CTS HERITAGE

APPENDIX 1: Archaeological Assessment

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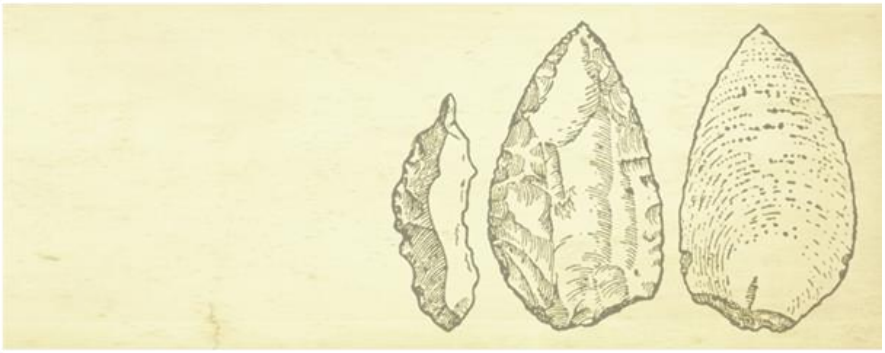

PHASE 1 AIA SPECIALIST FIELD REPORT PROPOSED KHUNAB PV FACILITIES, UPINGTON, NORTHERN CAPE PROVINCE

PROPOSED PHASE 2 EXTENSION OF KHUNAB PV FACILITIES AND ASSOCIATED INFRASTRUCTURE ON THE FARM MC TAGGART'S CAMP NO. 453 PORTION 3, UPINGTON, DAWID KRUIPER LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, NORTHERN CAPE

PREPARED FOR:

CTS HERITAGE

PREPARED BY:

JAN ENGELBRECHT & HEIDI FIVAZ

UBIQUE HERITAGE CONSULTANTS

13 MARCH 2020

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 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: **Date: 2020-03-13**

J.A.C. Engelbrecht & H. Fivaz

UBIQUE Heritage Consultants

EXECUTIVE SUMMARY

Project description

UBIQUE Heritage Consultants were appointed by CTS Heritage as independent heritage specialists to conduct the Phase 1 field surveys for the Archaeological Impact Assessment of the proposed development of Photovoltaic (PV) facilities and infrastructure on the Farm Mc Taggart's Camp No. 453 Portion 3, Upington, in the Dawid Kruiper Local Municipality, Z.F Mgcawu District Municipality, Northern Cape as required by Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA).

Findings and Impact on Heritage Resources

- A total of six occurrences (sites: MTG-1/11, MTG-5/01, MTG-5/02, MTG-5/03, MTG-5/04, MTG-5/05) of ESA and MSA lithic material in low concentrations was recorded across the development footprints of McTaggarts PV4 & PV5. The lithic assemblages contain mainly untrimmed flakes with few formal tools. The material is without archaeological context and considered not conservation worthy.

- An isolated hand-soldered fish tin was previously recorded on McTaggarts PV4a and graded as NCW.

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. Archaeologically speaking, there are no objections to the proposed development proceeding.

2. 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 any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA.

3. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as

possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

4. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such omissions.

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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: material remains, resulting from human activity, which is in a state of disuse and is in or on land and is older than 100 years, including artefacts, human and hominid remains and artificial features and structures;

- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and 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.

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). The 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 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 the 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 (historic 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

UBIQUE Heritage Consultants were appointed by CTS Heritage as independent heritage specialists to conduct the Phase 1 field surveys for the Archaeological Impact Assessment of the proposed development of Photovoltaic (PV) facilities and infrastructure on the Farm Mc Taggart's Camp No. 453 Portion 3, Upington, in the Dawid Kruiper Local Municipality, Z.F Mgcawu District Municipality, Northern Cape as required by Section 38 of the NHRA and the National Environmental Management Act 107 of 1998 (NEMA).

The identified heritage resources and anticipated, and cumulative impacts that the development of the proposed project may have on the identified heritage resources are presented objectively in this report. 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 responsibly managing the documented heritage resources, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.1 Technical information

Project description	
Project name	Proposed development of Khunab PV Facilities, Upington, Northern Cape
Description	Proposed Phase 2 extension of Khunab PV facilities and infrastructure on Portion 3 of the farm Mc Taggart's Camp No. 453 Upington, Dawid Kruiper Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu
Local municipality	Dawid Kruiper
Topo-cadastral map	1:50 000 2821AC
Farm name	Mc Taggart's Camp No. 453 Portion 3
Closest town	Upington
GPS Co-ordinates	28° 30' 08.22" S 21° 02' 46.03" E
Property size	Approximately 900 ha
Development footprint size	Approximately 200 ha
Land use	
Previous	Agriculture
Current	Agriculture
Rezoning required	No
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.	No
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

