upington, and approximately 35 km southeast of Noenieput, within the Dawid Kruiper Local Municipality, Z.F. Mgcawu District Municipality, in the Northern Cape Province.

The project entails the application by Annesley Salt (Pty) Ltd for Mining Rights for Salt on the above mention property and the consequent development of mining infrastructure. The proposed mine development will consist of the construction of ten evaporation ponds, measuring 6000 m² each, a storage area 22,750 m² in size, access roads, a workshop and accommodation. According to the information provided by Annesley Salt, highly saline groundwater (brine) will be abstracted from three existing boreholes at the salt pan and pumped to the ten evaporation ponds from where the salt will be cyclically harvested six times a year. The proposed salt mine requires c.17 550 m³ of brine per harvest cycle, which equates to 105 300 m³ of total brine abstracted over a period of nine months per annum (i.e. over c.285 days per annum). This equates to an average abstraction rate of 370 m³ per day. Salt is not harvested during the cold winter months from 31 May to 20 August, as the evaporation rate is too low for good quality salt crystals to form; hence, no water is abstracted from the boreholes during this period. (Du Preez & Visser 2018).

4.1 Technical information

Project description	
Project name	PROPOSED SALT MINE ON BLOUPAN, LOCATED REMAINDER OF THE FARM ANNESLEY NO. 338, SITUATED WITHIN THE DAWID KRUIPER LOCAL MUNICIPALITY, ZF MGCWU DISTRICT MUNICIPALTY, IN THE NORTHERN CAPE PROVINCE.
Description	Application for the proposed mining of salt on a portion of the Remainder of the Farm Annesley no. 338 in the Kalahari West, Northern Cape.
Developer	
Annesley Salt (Pty) Ltd	
Contact information	Private Bag X6009 Upington 8800
Development type	Mining
Land owner	
Contact information	
Consultants	
Environmental	Van Zyl Environmental Consultants cc
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	Banzai Environmental
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu District Municipality
Local municipality	Dawid Kruiper Local Municipality
Topo-cadastral map	2720CB
Farm name	Remainder of the Farm Annesley no. 338
Closest town	Noenieput

GPS Co-ordinates	latitude -27.588867 ° ; longitude 20.489743 °	
Property size	100 ha	
Development footprint size	100 ha	
Land use		
Previous		
Current		
Re- zoning required		
Sub-division of land	No	
Development criteria in terms of Section 38(1) NHRA		Yes/No
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.		Yes
Construction of bridge or similar structure exceeding 50m in length.		No
Construction exceeding 5000m ² .		Yes
Development involving three or more existing erven or subdivisions.		No
Development involving three or more erven or divisions that have been consolidated within the past five years.		No
Rezoning of site exceeding 10 000m ² .		No
Any other development category, public open space, squares, parks, recreation grounds.		No



PHASE 1 HIA PROPOSED SALT MINE ON BLOUPAN, REMAINDER OF THE FARM ANNESLEY NO. 338, DAVID KRUIPER LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALTY, GORDONIA, NORTHERN CAPE.

Figure 3 Proposed Salt Mine, Bloupan, Remainder of the Farm Annesley No 338. Based on kmz. file provided by Van Zyl Environmental Consultants cc.

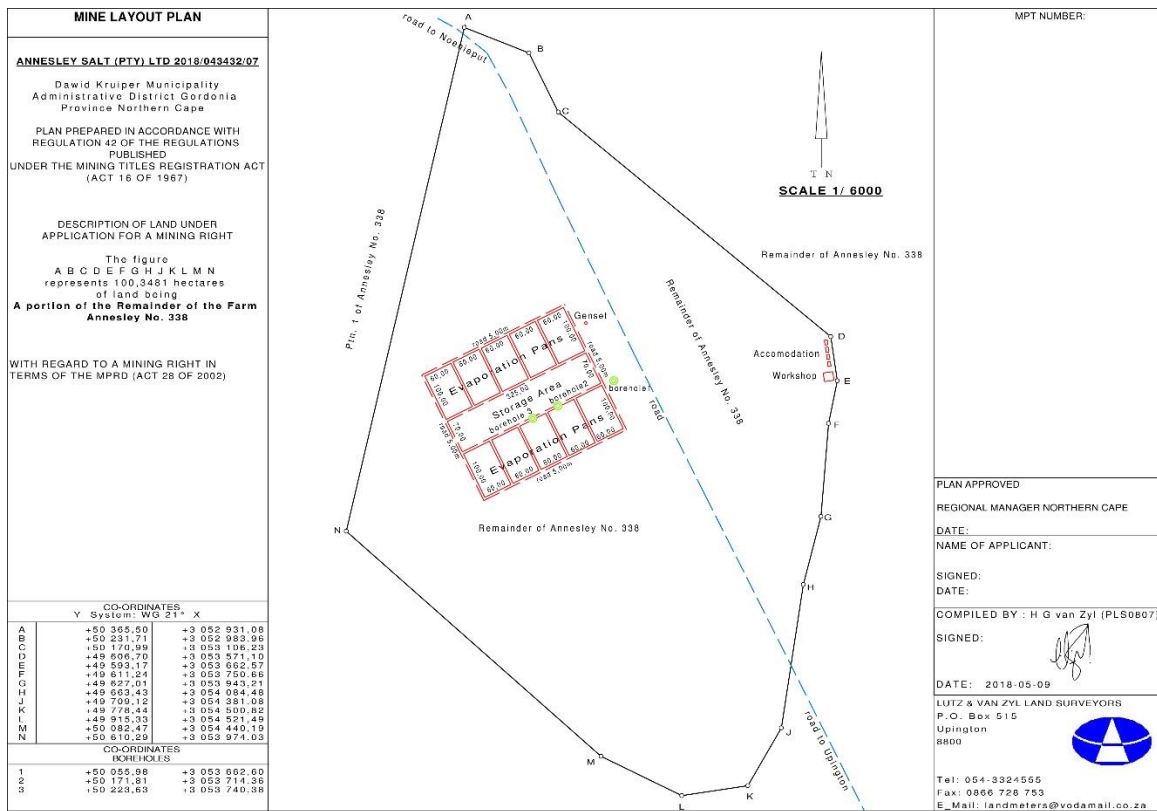


Figure 4 Proposed Salt Mine, Bloupan, Remainder of the Farm Annesley No 338. Site plan provided by Van Zyl Environmental Consultants cc.

4.2 Description of affected environment

The Dawid Kuiper Local Municipality falls predominantly within the Savanna biome and Kalahari Duneveld bioregion (Mucina & Rutherford 2006). Bloupan, situated on the Remainder of the Farm Annesley No. 338, is a characteristic Southern Kalahari Salt Pan. The pan formed on diamictites, a type of lithified sedimentary rock of the Dwyka Group (Karoo Supergroup) and the pan soils consist of white (washed) sand in shallow pans, rocky soils on calcrete outcrops, and typically sandy clays very rich in Na, K, Mg, and with a high pH value. The pan bottom is exposed for most of the year and only have shallow pools of water for a short time after very good rains (March–April) (Mucina & Rutherford 2006). At the time of our visit the pan was devoid of any vegetation and minimal surface water was visible.

Bloupan is surrounded by Gordonia Duneveld. The parallel fixed dunes consist of Aeolian sand underlain by superficial silcretes and calcretes of the Cenozoic Kalahari Group. Vegetation typically found on these dunes include open shrubland with ridges of grassland dominated by *Stipagrostis amabilis* on the dune crests, and *Acacia haematoxylon* on the dune slopes, also with *A. mellifera* on lower slopes and *Rhigozum trichotomum* in the interdune *straaten* (Mucina & Rutherford 2006).

The site of the prospective salt mine is flat with minimal fluctuations in altitude. The pan's surface is covered with stones and in certain areas the pan show signs of small-scale construction disturbance. Development of several evaporation salt ponds has already commenced at the time of our survey. A shallow man-made dam is evident too.

Access to the site from the southeast is via an unnamed secondary gravel road that turns off from the R360, between Upington and Askham, towards Noenieput. This road runs through the study area, east of the proposed evaporation ponds. Established saltworks can be found in the northern part of Bloupan, at Witpan to the south, Kakoerabepan to the east, and Groot-Witpan to the southeast of Bloupan.



