

Phase 1 Archaeological & Cultural Heritage Impact Assessment –

**Prospecting Right Application (without Bulk Sampling),
Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape**

- 16 June 2017 -

Report to:

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**Prospecting Right Application (without Bulk Sampling),
Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape**

Executive Summary

Project Description –

EIMS have been appointed as independent EAP by the project proponent, Black Mountain Mining (Pty) Ltd, to apply for EA, including a BAR and EMPr to the DMR for the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape*. The proposed prospecting right application affects an approximate 1,000ha area of the 3,800ha property Aroams 1/57. Black Mountain Mining intends to prospect for a variety of minerals including ferrous and base metals as well as precious metals, with the proposed prospecting area situated centrally within the existing Black Mountain and Gamsberg base metal mines areas. Prospecting is proposed through a phased approach, with results of each phase determining the particulars of the next phase, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive activities, including assaying and drilling at five (5) identified drill positions, namely BH0281, BH0291, BH0261, BH0301 and BH0271.

The Phase 1 Archaeological & Cultural Heritage Impact Assessment –

Project Name & Locality: Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1 (Aroams 1/57), near Aggeneys, Namakwa District Municipality, Northern Cape [1:50,000 Map Ref – 2918BB].

Summary of Findings:

Stone Age anthropogenic gravel surface occurrences have been identified at all five (5) of the proposed drill locations, or areas of invasive impact at the proposed study site. Surface identified lithic occurrences are extensive in size, with lenses flowing into one another along the foothills of the inselberg outcrops, the eastern foothills of the Aggeneys Mountains. In addition to identified Stone Age occurrences two (2) Colonial Period farmstead sites have been identified.

- The proposed development poses no ‘fatal flaws’ with reference to archaeological and cultural heritage resources.
- Consideration of a ‘No-Go’ option is irrelevant with reference to identified archaeological and cultural heritage resources.
- The development will have a limited negative visual impact on the cultural landscape during the construction (drilling) phase; there will be no visual impact during the operational phase.
- Proposed prospecting will not result in a negative cumulative impact on the cultural landscape, during either the construction (drilling) or operational phases.
- [A future mining application, resulting from the prospecting application, will have a direct impact on archaeological resources as well as a visual and cumulative impact on the cultural landscape].
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development, and not reported on in this report, the process described in ‘10) Heritage Management Plan’ should be followed.]

Heritage Compliance Summary – Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape				
Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
Aroams 1/57				
BH0281	Site ARS-01	MSA & LSA Lithic Scatter	S29.20951°; E18.90576°	*Drilling impact on identified lithic scatter
BH0291	Site ARS-02	ESA, MSA & LSA Lithic Scatter	S29.20519°; E18.90244°	*Drilling impact on identified lithic scatter
BH0261	Site ARS-03	ESA, MSA & LSA Lithic Scatter	S29.20137°; E18.89798°	*Drilling impact on identified lithic scatter
BH0301	Site ARS-04	MSA & LSA Lithic Scatter	S29.19630°; E18.90701°	*Drilling impact on identified lithic scatter
BH0271	Site ARS-05	ESA, MSA & LSA Lithic Scatter	S29.19426°; E18.90080°	*Drilling impact on identified lithic scatter
-	Site ARS-06	Colonial Period Farmstead	S29.20019°; E18.91069°	Temporary heritage signage
-	Site ARS-07	Colonial Period Farmstead	S29.20331°; E18.91306°	Temporary heritage signage
*Drilling impact on identified lithic scatters recommended without the developer having to comply with additional heritage compliance requirements				

Recommendations –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape*, proceed as applied for, provided the developer comply with the above listed heritage recommendations.

The SAHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

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1 – Declaration of Interest

I, Karen van Ryneveld (Company – ArchaeoMaps; Qualification – MSc Archaeology), declare that:

- I act as independent specialist in this application;
- I do not have any financial or personal interest in the application, its' proponent or subsidiaries, aside from fair remuneration for specialist services rendered;
- I am suitably qualified, accredited and experienced to act as independent specialist in this application;
- That work conducted have been done in an objective manner – and that any circumstances that may have compromised objectivity have been reported on transparently;
- That all material information collected for purposes of this application, that may reasonably influence the decision of the competent authority, are transparently disclosed in the report; and
- That work conducted have been done in accordance with relevant heritage legislation, regulations and policy guidelines.