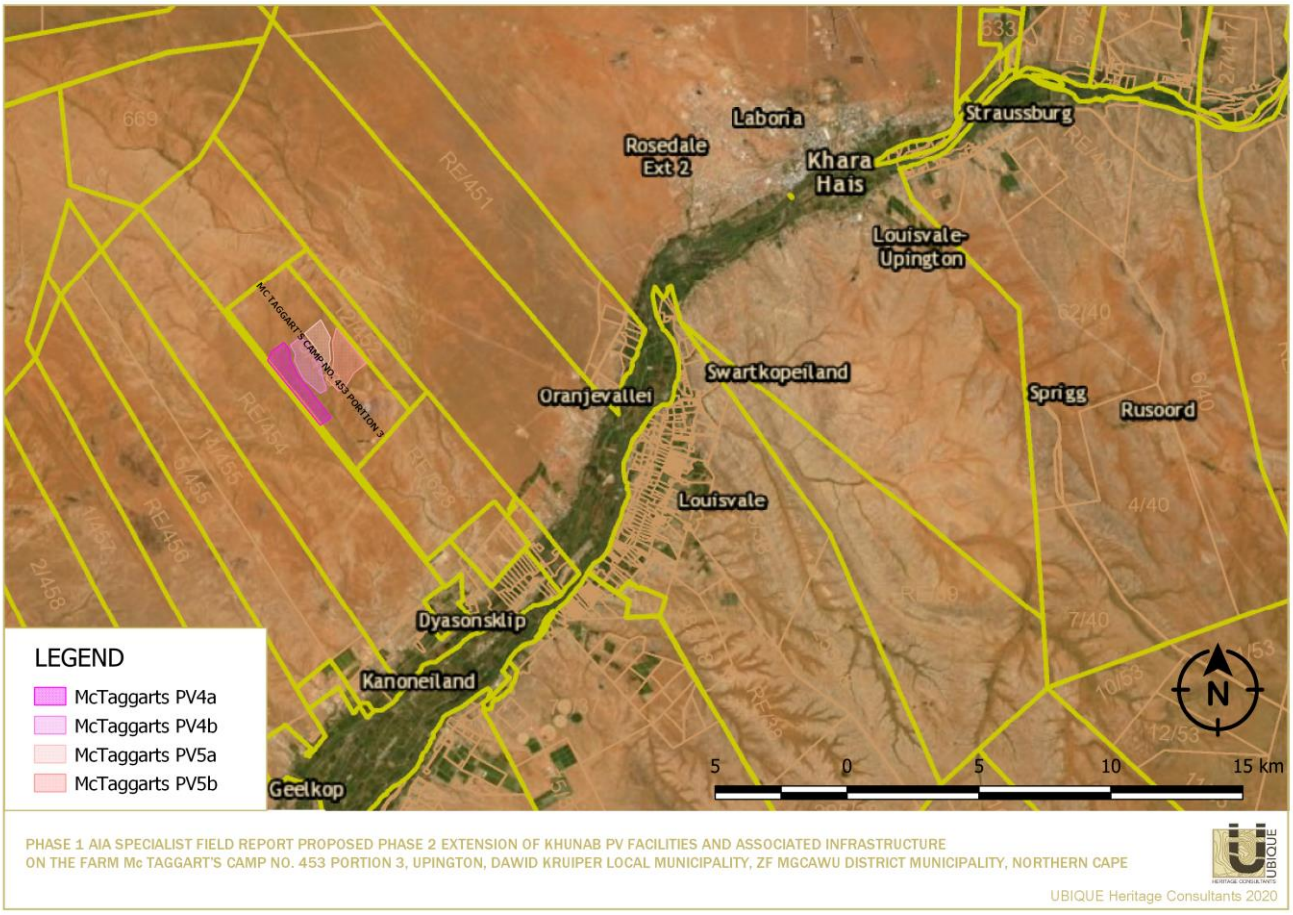


Figure 1 *Development footprints of the extension of the Khunab Pv facilities on Mc Taggart's Camp No. 453 Portion 3, Upington, Northern Cape.* Indicated on Chief Surveyor-General ArcGIS Web Map. *(Source: https://csg.esri-southafrica.com)*

2. FIELD ASSESSMENT

2.1 Methodology

2.1.1 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 corridors and surrounding areas on the 25th to 27th of February 2020. Some parts of the area marked as Mc Taggart's PV 4a has also been surveyed on a prior occasion on the 13th of June 2019, as part of the developmental phase of the four Khunab Solar Energy facilities and two grid connection solutions on Portion 12 of Farm Klip Punt 452 and Portion 3 of the Farm Mc Taggart's Camp 453 (CTS Heritage, Savannah, & UBIQUE Heritage Consultants 2019).The areas surveyed for the impact assessment was dictated by the Google Earth maps of the development footprints provided by the client, as well as the Heritage Screener compiled by CTS Heritage. The area was surveyed from an access point in the north-west. The starting point for the survey was 28° 30' 11.15" S; 21° 01' 23.50" E. All the study areas were surveyed in transects of approximately 30 - 50m where possible. The development corridor was surveyed on foot and by 4x4 vehicle by a team of three experienced surveyors.

We conducted an inspection of the surface of the ground, wherever the surface was visible. The archaeological survey 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.

2.1.2 Recording significant areas

GPS points of identified significant areas were recorded with handheld Garmin global positioning units (Garmin eTrex 10) and Android Locus Maps application on Hisense U605 smartphone. Photographs were taken with a Canon Ixus 190 20-megapixel camera. Detailed field notes were taken to describe observations (Appendix B).

2.1.3 Determining significance

Levels of the significance of the various types of heritage resources observed and recorded in the project area have been determined according to criteria set out in Appendix A.

2.1.4 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 through 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 essential 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. All effort has been made to cover as much ground as possible in the circumstances.

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 assess the significance of the site (or material) in question.