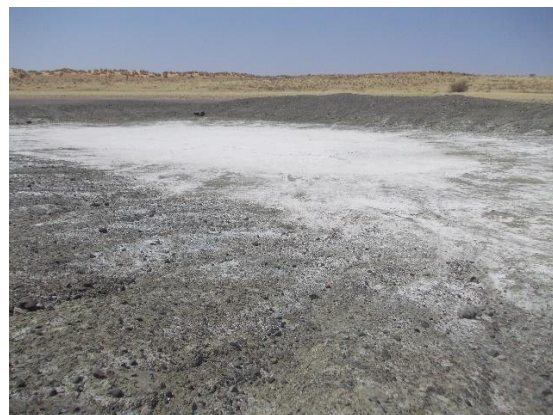
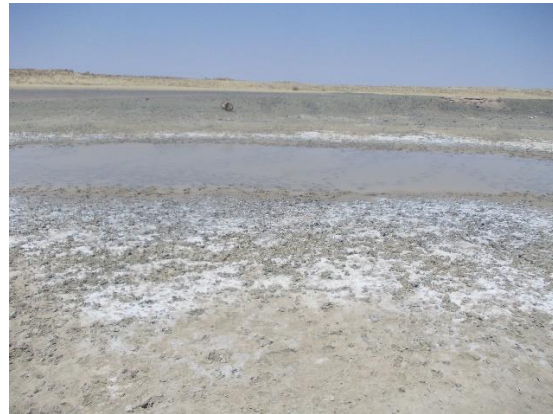
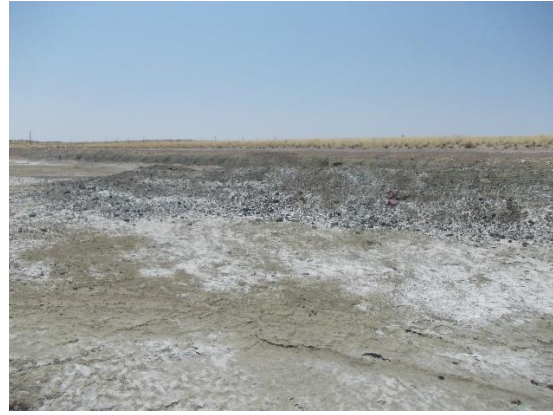


Figure 5 Views of the affected development area.

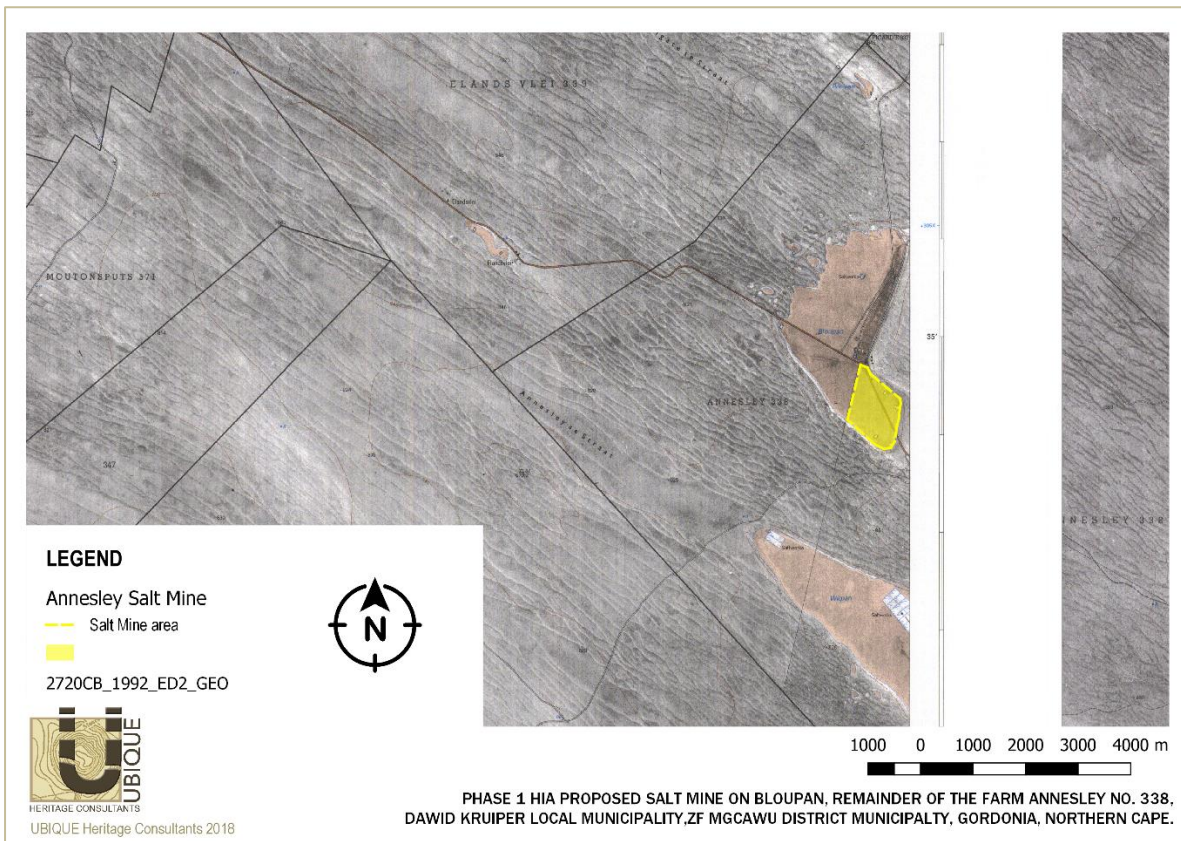


Figure 6 Locality of study area indicated on 1:50 000 Topo-Cadastral map 2720CB, Surveyor General

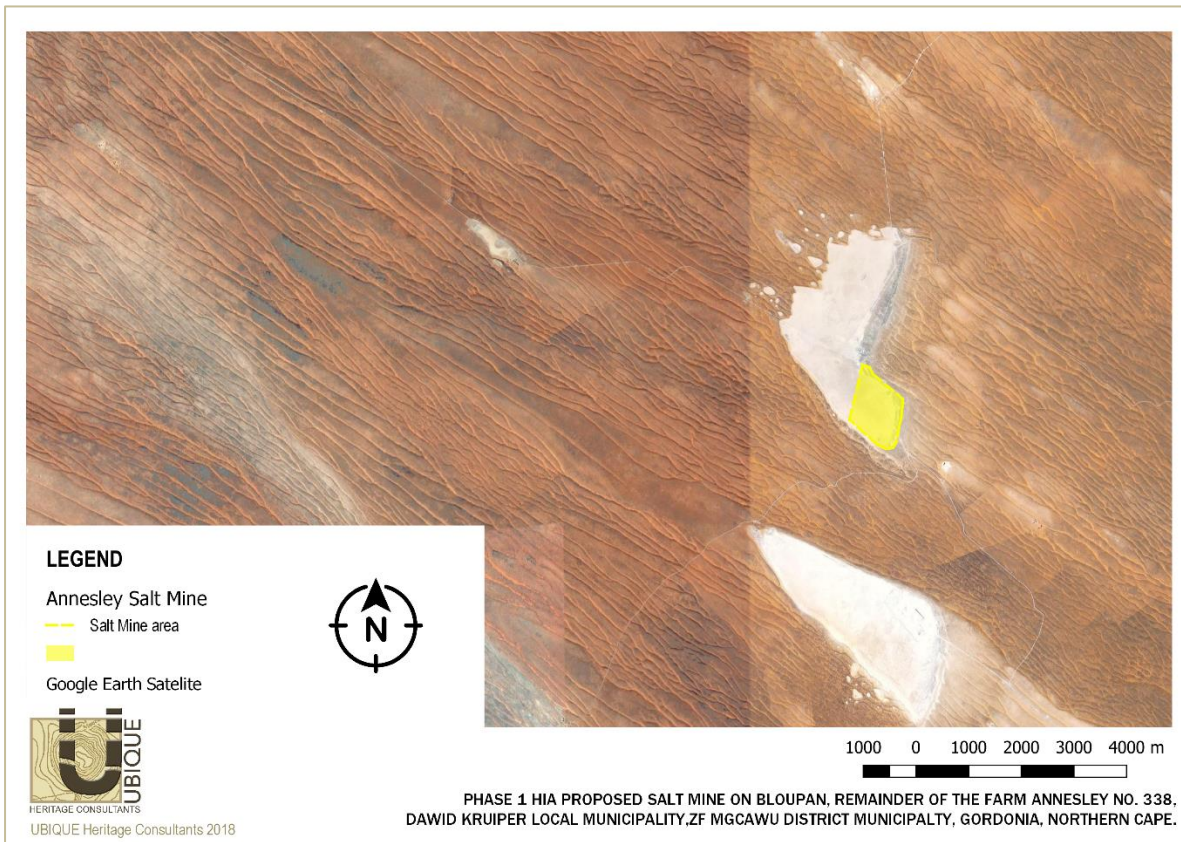


Figure 7 Locality of study area indicated on Google Earth Satellite image

5. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

5.1 Region

The Northern Cape is rich in archaeological sites and landscapes that reflect the complex South African heritage from the Stone Age to Colonial history.

5.1.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division of the Stone Age according to Lombard et al. (2012) is as follows:

Earlier Stone Age: >2 000 000 - >200 000 years ago
Middle Stone Age: <300 000 - >20 000 years ago
Later Stone Age: <40 000 - until the historical period.

Each of the sub-divisions is formed by a group of industries where the assemblages share attributes or common traditions (Lombard et al. 2012). Prominent sites that exemplify these periods in the Nama-Karoo Biome are Rooidam and Bundu Farm (Earlier Stone Age and Middle Stone Age), and Biesje Poort 2, Bokvasmaak 3, Melkboom 1, Vlermuiscgat, and Jagtpan 7 (Later Stone Age) (Lombard et al. 2012).

Within the region, Stone Age sites and complexes have been, and are still being investigated in some detail. This includes, but are not limited to, the landscape near Kathu, where numerous Stone Age sites have been documented and excavated, representing the longest preserved lithostratigraphic and archaeological sequence of human occupation at the pan through the ESA, MSA, and LSA and with evidence of 500 000-year-old hafted stone points; ancient specularite working (and mining) on the eastern side of Postmasburg, Doornfontein; and associated Ceramic Later Stone Age material, and also the older transitional ESA/MSA Fauresmith sites at Lyly Feld, Demaneng, Mashwening, King, Rust & Vrede, Paling, Gloucester and Mount Huxley (Beaumont 2004; Beaumont 2013; Beaumont & Morris 1990; Beaumont & Vogel 2006; Morris 2005; Morris & Beaumont 2004; Porat et al. 2010; Thackeray et al. 1983; Walker et al. 2014; Wilkins et al. 2012).