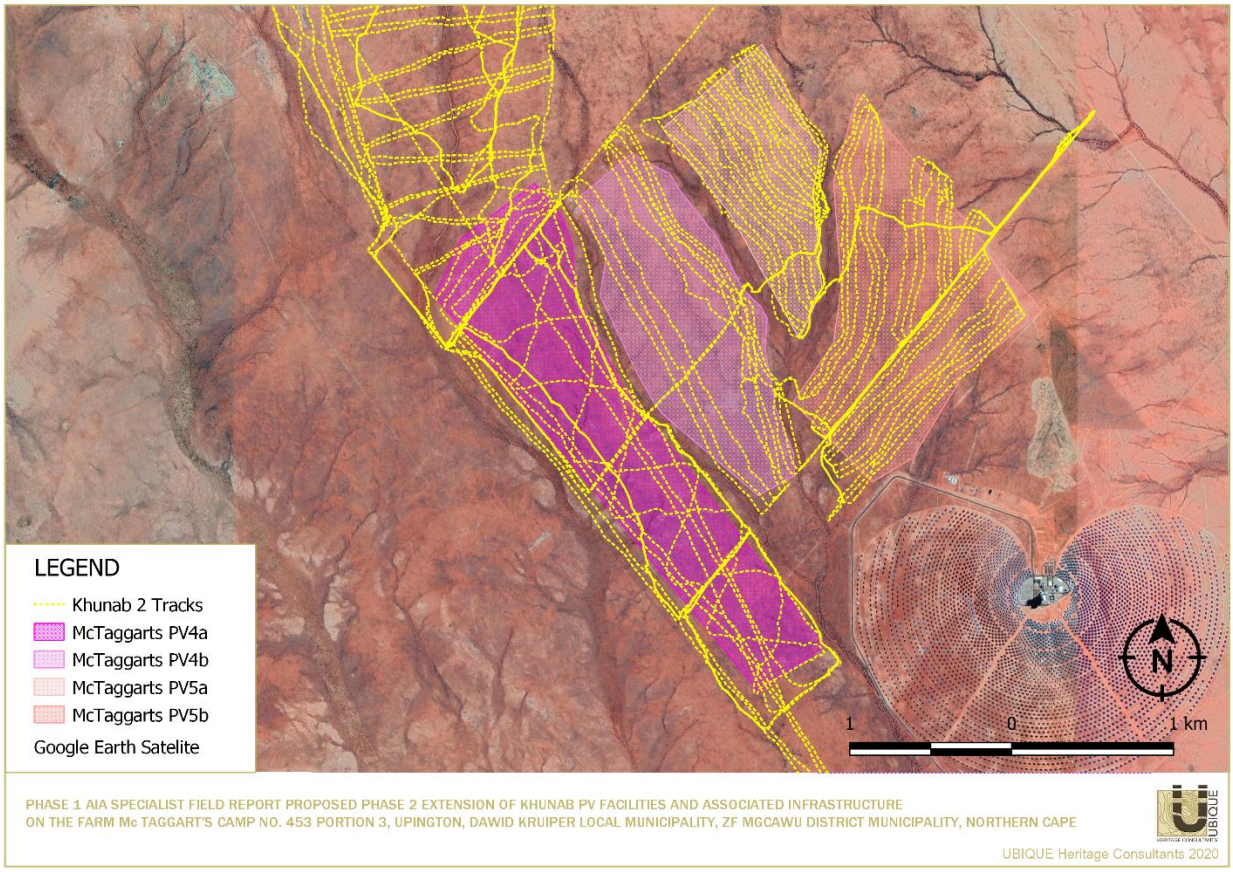


Figure 2 *Recorded tracks of the survey along the proposed development footprint.*

2.2 Description of the affected environment

The landscape of the study areas is typical Kalahari Karroid Shrubland vegetation type. The terrain is flat with intermittent gravel and red-yellow sandy plains, covered with low karroid shrubs and Camel Thorn trees *(Acacia erioloba)*, Black Thorn trees *(Acacia mellifera)*, Three Thorn/Driedoring *(Rhigozum trichotomum*), Skaapbossie *(Aizoon schellenbergii)*, Shepherd tree *(Boscia albitrunca*), Suurgras (*Enneapogon desvauxii),* Pencil Milkbush *(Euphorbia lignose), Helichrysum tomentosulum,* Wild Basil *(Ocimum americanum),* Honey Locust *(Prosopis glandilosa),* Tall Bushman grass *(Stipagrostis hirtigluma),* Silky Bushman grass *(Stipagrostis uniplumis),* Kortbeen Boesmangras *(Stipagrostis obtuse).* Several outcrops of quartz and quartzite, as well as some dolomite and calcrete outcrops, can be observed throughout the site footprint. The terrain slopes gradually from the north to the south. Some dry riverine beds traverse the site from north to south and from west to east.

The site footprint is currently still utilised for agricultural purposes (livestock farming), and several internal fences cross over the site. To the north-west of the site, outside of the development footprint, previous mining activities, as well as old ruins associated with tungsten mining in the 1930s is located. Two-track roads sand/gravel are also present on the development footprint.

To the north, the development footprint is bounded by McTaggarts PV 2, to the south by existing PV facility developments and some open fields, in the west by game fences and bounded in the east by gravel road and some open fields. The study areas are located approximately 30 km south-west of Upington.

Figure 3 *Panoramic view of existing Photovoltaic station towards the south and surrounds.*

Figure 4 *Panoramic view of the landscape type prominent over the entire development footprint.*

Figure 5 *Panoramic view of the access road and mining activities towards the north-west of the development footprint.*

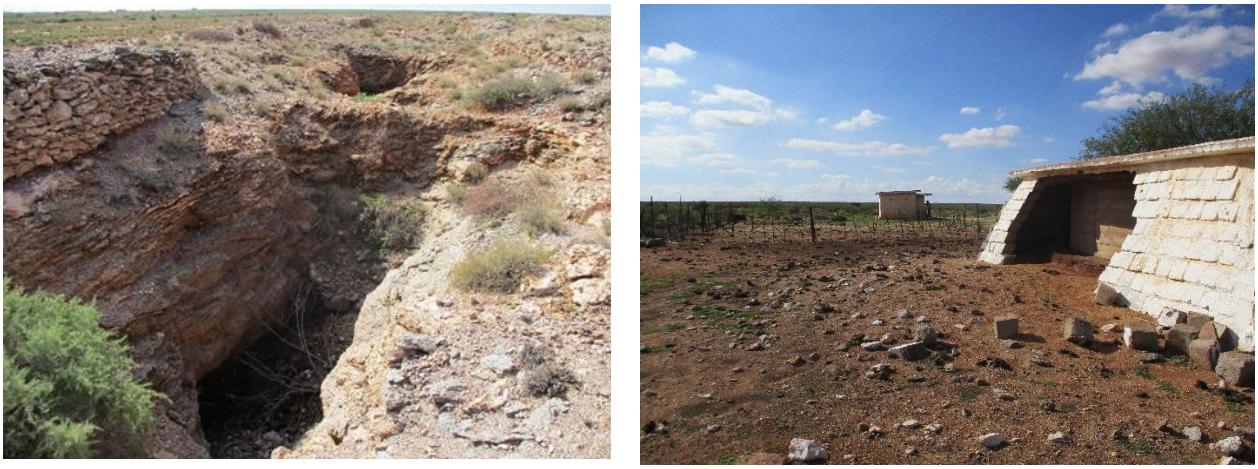


Figure 6 *Tungsten mining and associated structures, outside the development footprint.*