Beaumont et al. (1995) commented that thousands of square kilometres of Bushmanland are covered by low-density lithic scatters. It is therefore not surprising that Stone Age sites and lithic scatters were identified by CRM practitioners between the Garona substation and the Gariep/Orange River in numerous surveys conducted during the recent years. Scatters of MSA material have been recorded close to Griekwastad, Hotazel, Postmasburg and Kenhardt, Pofadder, Marydale, and in the Upington district (Dreyer 2006, 2012, 2014; Pelsler & Lombard 2013; PGS Heritage 2009, 2010; Webley 2013). MSA and LSA tools as well as rock engravings were also found at Putsonderwater, Beeshoek and Bruce (Morris 2005; Snyman 2000; Van Vollenhoven 2012b; Van Vollenhoven 2014).

Archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks and confluences to be prime localities for archaeological finds and specifically Stone Age sites since these areas were utilized for base camps close to water and hunting ranges. If any such features occur in the study area, Stone Age manifestations can be anticipated (Lombard 2011).

5.1.2 Historical period

The historical period within the region coincides with the incursion of white traders, hunters, explorers, and missionaries into the interior of South Africa. Buildings and structures associated with the early missionaries, travellers, and traders such as PJ Truter's and William Somerville (arriving in 1801), Donovan, Burchell and Campbell, James Read (arriving around 1870) William Sanderson, John Ryan and John Ludwig's (De Jong 2010; Snyman 2000) arrival during the 19th century, and the settlement of the first white farmers and towns, are still evident in the Northern Cape. Numerous heritage reports that provide a synthesis of the incursions of travellers, missionaries and the early European settlers have been captured on the SAHRIS database.

San hunter-gatherer groups utilised the landscape for thousands of years and Khoi herders moved into South Africa with their cattle and sheep approximately 2000 years ago. With the arrival of the Dutch settlers in the Cape in the mid-17th century, clashes between the Europeans and Khoi tribes in the Cape Peninsula resulted in the Goringhaiqua and Goraxouqua migrating north towards the Gariep/Orange River in 1680. These tribes became collectively known as the Korannas, living as small tribal entities in their own separate areas (Penn 2005).

According to Breutz (1953, 1954), and Van Warmelo (1935), several Batswana tribes, including the different Thlaping and Thlaro sections as well as other smaller groups, take their 18th and 19th century roots back to the area around Groblershoop, Olifantshoek, the Langeberg (Majeng) and Korannaberg ranges in the western part of the region. After Britain annexed Bechuanaland in 1885, the land of the indigenous inhabitants was limited to a few reserves. In 1895, when British Bechuanaland was incorporated into the Cape Colony, the land inside the reserves remained the property of the Tswana and could only be alienated with the consent of the British Secretary of State.

Because of its distance from the Cape Colony, this arid part of South Africa's interior was generally not colonised until relatively recent. According to history, the remote northern reaches of the Cape Colony were home to cattle rushers, gun-runners, river pirates and various manner of outlaws. Distribution of land to colonial farmers only occurred from the 1880s onwards when Government-owned land was surveyed, divided into farms, and transferred to farmers. More permanent large-scale settlement however only started in the late 1920s and the first farmsteads were possibly built during this period. The region remained sparsely populated until the advent of the 20th century (De Jong 2010, Penn 2005).

The region has been the backdrop to various incidents of conflict. The arrival of large numbers of Great Trek Boers from the Cape Colony to the borders of Bechuanaland and Griqualand West in 1836 caused conflict with many Tswana groups and the missionaries of the London Mission Society. The conflict between Boer and Tswana communities escalated in the 1860s and 1870s

when the Korana and Griqua communities and the British government became involved. The Northern Cape was very important in the Anglo-Boer War (1899-1902) and major battles took place within 120 km of Kimberley, including the battle of Magersfontein. Boer guerrilla forces roamed the entire Northern Cape region and skirmishes between Boer and Brits were regular occurrences. Furthermore, many graves in the region tell the story of battles fought during the 1914 Rebellion (Hopkins 1978).

5.2 Local

Several Heritage Impact Assessments have been conducted in the wider landscape surrounding the study area, but few has been done in closer proximity. Studies undertaken include investigations conducted by Beaumont (2007), Kaplan (2014), Morris (2006; 2016) and Van Pletzen-Vos & Rust (2013).

5.2.1 Stone Age

Van Pletzen-Vos & Rust (2013), surveyed the site of the proposed Noenieput residential development, approximately 35 km northwest of the study area, and recorded archaeological remains spanning the Earlier Stone Age (ESA), Middle Stone Age (MSA) and the Later Stone Age (LSA). The lithic assemblage consisted of 354 MSA tools, as well as Acheulian hand-axes and cleavers.

Smith (1995) describes the results of various archaeological surveys in the Rietfontein region. Samples of cultural material taken from flattened hollows on the dunes included pottery sherds, quartz, quartzite, silcrete, and shale flakes, cores and chunks and a lithic manuport. Similar lithic assemblages were located around dry pans in the area. On the sand dunes northeast of Rooipan, 30 km northeast of the study area, a continuous low-density LSA occupation area with stone flakes, ostrich eggshell and large grinding equipment was recorded. Smith (1995) also mentions sites on the southeast side of Rooipan and the southeast side of Witpan, located 4 km south of Bloupan. (Van Pletzen-Vos & Rust 2013).

At Swartkopdam, 28 km southwest of the study area, Beaumont (2007) recorded some occasional stone artefacts and a fraction of associated fresh - weathered artefacts, including a quartzite blade and a small 5 cm - long hand-axe. Beaumont (2007) ascribed these finds to the Fauresmith technology type, but the older material, with prepared cores, as probable Middle Acheulean.

Approximately 34,5 km towards the west of Bloupan, a fair concentration of Fauresmith or Late Acheulean material was identified at Eensaamheidpan (Masson 2006; Morris 2006). Lithic components comprise of small end-struck and bifacially worked hand-axes (>120 x 80 mm), pointed, almost ovate flakes, long unretouched flakes, and a few side scrapers (Masson 2006).

Masson (2006) further mentions the occurrence of Later Stone Age material in the dunes at the eastern end of the pan. The small flakes of translucent chalcedony and fragments of ostrich-egg shells suggest a late stone age presence at the pan.

Furthermore, Morris (2016) noted traces of LSA material at Norokei Pan, Groot-Witpan, and Middelputs, mainly on the dunes surrounding the pans. Older surfaces are exposed by deflation on dune crests and slopes, making these sites archaeologically sensitive.

5.2.2 Historical period

Significant historical events that took place in the area include the pursuit and death of Jakob Marengo in 1907. On the 20th of September 1907, a British armed force consisting of one hundred men from the Cape Mounted Police (CMP) and the Cape Mounted Rifles (CMR), accompanied by a party of scouts, pursued a small group of Nama making their way northwards through the desolate red dune and white salt-pan region of the Southern Kalahari. The chase ended at Eensaamheidpan, after a three-hour long skirmish. According to Masson (1995), sources state that the British force fired approximately 5 000 rounds and killed six armed Nama and captured two. Two accompanying Nama women also perished while one was wounded. Three men managed to escape before the engagement. On the side of the British force, one man was killed and one wounded.

Even though no tangible trace of these events has been detected on the landscape, Marengo's important role in the 1903-7 Nama uprising in German South West Africa, and his place in the historiography of the colonial resistance movement of Namibia, imbues the area with significance (Masson 1995; 2006).

5.2.3 Oral history

No interviews with locals were conducted regarding the history of the area.

6. IDENTIFIED RESOURCES AND HERITAGE ASSESSMENT

6.1 Surveyed area

The area surveyed for the impact assessment was dictated by the Google Earth map of the development footprint provided by the client. The survey commenced and were completed on the south-eastern section of the site on the secondary access road towards Noenieput (27° 35' 58.3"

S; 20° 29' 46.5" E). The pedestrian survey was conducted in transects throughout the development footprint, combined with a vehicular survey on the south western part of the terrain.



Figure 8 Google Earth image showing survey track for Remainder of the Farm Annesley No 338, indicated on Google Earth Satellite image.