3. Archaeological resources identified

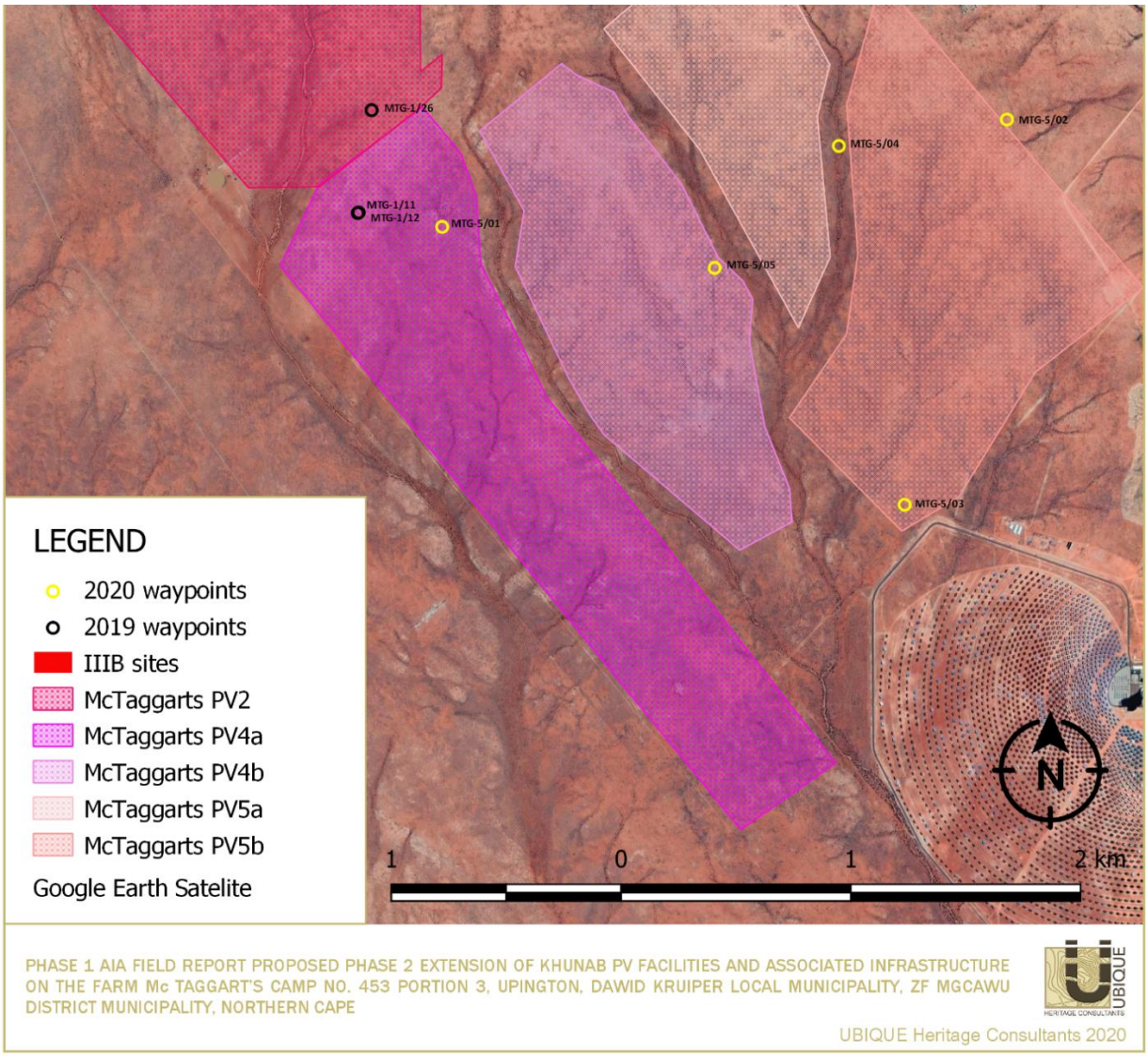


Figure 7. *Recorded heritage resources across the development alternatives.*

Point ID	Site No.	Site name	Description	Co-ordinates	Grading	Mitigation
McTaggart's PV 4 and 5 Archaeological resources						
011	MTG-5/01	McTaggarts PV4a	Low-density open scatter with BIF flakes, chips and one point. N=7/100m² MSA	28° 31' 07.8" S 21° 02' 47.2" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)
012	MTG-5/02	McTaggarts PV5b	Low-density open scatter with BIF flakes. N=2/100m² MSA	28° 30' 52.7" S 21° 04' 17.7" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)

013	MTG-5/03	McTaggarts PV5b	Isolated BIF chunk. N=1/100m² MSA	28° 31' 46.9" S 21° 04' 01.3" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)
014	MTG-5/04	McTaggarts PV5b	Low-density open scatter with BIF and CCS chunks, flakes, chips and scrapers. N=13/100m² ESA/MSA Outside development footprint.	28° 30' 56.4" S 21° 03' 50.8" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)
015	MTG-5/05	McTaggarts PV4b	Low-density open scatter with BIF and CSS flakes. N=10/100m² ESA/MSA	28° 31' 13.6" S 21° 03' 30.9" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)
011 (2019)	MTG 1/11	McTaggarts PV4a	Low-density open scatter with BIF flakes and debris. N=2/100 m². MSA Recorded during 2019 survey.	28° 31' 05.80" S 21° 02' 33.87" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)
012 (2019)	MTG 1/12	McTaggarts PV4a	Machine soldered square fish tin. Probably associated with 1930-1940s mining activities. Recorded during 2019 survey.	28° 31' 05.87" S 21° 02' 33.73" E	NCW	Phase 1 is seen as sufficient recording, and it may be demolished (low significance)

3.1.1 Heritage resources within the development footprints

Seven incidences of heritage resources were documented across the development footprints of the proposed sites McTaggarts PV4, and McTaggarts PV 5 on Portion 3 of the Farm McTaggart's Camp 453. Two of these were recorded during a 2019 survey.

3.1.1.1 Archaeological

Across the development footprints of McTaggarts PV4 and McTaggarts PV 5, six incidences of low-density surface scatters with ESA and MSA chunks, cores, flakes and scrapers made from BIF (Banded Ironstone Formation) and CCS (Crypto-Crystalline Silicates), were recorded. The found lithic material shows various degrees of weathering and are without substantial archaeological context or matrix, and are therefore deemed of minor scientific importance, and not conservation worthy (NCW).

One isolated incidence of colonial period material, a machine-soldered fish tin was recorded in 2019. Without substantial archaeological context, this find is graded as not conservation worthy (NCW).

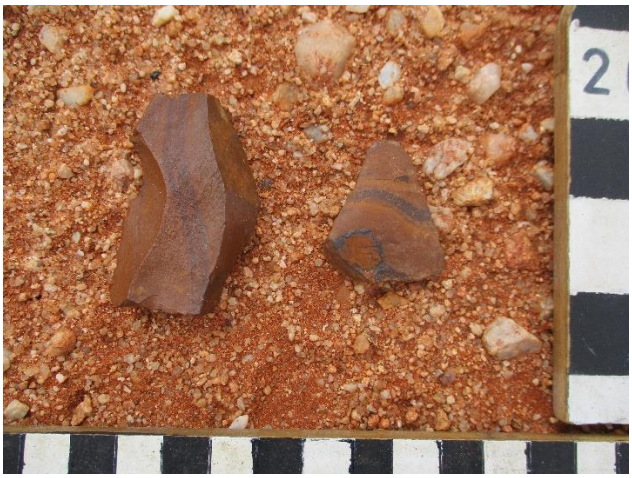
3.1.1.2 Graves

No formal or informal graves were identified within the development footprint.