6.2 Identified heritage resources

Description	Period	Location	Field rating/ Significance
Stone Age			
1. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 51.8" S 20° 29' 42.6" E	Field Rating IV C Low significance
2. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 51.2" S 20° 29' 39.5" E	Field Rating IV C Low significance

PHASE 1 HIA REPORT BLOUPAN, REMAINDER OF THE FARM ANNESLEY NO. 338, NORTHERN CAPE

3. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 45.3" S 20° 29' 26.5" E	Field Rating IV C Low significance
4. MSA Debitage (chips, chunks and flakes)	Early LSA/MSA	27° 35' 30.7" S 20° 29' 24.8" E	Field Rating IV C Low significance
5. MSA Chunks	Early LSA/MSA	27° 35' 36.7" S 20° 29' 23.4" E	Field Rating IV C Low significance
6. MSA Flakes	Early LSA/MSA	27° 35' 57.3" S 20° 29' 21.1" E	Field Rating IV C Low significance
7. MSA flake and chunks, possible knapping site, low density (n= \leq 5 per m ²)	Early LSA/MSA	27° 35' 57.8" S 20° 29' 22.0" E	Field Rating IV C Low significance
8. MSA Chunk	Early LSA/MSA	27° 35' 55.8" S 20° 29' 22.8" E	Field Rating IV C Low significance
9. MSA Chunks and flakes	Early LSA/MSA	27° 35' 59.6" S 20° 29' 24.1" E	Field Rating IV C Low significance
10. MSA Debitage (chips and flakes)	Early LSA/MSA	27° 35' 52.0" S 20° 29' 14.7" E	Field Rating IV C Low significance
Historical			
11. No historical features were identified.			N/A
Graves			
12. No formal or informal graves were identified.			N/A



Figure 9 Distribution of lithic occurrences across study area, indicated on Google Earth Satellite image.

6.3 Discussion

6.3.1 Archaeological features

A total of ten incidences of Stone Age material were recorded across the surveyed area (Figures 2 & 9). Five lithic occurrences are concentrated along the southwestern boundary of the surveyed area, while the remaining five lithic incidents are spread out across the pan from the north-western area towards the central and eastern part of the site. The assemblage of lithics along the southwest boundary of the development footprint consist of chunks, flakes, and knapping debris scattered ex situ in low densities ($n=5$ per m^2) close to the surrounding high dune veld. This might indicate the presence of a knapping site, either at the locale of the lithics recorded, or higher up on the dunes, from where the lithics might have washed down into the site. Evidence gathered from previous archaeological investigations around various pans in the region, points to a high probability of Stone Age material scattered on the dune crests and/or in the *straaten* in between (Masson 2006; Morris 2006, 2016; Smith 1995; Van Pletzen-Vos & Rust 2013). The lithic incidences across the pan include chunks and flakes in very low densities ($n=/ <2 per m^2) with no context.$

The cultural material recorded shows various degrees of weathering and is representative of the Early Later Stone Age and the Middle Stone Age. The identified archaeological materials are of low

significance, as the archaeological sample is small and without context, and therefore of little scientific value.

These Stone Age heritage finds are given a 'General' Protection C (Field Rating IV C). This means these sites have been sufficiently recorded (in the Phase 1). It requires no further action.

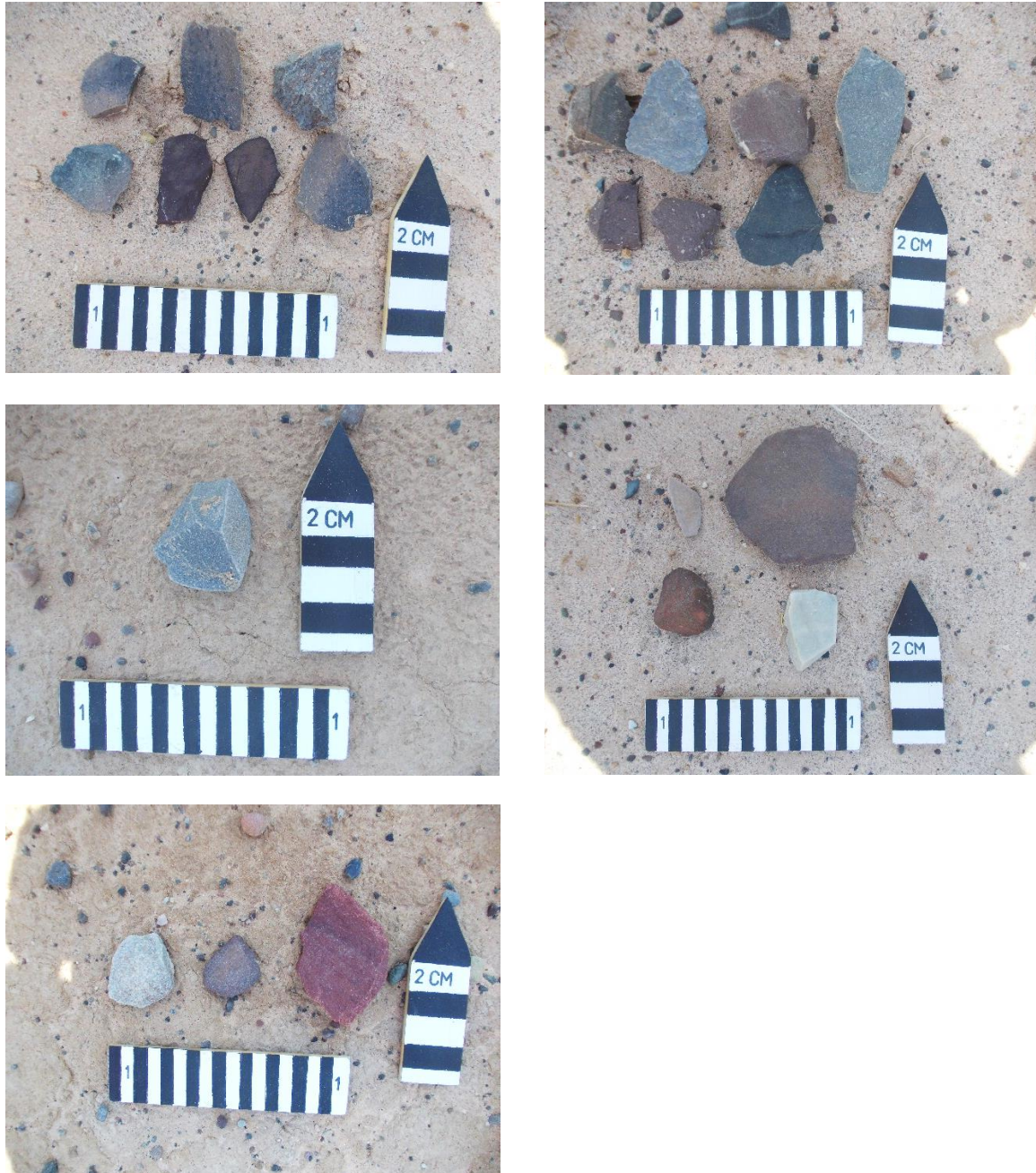


Figure 10 *Lithics on the south-western boundary of the study area.*



Figure 11 Lithic finds from across the pan in the study area.

6.3.2 Historical features

No significant historical features were identified within the study area.

6.3.3 Graves

No formal or informal graves were identified in the study area.

6.3.4 Palaeontological resources

The proposed development is primarily underlain by the Dwyka Group of the Karoo Supergroup while a very small portion falls in the Kalahari Group (Almond & Pether 2009; Butler 2018). The Dwyka sediments are of low palaeontological sensitivity while the fossil assemblages of the Kalahari are generally very low in diversity and occur over a wide range. A Protocol for Palaeontological finds for the proposed salt mining project at Bloupan, Remainder of the Farm Annesley 338 have been included with this report (see Appendix 1).

7. RECOMMENDATIONS

Based on the assessment of the potential impact of the development on the identified heritage, the following recommendations are made, taking into consideration any existing or potential sustainable social and economic benefits:

1. The lithic traces on the landscape of the study area are of low significance and the impact of the development on these resources are inconsequential. No further mitigation is required. Therefore, from a heritage point of view we recommend that the proposed development can continue.
2. Lying just outside the development footprint on the south-western boundary, is an archaeologically sensitive dune area, which has not been fully explored as it lies outside the scope of this study. Care should be taken to avoid this area completely until its significance can be fully accessed by a professional.
3. Due to the low palaeontological significance of the area, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils. It is considered that the development of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. If fossil remains are discovered during any phase of construction, either on the surface or unearthed by fresh excavations, the ECO in charge of these developments ought to be alerted immediately. These discoveries ought to be protected (preferably in situ) and the ECO must report to SAHRA so that appropriate mitigation (e.g. recording, collection) can be carried out by a professional palaeontologist (Butler 2018). A protocol for finds has been included within this report.
4. Although all possible care has been taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the assessment. If during construction, any possible discovery of finds such as stone tool scatters, artefacts, human remains, or fossils are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

8. CONCLUSION

This HIA has identified and recorded a small number of archaeological resources on Bloupan, situated on Remainder of the Farm Annesley no. 338, within the Dawid Kruiper Local Municipality, Z.F. Mgcawu District Municipality, Northern Cape. In the development footprint are no archaeological, historical or cultural sites, or paleontological material that will be impacted on negatively by the proposed development.

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WEB

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APPENDIX A

PALAEONTOLOGICAL IMPACT ASSESSMENT AND PROTOCOL FOR FINDS FOR THE PROPOSED ANNESLEY SALT MINE ON THE REMAINDER OF FARM ANNESLEY NO. 338, DAWID KRUIPER LOCAL MUNICIPALITY, Z. F. MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE.