3.1.2 Selected photographic record

MTG-5/01

MTG-5/04



MTG-5/02

MTG-5/05

Figure 8 *Selection of lithics recorded within the development footprints.*

4. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

Description	Development Impact		Mitigation	Field rating/ Significance
1. Six occurrences of ESA and MSA lithic material recorded across the development footprints McTaggarts PV4 & PV5. Sites: MTG-1/11, MTG-5/01, MTG-5/02, MTG-5/03, MTG-5/04, MTG-5/05	Nature	Negative	**No mitigation** required	Field Rating of Local Grade IVC or NCW (low significance)
	Extent	Low		
	Duration	Low		
	Intensity	Low		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		
2. One occurrence of late-19th-century to mid-20th-century cultural material, predominantly associated with tungsten mining, recorded on the McTaggarts PV4a in 2019. Sites: MTG-1/12	Nature	Negative	**No mitigation** required	Field Rating of Local Grade IVC or NCW (low significance)
	Extent	Low		
	Duration	Low		
	Intensity	Low		
	Potential of impact on irreplaceable resource	Low		
	Consequence	Low		
	Probability of impact	Low		
	Significance	Low		

The proposed development will have a negative impact on the heritage resources situated on the proposed powerline route. The effect will be inconsequential as the heritage resources are deemed of low significance and not conservation worthy (NCW). From a heritage point of view, the development can continue.

5. RECOMMENDATIONS AND CONCLUSIONS

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. Archaeologically speaking, there are no objections to the proposed development proceeding.

2. 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 any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA.

3. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

4. UBIQUE Heritage Consultants and its personnel will not be held liable for such oversights or costs incurred as a result of such omissions.

6. REFERENCES

Mucina, L. & Rutherford, M.C. (eds) 2006. *The vegetation of South Africa,* Lesotho *and Swaziland.* Strelitzia 19. SANBI: Pretoria.

APPENDIX A

Determining significance and development impacts

Levels of the 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 as 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 categorised as of high importance. Likewise, any principal 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 unique association with a particular community or cultural group for social, cultural or spiritual reasons;

h. its strong or unique 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.

Assessment of development impacts

A heritage resource impact may be defined broadly as the net change, either beneficial or adverse, between the integrity of a heritage site with and without the proposed development. Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource, by minimising natural site erosion or facilitating non-destructive public use, for example. More commonly, development impacts are adverse and can include:

- destruction or alteration of all or part of a heritage site;
- isolation of a site from its natural setting; and/or
- introduction of physical, chemical or visual elements that are out of character with the heritage resource and its setting.

Beneficial and adverse impacts can be direct or indirect, as well as cumulative, as implied by the examples. Although indirect impacts may be more difficult to foresee, assess and quantify, they must form part of the assessment process. The following assessment criteria have been used to assess the impacts of the proposed development on possible identified heritage resources:

Criteria	Rating Scales	Notes
Nature	Positive	An evaluation of the type of effect the construction, operation and management of the proposed development would have on the heritage resource.
	Negative	
	Neutral	
Extent	Low	Site-specific affects only the development footprint.
	Medium	Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius);
	High	Regional (beyond a 10 km radius) to national.
Duration	Low	0-4 years (i.e. duration of construction phase).
	Medium	5-10 years.
	High	More than 10 years to permanent.
Intensity	Low	Where the impact affects the heritage resource in such a way that its significance and value are minimally affected.
	Medium	Where the heritage resource is altered, and its significance and value are measurably reduced.
	High	Where the heritage resource is altered or destroyed to the extent that its significance and value cease to exist.
Potential for impact on irreplaceable resources	Low	No irreplaceable resources will be impacted.
	Medium	Resources that will be impacted can be replaced, with effort.
	High	There is no potential for replacing a particularly vulnerable resource that will be impacted.
Consequence, (a combination of extent, duration, intensity, and the potential for impact on irreplaceable resources).	Low	A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium, and all three other criteria are rated low.
	Medium	Intensity is medium, and at least two of the other criteria are rated medium.
	High	Intensity and impact on irreplaceable resources are rated high, with any combination of extent and duration. Intensity is rated high, with all the other criteria being rated medium or higher.
Probability (the likelihood of the impact occurring)	Low	It is highly unlikely or less than 50 % likely that an impact will occur.
	Medium	It is between 50 and 70 % certain that the impact will occur.

Criteria	Rating Scales	Notes
	High	It is more than 75 % certain that the impact will occur, or it is definite that the impact will occur.
Significance (all impacts including potential cumulative impacts)	Low	Low consequence and low probability. Low consequence and medium probability. Low consequence and high probability.
	Medium	Medium consequence and low probability. Medium consequence and medium probability. Medium consequence and high probability. High consequence and low probability.
	High	High consequence and medium probability. High consequence and high probability.

APPENDIX B

Fieldnotes

UBIQUE HERITAGE CONSULTANTS

FIELD NOTES

Phase 1 Archaeological/Heritage Impact Assessment

Site ID: Khunab PV Facility near Upington: Northern Cape Province

Phase 1 survey conducted				
CRM Archaeologist	Jan Engelbrecht		Date/s	2020-02-25 2020-02-26 2020-02-27
Additional surveyors	N. Titus and H. de Klerk			
Type of survey	Pedestrian/Vehicular		Transects	30m to 50m where possible
Technical equipment	GPS	E-tracks 10 Garmin Hisense Mobile Locus maps	Camera	Canon IXUS Digital Camera

Technical information

Project description	
Project name	Proposed development of Khunab PV Facilities near Upington: Northern Cape Province
Description	Proposed development of Khunab PV facilities and associated infrastructure on a Portion of the Farm Mc Taggart's Camp No. 453 Portion 3 in the Northern Cape Province.
Developer	
Federico Zanotta	
Contact information	Mobile: (+27) 74 793 9994 Email: Federico.zanotta@abengoa.com
Development type	PV Facility
Landowner	
Mr Abengoa	
Contact information	(+27) 062 059 4721
Consultants	
Environmental	N/A
Heritage and archaeological	UBIQUE Heritage Consultants
Paleontological	N/A
Property details	
Province	Northern Cape
District municipality	Z.F. Mgcawu
Local municipality	Dawid Kruiper

Topo-cadastral map	1:50 000 2821AC
Farm name	Mc Taggart's Camp No 453 Portion 3
Closest town	Upington
GPS Co-ordinates	28° 30' 08.22" S 21° 02' 46.03" E
Property size	Approximately 900 ha
Development footprint size	Approximately 200 ha
Land use	
Previous	Agriculture
Current	Agriculture
Rezoning required	No
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.	No
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

Site description

Description of the general area affected by development
Type of environment
Typical arid Kalahari landscape
Terrain description
The terrain is rather flat and sandy with some rocky outcrops at several places. The terrain varies in vegetation cover. It also has a slight slope from south to north. The site footprint is currently still utilised for agricultural purposes (livestock farming), and several internal fences cross over the site. In the north-western section of the site, previous mining activities were located, as well as old ruins associated with the mining.
Geology
Several quartz and quartzite outcrops throughout the site footprint. Dolomite outcrops could also be seen but in a lesser degree/density. Numerous Limestone (calcrete) outcrops as well.
Vegetation
The site footprint is covered by various types of vegetation: Camel Thorn trees *(Acacia erioloba)*, Black Thorn trees *(Acacia mellifera)*, Three Thorn/Driedoring *(Rhigozum trichotomum*), Skaapbossie *(Aizoon schellenbergii)*, Shepherd tree *(Boscia albitrunca*), Suurgras (*Enneapogon desvauxii),* Pencil Milkbush *(Euphorbia lignose), Helichrysum tomentosulum,* Wild Basil *(Ocimum americanum),* Honey Locust *(Prosopis glandilosa),* Tall Bushman grass *(Stipagrostis hirtigluma),* Silky Bushman grass *(Stipagrostis uniplumis),* Kortbeen Boesmangras *(Stipagrostis obtuse).*
Waterways/sources
Several dry riverine beds are present on the site flowing from north to south and from west to east. No perennial rivers or riverine on site.

Site boundaries	
North: Bounded by fencing of a neighbouring farm, **South:** Bounded by existing PV facility developments and some open fields**, West**: Bounded by a game fence and neighbouring farm, **East**: Bounded by gravel road and some open fields.	
Site access	GPS Co-ordinates
Access to the site was obtained from the north-western corner for the PV area	PV: 28° 30' 11.15" S 21° 01' 23.50" E
Disturbances	
Natural erosion	
The only natural disturbances detected were the minor dry riverine flowing in various directions on the site at several areas on the site footprint.	
Human-made	
Mining activities in the western and north-western section. Most of the mining activities are located outside the development footprint. At least two livestock posts are located on the site, but with minimal disturbances. Two-track roads sand/gravel are also present on the development footprint	
Notes	

Environmental Recording/Panorama and Landscape

Way point	Site Name	Description	Location	Field rating/ Significance	Photo No.
Site-specific points of interest/ natural significance					
N/A	MGT	Panorama view of site/development footprint. View towards South existing PV facility. View towards North, East and West	N/A	N/A	41-51
N/A	MGT	Panorama view/contextual images of the site taken towards all directions.	N/A	N/A	63-66
N/A	N/A	Panorama view/contextual images of collapsed hearths present towards the NW of the site around old ruins	N/A	N/A	70-73

Heritage recording

STONE AGE

Way Point & Site No,	Photo No.	Description		Period	Location	Field rating/ Significance
003 MTG-1/03	Photo 7-10	Type lithic/s	Flakes and chunks	ESA/ MSA	28° 29' 46.5" S 21° 02' 02.8" E	IVC NCW
		Raw material	BIF			
		N in m².	8/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
004	Photo 11-13	Type lithic/s	Flakes, chunks and chips	ESA MSA	28° 29' 49.2" S	IVC NCW

MTG-1/04		Raw material	BIF, Dolerite and CCS		21° 02' 24.3" E	
		N in m².	7/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
006 MTG-1/06	Photo 18-21	Type lithic/s	Flakes, chunks and chips	MSA	28° 30' 10.2" S 21° 02' 11.9" E	IVC NCW
		Raw material	BIF and Quartzite			
		N in m².	6/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
009 MTG-1/07	Photo 32-34	Type lithic/s	Scraper, core, small axe and chips	MSA	28° 30' 35.3" S 21° 02' 03.1" E	IVC NCW
		Raw material	BIF			
		N in m².	5/100m²			
		Context	Open scatter, no context			
		Additional	Tools and debris without context			
010 MTG-1/08	Photo 35-37	Type lithic/s	Flakes and chips	MSA	28° 30' 11.4" S 21° 02' 40.5" E	IVC NCW
		Raw material	BIF			
		N in m².	6/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
011 MTG-5/01	Photo 38-40	Type lithic/s	Flakes, chips and one point	MSA	28° 31' 07.8" S 21° 02' 47.2" E	IVC NCW
		Raw material	BIF			
		N in m².	7/100m²			
		Context	Open scatter. No context			
		Additional	Debris			