**PALAEONTOLOGICAL DESKTOP ASSESSMENT AND PROTOCOL FOR FINDS FOR THE
PROPOSED ANNESLEY SALT MINE ON BLOUPAN, REMAINDER OF FARM ANNESLEY NO. 338,
DAVID KRUIPER LOCAL MUNICIPALITY, AND Z. F. MGCWU DISTRICT MUNICIPALITY,
NORTHERN CAPE-MINE**

Compiled for:

UBIQUE Heritage Consultants

PO Box 51

Askham

8814

www.ubiquecrm.com

24 Augustus 2019

Prepared by:

BANZAI ENVIRONMENTAL (PTY) LTD

Declaration of Independence

General declaration:

- I, Elize Butler, declare that –
- I act as the independent Palaeontologist 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 palaeontological 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;

PALAEONTOLOGICAL CONSULTANT: Banzai Environmental (Pty) Ltd

CONTACT PERSON: Elize Butler

Tel: +27 844478759

Email: elizebutler002@gmail.com

SIGNATURE:

A handwritten signature in black ink, appearing to read 'Elize Butler', is positioned to the right of the 'SIGNATURE:' label.

The Palaeontological Impact Assessment report has been compiled taking into account the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

Table 1:Nema Requirements

NEMA Regs (2014) - Appendix 6	Relevant section in report
1. (1) A specialist report prepared in terms of these Regulations must contain-	
a) details of- <ul style="list-style-type: none"> i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; 	Page ii of Report – Contact details and company and Appendix 1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii-iii
c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 4 – Objective
(cA) an indication of the quality and age of base data used for the specialist report;	Section 5 – Geological and Palaeontological history
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 9
d) the date, duration and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A Desktop assessment
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 7 Methodology
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 1, Section 5
g) an identification of any areas to be avoided, including buffers;	Desktop assessment
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 5
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7.1.– Assumptions and Limitation

j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	Section 10
k) any mitigation measures for inclusion in the EMPr;	Section 10
l) any conditions for inclusion in the environmental authorisation;	N/A
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
n) a reasoned opinion- i. as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and 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;	Section 10 – Conclusion
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable.
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable. To date not 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 <i>gazetted</i> by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Refer to section 2 and 3 compliance with SAHRA guidelines

EXECUTIVE SUMMARY

Van Zyl Environmental Consultants cc appointed UBIQUE Heritage Consultants to conduct the Heritage Impact Assessment (HIA) for the Application for the proposed mining of salt on Bloupan, Remainder of the Farm Annesley no. 338 in the Kalahari West, within the Dawid Kruiper Local Municipality, and Z.F. Mgcawu District Municipality, Northern Cape. Banzai Environmental (Pty) Ltd was in turn appointed to undertake the Palaeontological Desktop Assessment (DIA) assessing the palaeontological impact of the proposed development. The National Heritage Resources Act (No 25 of 1999, section 38) (NHRA), states that a Palaeontological Impact Assessment (PIA) is key to detect the presence of fossil material within the planned development footprint. This DIA is thus necessary to evaluate the effect of the construction on the palaeontological resources.

The proposed Annesley salt mine project is underlain by the Dwyka Group of the Karoo Supergroup and by the Cenozoic Kalahari Group. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Dwyka Group (Karoo Supergroup) is moderate while the Kalahari Group has a Low Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website).

It is therefore considered that the construction and operation of the proposed Annesley salt mine project, Northern Cape is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the **Chance Find Protocol** must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (preferably *in situ*) and the ECO ought to alert SAHRA so that appropriate mitigation (*e.g.* documented and collection) can be undertaken by a palaeontologist.

The specialist would need a collection permit from SAHRA. Fossil material must be curated in an approved collection (museum or university), and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

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1 INTRODUCTION

Annesley Salt (Pty) Ltd plans to develop a salt mine and associated infrastructure on Bloupan, on Remainder of the Farm Annesley no. 338. The project requires the application by Annesley Salt (Pty) Ltd for **Mining Rights for Salt** on this property and the consequent development of mining infrastructure. The proposed mine will be approximately 100 ha in extent.

The proposed mine development will consist of the construction of ten evaporation ponds, measuring 6000 m² each, a storage area 22,750 m² in size, access roads, a workshop and accommodation. Highly saline groundwater (brine) will be abstracted from three existing boreholes at the salt pan and pumped to the ten evaporation ponds from where the salt will be cyclically harvested six times a year. The proposed salt mine requires c.17 550 m³ of brine per harvest cycle, which equates to 105 300 m³ of total brine abstracted over a period of nine months per annum (i.e. over c.285 days per annum). This equates to an average abstraction rate of 370 m³ per day. Salt is not harvested during the cold winter months from 31 May to 20 August, as the evaporation rate is too low for good quality salt crystals to form; hence, no water is abstracted from the boreholes during this period. (Du Preez & Visser 2018)¹.

¹Information provided by Annesley Salt

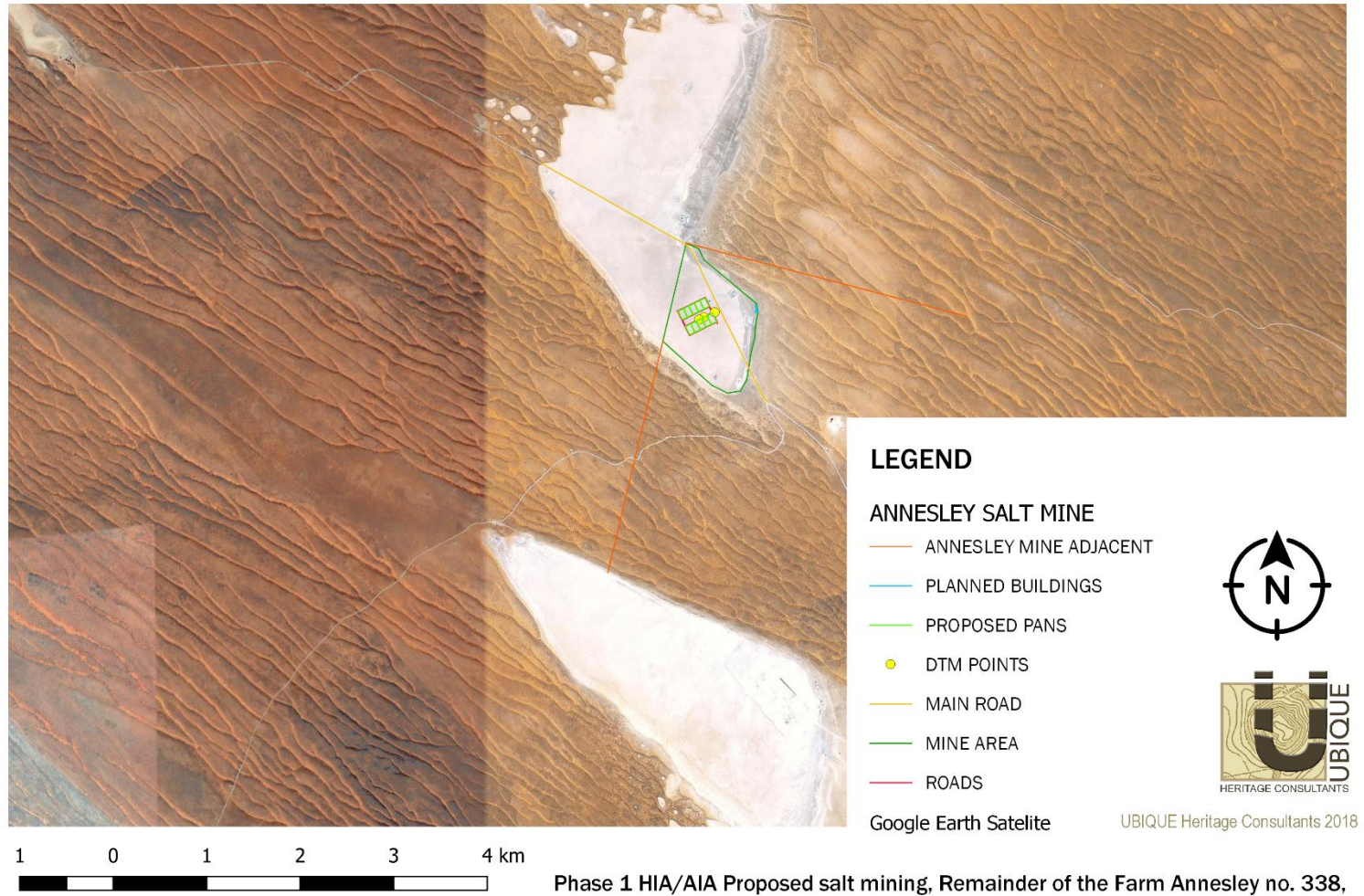
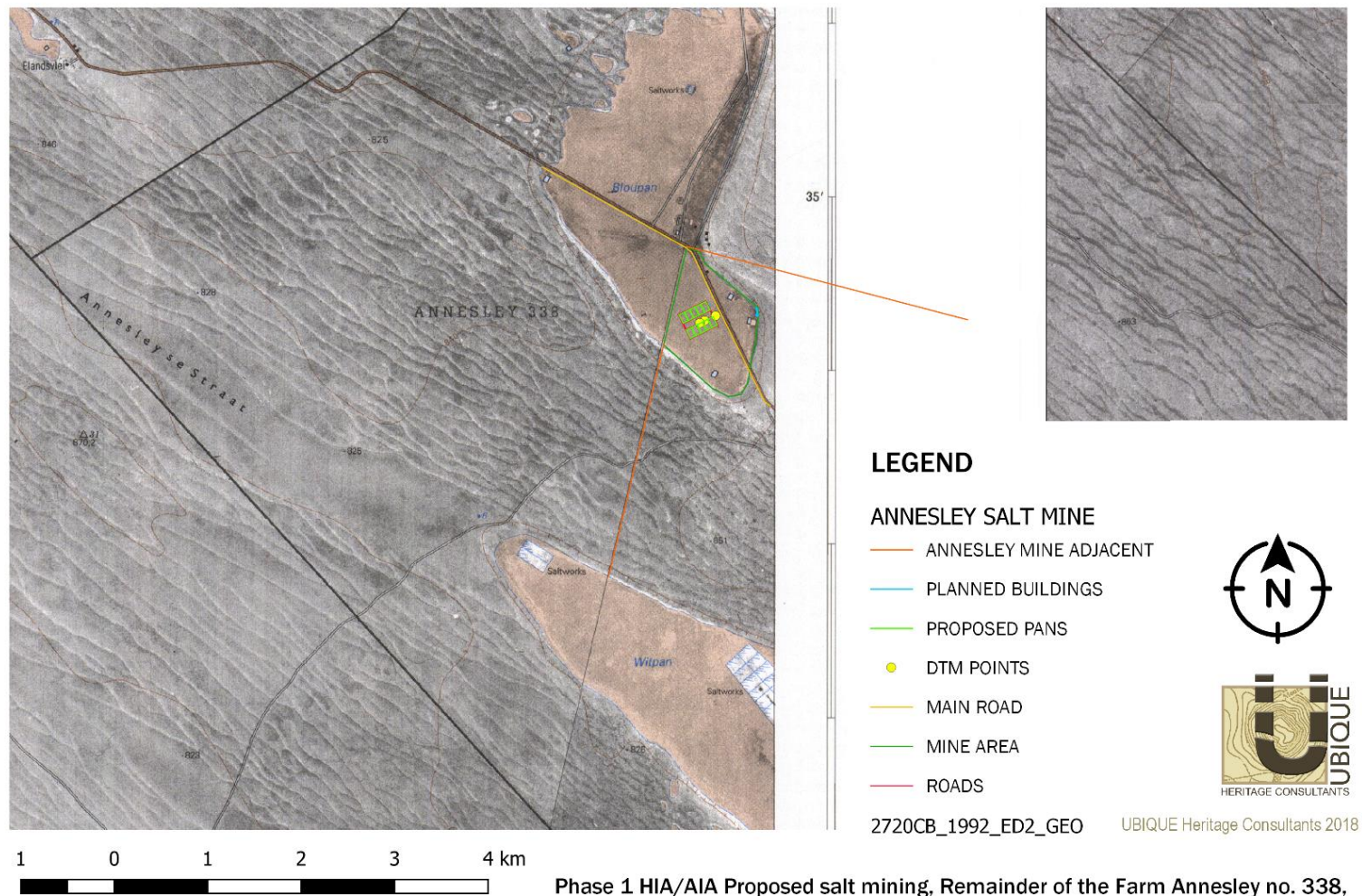