012 MTG-5/02	Photo 52-54	Type lithic/s	Flakes	MSA	28° 30' 52.7" S 21° 04' 17.7" E	IVC NCW
		Raw material	BIF			
		N in m².	2/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
013 MTG-5/03	Photo 55-58	Type lithic/s	One chunk	MSA	28° 31' 46.9" S 21° 04' 01.3" E	IVC NCW
		Raw material	BIF			
		N in m².	1/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
014 MTG-5/04	Photo 59-62	Type lithic/s	Chunks, flakes, chips and scrapers	ESA/ MSA	28° 30' 56.4" S 21° 03' 50.8" E	IVC NCW
		Raw material	BIF and CCS			
		N in m².	13/100m²			
		Context	Open scatter. No context			
		Additional	Debris			
015 MTG-5/05	Photo 67-69	Type lithic/s	Flakes	ESA/ MSA	28° 31' 13.6" S 21° 03' 30.9" E	IVC NCW
		Raw material	BIF and CCS			
		N in m².	10/100m²			
		Context	Open scatter. No context			

		Additional	Debris			

HISTORICAL /COLONIAL FINDS

Waypoint And Site No.	Photo No.	Description	Period	Location	Field Rating
001 MTG-1/01	1-2	Metal tin can	Ca. 1930,s-1950's	28° 30' 02.1" S 21° 01' 45.4" E	IVC NCW
002 MTG-1/ 02	3-6	Metal tin can	Ca. 1930,s-1950's	28° 29' 59.2" S 21° 01' 41.5" E	IVC NCW
005 MTG-1/05	14-17	Metal tin can. Hand soldered seem	Ca 1890>	28° 29' 53.6" S 21° 02' 21.0" E	IVC NCW
007 MTG-1/27	22-27	Old collapsed ruin. Related to mining activities. Probable living quarters High-density surface scatter of metal tin cans, glass and ceramics to the north, north-west, and east of MTG-1/27.	Ca. 1930,s-1950's	28° 30' 12.2" S 21° 02' 08.3" E	IIIB
008 MTG-1/28	28-31	Metal and glass debris close to old collapsed ruin (WP 007). In context with mining activities and garbage of living quarters	Ca. 1930,s-1950's	28° 30' 12.2" S 21° 02' 08.3" E	IVC NCW
Associated with 016	81-85	Metal tin cans, glass and ceramics scattered around collapsed hearths/ *kookskerms*	Ca. 1930,s-1950's	28° 29' 59.2" S 21° 01' 59.2" E	IIIB
016 MTG-1/14	86-94	Previous Tungsten mining activities and mines. Present throughout the area adjacent and in proximity of WP 016. High-density surface scatter of metal tin cans, glass and ceramics scattered up to the300m south of waypoint 016, to the west and east of the mine, and south of the mine around collapsed cooking screens. 1930-1950	Ca. 1930,s-1950's	28° 30' 10.9" S 21° 01' 45.5" E	IIIB
017 or 022 MTG-1/22	95-103	Explosives bunker for safekeeping of explosives for mining activities and surrounding buildings High-density surface scatter of metal tin cans, glass and ceramics.	Ca. 1930,s-1950's	28° 29' 59.2" S 21° 01' 59.2" E	IIIB

GRAVES

Waypoint And Site No.	Photo No.	Description	Period	Location	Field Rating
No graves were located or identified on the development footprint					

Discussion

Stone Age finds
Scattered debris and minor tools at sites as registered above, mostly MSA with some combination of possible ESA material. Stone age material has no context and is mostly debris left behind by the producers. Higher densities of Stone age remnants are present closer to the south near the Orange River. ESA/MSA debris are randomly scattered over a wide area, and the densities are low.
Historical finds
In the north-western area of the site, there are several old ruins and buildings. Extensive mining of Tungsten was done on the farms involved as from 1935 to the 1940s. Tungsten was used in the war effort of WWII for it was used in the manufacturing of various ammunition, weapons and for industrial purposes. By the end of WWII in Southern Africa, the mining seized, and the sites, as well as the mining activities, were abandoned. (Interview: Mr.Willem Louw: 2019: Upington: the previous owner of the farm). Around ruins and especially probable living quarters of previous miners, there is a high density of garbage debris such as metal tins, glass and ceramics scattered around such ruins and hearths. These were recorded, but are not conservation worthy.
Identified graves
No graves were identified on the development footprint.

Recommendation

Stone Age finds
The Stone Age artefacts are of low open surface scatter significance. It is random and not concentrated in high densities like, for example, a knapping site. Our recommended field rating for the Stone Age deposits is IVC and is therefore sufficiently recorded during our Phase 1 assessment, and no further action is required.
Historical finds
Certain historical artefacts are of medium to high significance such as the architectural remains of the Tungsten mining activities and are rated as Local Field rating IIIB. It could be mitigated and (part) retained as a heritage register site. Other historical artefacts are rated as Field rating IVC or NCW and have been sufficiently recorded during our Phase 1 assessment.
Identified graves
No graves or burial grounds of any kind were located, identified or recorded on the proposed development footprint or surrounding areas.

Other
None

Additional notes

None

HERITAGE CONSULTANTS

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Declaration of independence:

I, Jan Engelbrecht, hereby confirm my independence as heritage specialist and declare that:

- I am suitably qualified and accredited to act as independent specialist in this application;
- I 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: Date: 2020-03-02

J.A.C. Engelbrecht UBIQUE Heritage Consultants