Figure 12: Google Earth Satellite Image of Annesley Salt mine on the Remainder of Farm Annesley no. 338, Dawid Kruiper Local Municipality, Z. F. Mgcawu District Municipality, Northern Cape. Map provided by Ubiqwe Heritage Consultants.



Phase 1 HIA/AIA Proposed salt mining, Remainder of the Farm Annesley no. 338, Dawid Kruiper Local Municipality, Z.F. McGawu District Municipality, Northern Cape.

Figure 13: Proposed Annesley Salt Mine on the Remainder of Farm Annesley no. 338, Dawid Kruiper Local Municipality, Z. F. Mgcawu District Municipality, Northern Cape. Map provided by Ubuque Heritage Consultants

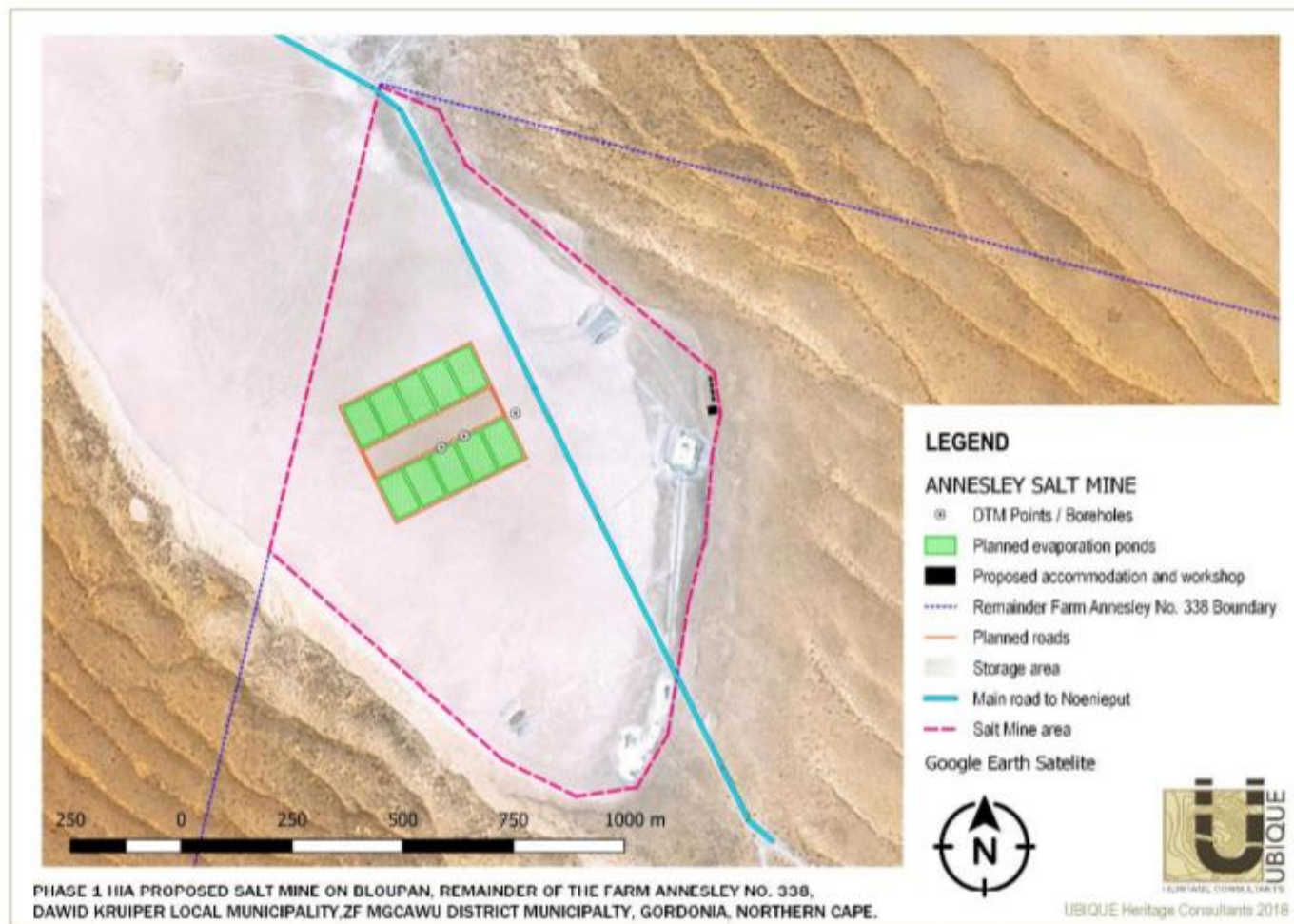


Figure 14: Proposed salt mine, Bloupan, Remainder of Farm Annesley no 338. This map is based on a kmz. File provided by Van Zyl Environmental Consultants. Map provided by Ubiqum Heritage Consultants.

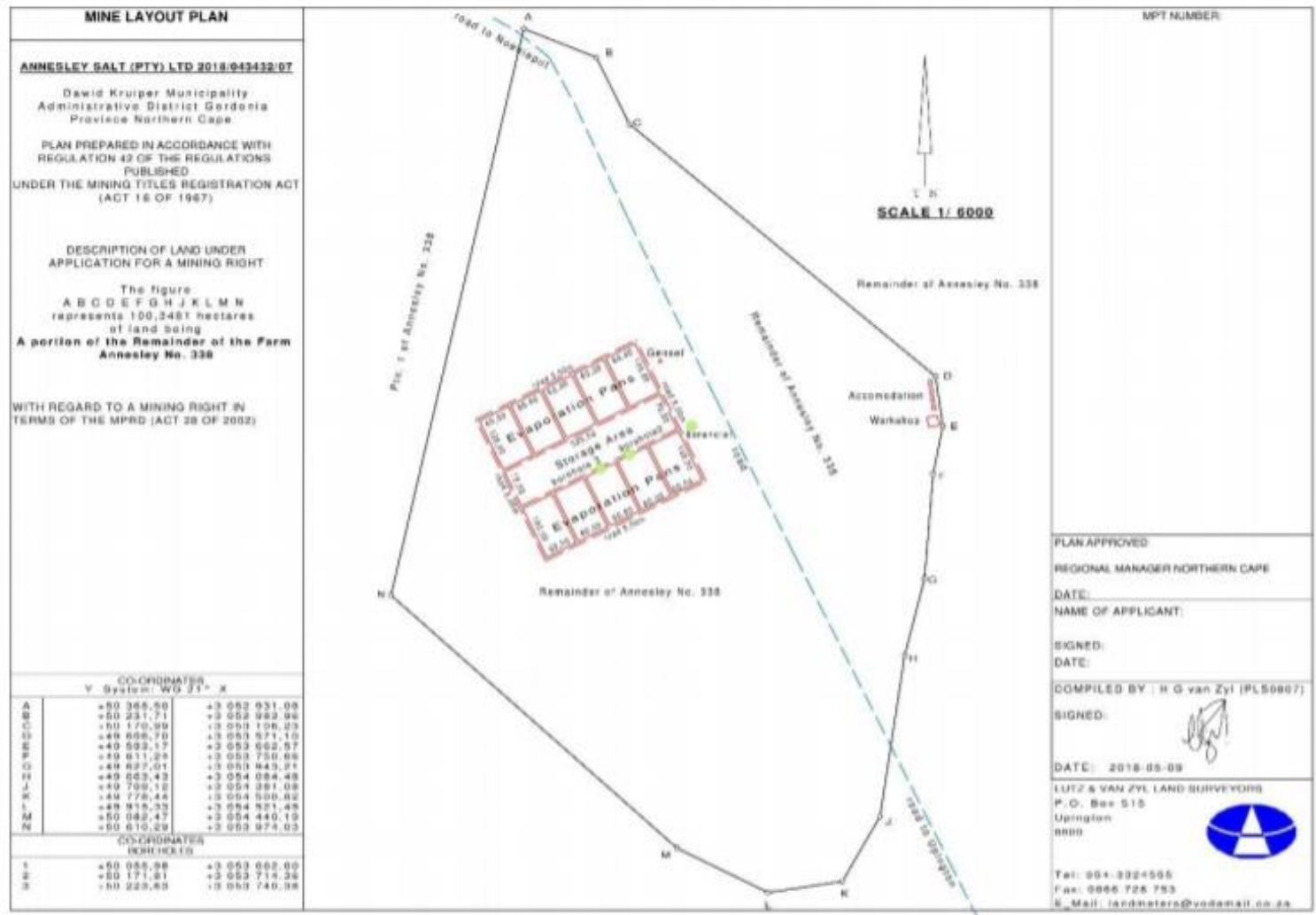


Figure 15: Proposed salt mine, Bloupan, Remainder of Farm Annesley no 338. This map was provided by Van Zyl Environmental Consultants.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

The author (Elize Butler) has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty-four years. She has extensive experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa for 13 years. She has been conducting PIAs since 2014.

3 LEGISLATION

3.1 National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA. Palaeontological resources may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This DIA forms part of the Heritage Impact Assessment (HIA) and adhere to the conditions of the Act. According to **Section 38 (1)**, an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- the construction of a bridge or similar structure exceeding 50 m in length;
- any development or other activity which will change the character of a site—
- (exceeding 5 000 m² in extent; or
- involving three or more existing erven or subdivisions thereof; or
- involving three or more erven or divisions thereof which have been consolidated within the past five years; or
- the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- the re-zoning of a site exceeding 10 000 m² in extent;
- or any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

4 OBJECTIVE

The objective of a DPIA is to determine the impact of the development on potential palaeontological material at the site.

According to the “SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports” the aims of the PIA are: 1) to **identify** the palaeontological status of the exposed as well as rock formations just below the surface in the development footprint 2) to estimate the **palaeontological importance** of the formations 3) to determine the **impact** on fossil heritage; and 4) to recommend how the developer ought to protect or mitigate damage to fossil heritage.

The terms of reference of a DPIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended;
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements;
- Submit a comprehensive overview of all appropriate legislation, guidelines;
- Description of the proposed project and provide information regarding the developer and consultant who commissioned the study,
- Description and location of the proposed development and provide geological and topographical maps
- Provide Palaeontological and geological history of the affected area.
- Identification sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development;
- Evaluation of the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
 - a. **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
 - b. **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity.
 - c. **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.
- Fair assessment of alternatives (infrastructure alternatives have been provided):
- Recommend mitigation measures to minimise the impact of the proposed development; and
- Implications of specialist findings for the proposed development (such as permits, licenses etc).

5 GEOLOGICAL AND PALAEOONTOLOGICAL HERITAGE

The proposed development is underlain by the Dwyka Group of the Karoo Supergroup and in the Cenozoic Kalahari Group (Figure 5).

Dwyka Group

The Permo-Carboniferous Dwyka Group is the oldest deposit in the Karoo Supergroup and has a low palaeontological sensitivity. During this period, South Africa was covered by an ice sheet. Deposits were thus deposited in a cold, glacially-dominated environment. This Group consists mainly of gravelly sediments with subordinate varved shales and mudstones with scraped and faceted pebbles. The retreating glaciers deposited dark-grey tillite. Geologically the Dwyka is known for its rich assemblage of dropstones of various sizes. And Palaeontologically the Permo-Carboniferous Dwyka Group is known for its track ways also known as ichnofacies that was formed by fish and arthropods. Fossilized faeces or coprolites have also been recovered. Body fossils consists of gastropods, invertebrates and marine fish, as well as fossil plants. A rich diversity of conifers, cordaitaleans, glossopterids, ginkgoaleans, pollens and spores have been described from this Group while ferns, horsetails and lycopods, are also found.

The **Kalahari deposits.**

The Cenozoic Kalahari Group is the most widespread body of terrestrial sediments in southern Africa. The Cenozoic sands and calcretes of the Kalahari Group range in thickness from a few metres to more than 180m (Partridge et al., 2006). The youngest formation of the Kalahari group is the Gordonia Formation which is generally termed Kalahari sand and comprises of red aeolian sands that covers most of the Kalahari Group sediments. The pan sediments of the area originated from the Gordonia Formation and contains white to brown fine grained silts, sands and clays. Some of the pans consist of clayey material mixed with evaporates that shows seasonal effects of shallow saline groundwaters. Quaternary alluvium, aeolian sands, surface limestone, silcrete, and terrace gravels are also included in the Kalahari Group (Kent 1980).

The fossil assemblages of the Kalahari are generally very low in diversity, and occur over a wide range and thus the palaeontological diversity of this Group is low. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils.

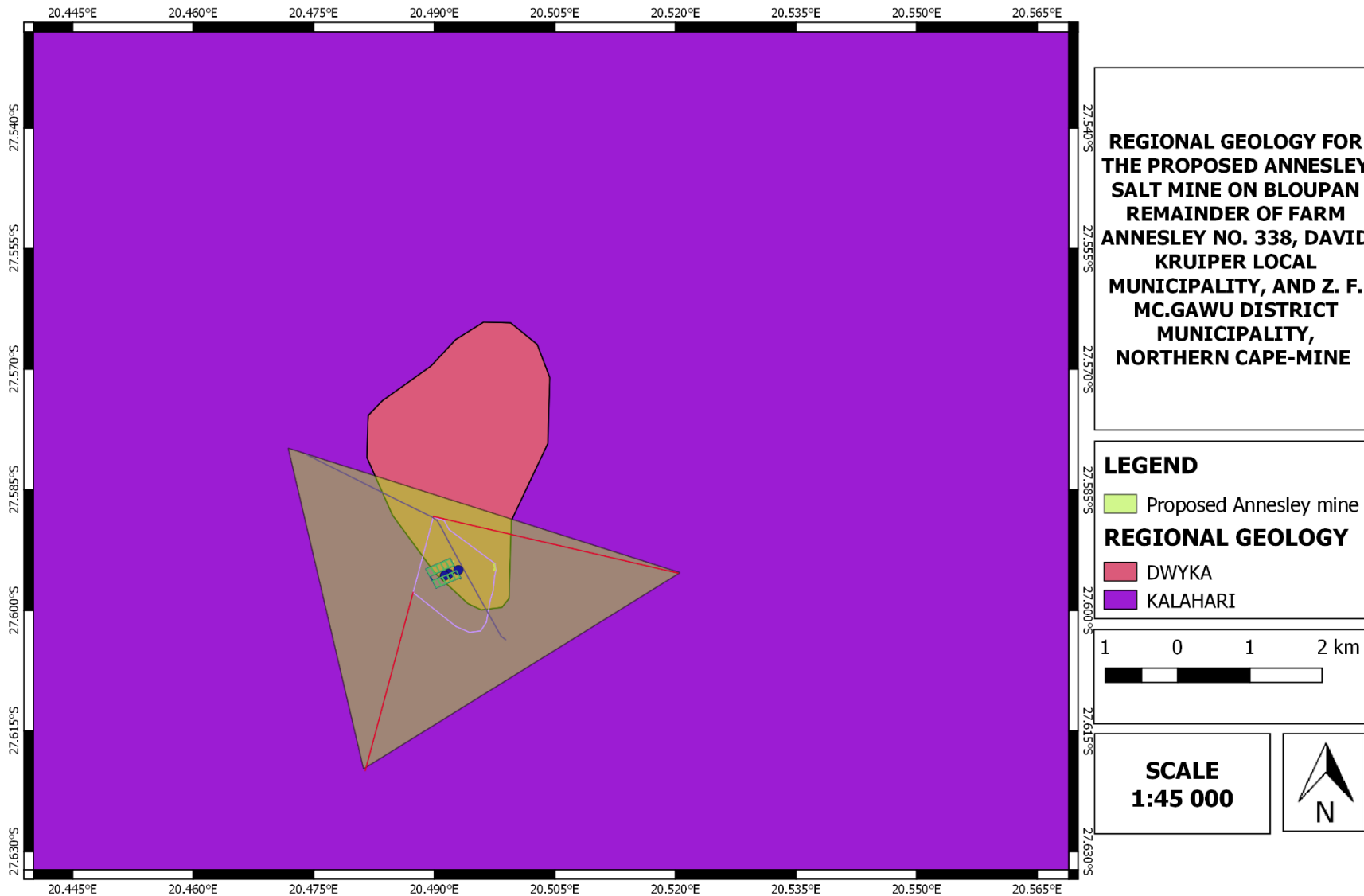


Figure 16: The surface geology of the proposed Annesley Salt Mine on the Remainder of Farm Annesley no. 338, David Kruiper Local Municipality, Z. F. Mgcawu District Municipality, Northern Cape. The proposed development is underlain by the Dwyka Group of the Karoo Supergroup and the Kalahari Group. Map drawn QGIS Desktop 2.18.18.

6 GEOGRAPHICAL LOCATION OF THE SITE

The proposed development of the Annesley Salt mine is located on Bloupan, on the Remainder of the Farm Annesley no. 338 in the Kalahari West, within the Dawid Kruiper Local Municipality, and Z.F. Mgcawu District Municipality, Northern Cape.

Access to the site from the southeast is via an unnamed secondary gravel road that turns off from the R360, between Upington and Askham, towards Noenieput. This road runs through the study area, east of the proposed evaporation ponds. Established saltworks can be found in the northern part of Bloupan, at Witpan to the south, Kakoerabepan to the east, and Groot-Witpan to the southeast of Bloupan¹.

¹Information provided by Ubique

7 METHODS

A desktop study was assembled to evaluate the possible risk to palaeontological heritage (this includes fossils as well as trace fossils) in the proposed development area. In compiling the desktop report aerial photos, Google Earth 2018, topographical and geological maps and other reports from the same area as well as the author's experience were used to assess the proposed development footprint.

7.1 Assumptions and limitations

The accuracy of DIA is reduced by several factors which may include the following: the databases of institutions are not always up to date and relevant locality and geological information were not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area and the sheet explanations were never intended to focus on palaeontological heritage.

Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally **assume** that exposed fossil heritage is present within the development area. The accuracy of the Palaeontological Impact Assessment is thus improved considerably by conducting a field-assessment.

8 ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- The Palaeosensitivity Map from the SAHRIS website.
- A Google Earth map with polygons of the proposed development was obtained from *Ubique Heritage*.
- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984)
- Information by Van Zyl Environmental Consultants
- 2720 CB Topographical map

9 IMPACT ASSESSMENT METHODOLOGY

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the following project phases:

- Construction
- Operation
- Decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact the following criteria is used:

Table 2: The rating system

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
The Nature of the Impact is the possible destruction of fossil heritage		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		

1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).

DURATION

This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.

1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.

INTENSITY/ MAGNITUDE

Describes the severity of an impact.

1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may

		temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

REVERSIBILITY

This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.

1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.

IRREPLACEABLE LOSS OF RESOURCES

This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.

1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.

CUMULATIVE EFFECT

This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.

1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

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

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive

1.1 Summary of Impact Tables

The proposed Annesley salt mine project is underlain by the Dwyka Group of the Karoo Supergroup and by the Cenozoic Kalahari Group. According to the PalaeoMap of South African Heritage Resources Information System the Palaeontological Sensitivity of the Dwyka Group (Karoo Supergroup) is moderate while the Kalahari Group has a Low Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website). The expected duration of the impact is assessed as potentially permanent to long term. In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be **permanent**. Impacts on palaeontological heritage during the construction phase could potentially occur but are regarded as having negative low impact.

10 FINDINGS AND RECOMMENDATIONS

The proposed Annesley salt mine project is underlain by the Dwyka Group of the Karoo Supergroup and by the Cenozoic Kalahari Group. According to the PalaeoMap of South African Heritage Resources Information System, the Palaeontological Sensitivity of the Dwyka Group (Karoo Supergroup) is moderate while the Kalahari Group has a Low Palaeontological Sensitivity (Almond and Pether 2008, SAHRIS website).

It is therefore considered that the construction and operation of the proposed Annesley salt mine project, Northern Cape is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources.

In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the **Chance Find Protocol** must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (preferably *in situ*) and the ECO ought to alert SAHRA so that appropriate mitigation (*e.g.* documented and collection) can be undertaken by a palaeontologist.

The specialist would need a collection permit from SAHRA. Fossil material must be curated in an approved collection (museum or university) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

1.2 CHANCE FINDS PROTOCOL

A following procedure will only be followed in the event that fossils are uncovered during excavation.

1.3 Legislation

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources include “**all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens**”.

Palaeontological heritage is unique and non-renewable and is protected by the NHRA and are the property of the State. It is thus the responsibility of the State to manage and conserve fossils on behalf of the citizens of South Africa. Palaeontological resources may not be excavated, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

1.4 Background

A fossil is the naturally preserved remains (or traces) of plants or animals embedded in rock. These plants and animals lived in the geologic past millions of years ago. Fossils are extremely rare and irreplaceable. By studying fossils it is possible to determine the environmental conditions that existed in a specific geographical area millions of years ago.

1.5 Introduction

This informational document is intended for workmen and foremen on construction sites. It describes the actions to be taken when mining or construction activities accidentally uncovers fossil material.

It is the responsibility of the Environmental Control Officer (ECO) of the project to train the workmen and foremen in the procedure to follow when a fossil is accidentally uncovered. In the absence of the ECO, a member of the staff must be appointed to be responsible for the proper implementation of the chance find protocol as not to compromise the conservation of fossil material.

1.6 Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately **stop working** and all work must cease in the immediate vicinity of the find.
- The person who made the find must immediately **report** the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO or site manager. The ECO must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within **24 hours** of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.

- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ECO (site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. **No attempt** should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ECO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development.

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Appendix: 1: CV

ELIZE BUTLER

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 25 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988

University of the Orange Free State

B.Sc (Hons) Zoology, 1991

University of the Orange Free State

Management Course, 1991

University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009

University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

Dissertation title: A new gorgonopsian from the uppermost *Daptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA)

2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant	Department of Zoology & Entomology University of the Free State Zoology 1989- 1992
Part time laboratory assistant	Department of Virology University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant and Collection Manager	National Museum, Bloemfontein 1998–currently

TECHNICAL REPORTS

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APPENDIX B

SPECIALISTS CREDENTIALS

ELIZE BUTLER

Palaeontologist

Elize Butler has 25 years of experience in Palaeontology and has conducted numerous Palaeontological Impact Assessments since 2014. She holds a B.Sc. degree in Botany and Zoology (1988) and a B.Sc. (Hons) Zoology degree (1991) from the University of the Orange Free State and has earned her M. Sc. *Cum laude* (Zoology) in 2009 from University of the Free State. Ms. Butler is currently registered as a PhD fellow at the Zoology Department of the UFS, working on her dissertation titled: *A new gorgonopsian from the uppermost Daptocephalus Assemblage Zone, in the Karoo Basin of South Africa*. Ms. Butler is currently employed at the National Museum, Bloemfontein, where she has held the position of Principal Research Assistant and Collection Manager since 1998. She is a registered member of the Palaeontological Society of South Africa (PSSA).

JAN ENGELBRECHT

CRM Archaeologist

Jan Engelbrecht is accredited by the Cultural Resources Management section of the Association of Southern African Professional Archaeologists (ASAPA) to undertake Phase1 AIAs and HIAs in South Africa. He is also a member of the Association for Professional Archaeologists (ASAPA). Mr Engelbrecht holds an honours degree in archaeology (specialising in the history of early farmers in southern Africa (Iron Age) and Colonial period) from the University of South Africa and has 12 years' experience in heritage management. He has worked on projects as diverse as the Zulti South HIA project of Richards Bay Minerals, research on the David Bruce heritage site at Ubombo in Kwa-Zulu Natal, and various archaeological excavations and historical projects. He has worked with many rural communities to establish integrated heritage and land use plans and speaks Zulu fluently.

Mr. Engelbrecht established Ubique Heritage Consultants during 2012. The company moved from KZN to the Northern Cape and is currently based at Askham in the Northern Cape within the Mier local municipality in the Kgalagadi region. He had a significant military career as an officer, where after he qualified as an Animal Health Technician at Technikon RSA and UNISA. He is currently studying for his MA Degree in Archaeology.

HEIDI FIVAZ

Archaeologist

Heidi Fivaz has been a part of UBIQUE Heritage Consultants since 2016 and is responsible for research and report compilation. She holds a B.Tech. Fine Arts degree (2000) from Tshwane University of Technology, a BA Culture and Arts Historical Studies degree (2012) from UNISA and received her BA (Hons) Archaeology in 2015 (UNISA). She has received extensive training in object conservation from the South African Institute of Object Conservation and specialises in glass and ceramic conservation. Ms. Fivaz is currently completing her MA Archaeology at the University of South Africa (UNISA). She is a professional member of the Association of South African Archaeologists and has worked on numerous archaeological excavation and surveying projects over the past 10 years.