Signature –

- 16 June 2017 -

2 – Summary of Specialist Expertise

Name:	Karen van Ryneveld
Contact Details:	1) Mobile – 084 871 1064 2) E-mail – karen@archaeomaps.co.za 3) Website – www.archaeomaps.co.za 4) Postal address – Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
Company:	ArchaeoMaps cc
Occupation:	Archaeologist
Qualification:	MSc Archaeology (WITS University – 2003)
Accreditation:	1) Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management CRM practitioner [member nr – 163] <ul style="list-style-type: none"> o 2010 – ASAPA CRM Section: Principle Investigator – Stone Age o 2005 – ASAPA CRM Section: Field Director – Iron Age & Colonial Period 2) SAHRA, AMAFA, EC PHRA and HWC listed ASAPA accredited CRM archaeologist

Tertiary Education

2015 – Present	University of Fort Hare (UFH), East London (MPhil Environmental Studies)
2010	University of South Africa (UNISA), Pretoria (Project Management 501)
2006 – 2007	Nelson Mandela Metropolitan University (NMMU), Port Elizabeth (Undergraduate Certificate in Geographical Information Systems – GIS)
2001 – 2003	University of the Witwatersrand (WITS), Johannesburg (MSc Archaeology)
1999 – 2000	University of Pretoria (UP), Pretoria (BA Hons. Archaeology)
1991 – 1993	University of Pretoria (UP), Pretoria (BA Archaeology & History of Art)

Employment – Professional Archaeology

2007/04 – Present	ArchaeoMaps [Self-employed] (Archaeologist – CRM)
2006/06 – 2007/03	National Museum, Bloemfontein (Archaeologist – CRM, Dept. of Archaeology)
2005/04 – 2006/05	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)
2004/04 – 2005/01	Amafa aKwaZulu-Natali (HoD: Archaeology, Palaeontology & Meteorites Unit – APM Unit)
2002/09 – 2004/03	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)

Employment – Freelance: Ground Penetrating Radar

2015/10 – Present	Terra Scan assistant (BCM area, EC) – GPR & underground utilities focussing on petrol retail (oil & gas) industry
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Archaeology – Summary

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of approximately 500 Phase 1 AIA studies. Phase 1 AIA work is centred in South Africa, focussing on the Northern and Eastern Cape provinces and the Free State. She has also conducted Phase 1 work in Botswana (2006 / 2007). In 2007 she started ArchaeoMaps, an independent archaeological and heritage consultancy. In 2010 she was awarded ASAPA CRM Principle Investigator (PI) status based on large scale Phase 2 Stone Age mitigation work (De Beers Consolidated Mines – Rooipoort, Northern Cape, 2008 / 2009) and has also been involved in a number of other Phase 2 projects including Stone Age, Shell Middens, Grave / Cemetery projects and Iron Age sites.

In addition to CRM archaeology she has been involved in research, including the international collaborations at Maloney's Kloof and Grootkloof, Ghaap Plateau, Northern Cape (2005 / 2006). Archaeological compliance experience includes her position as Head of the Archaeology, palaeontology and Meteorites (APM) Unit at AMAFA aKwaZulu-Natali (2004).

Company Profile

Company Name	: ArchaeoMaps cc
Registration Number	: 2005/180719/23
VAT Number	: Not VAT Registered
Accountant	: AZIMA Financial Services
Members / Shareholders	: Karen van Ryneveld (100%)
BBBEE Status	: Exempted Micro Enterprise (EME)

Environmental Impact Management Services (EIMS) have been appointed as independent Environmental Assessment Practitioner (EAP) by the project proponent, Black Mountain Mining (Pty) Ltd, to apply for Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Plan (EMPr) to the Department of Mineral Resources (DMR) for the proposed *Prospecting Right Application (without Bulk Sampling) on the Farm Aroams 57, Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape* [1:50,000 Map Ref – 2918BB]. The proposed prospecting right application affects an approximate 1,000ha area of the 3,800ha property Aroams 1/57.

Black Mountain Mining (Pty) Ltd intends to prospect for a variety of minerals including ferrous and base metals (copper, iron, lead, zinc, manganese, nickel and molybdenum) as well as precious metals (gold and silver), with the proposed prospecting area situated centrally within the existing Black Mountain and Gamsberg base metal mines areas (EIMS 2017).

Prospecting is proposed through a phased approach, with results of each phase determining the particulars of the next phase. No bulk sampling will be done under the prospecting right application. The following provides a basic outline of the proposed phased prospecting (EIMS 2017):

1. Desktop Study –

Compilation of historical exploration data and analysis of existing data to target and rank prospecting areas.

2. Geological Field Mapping –

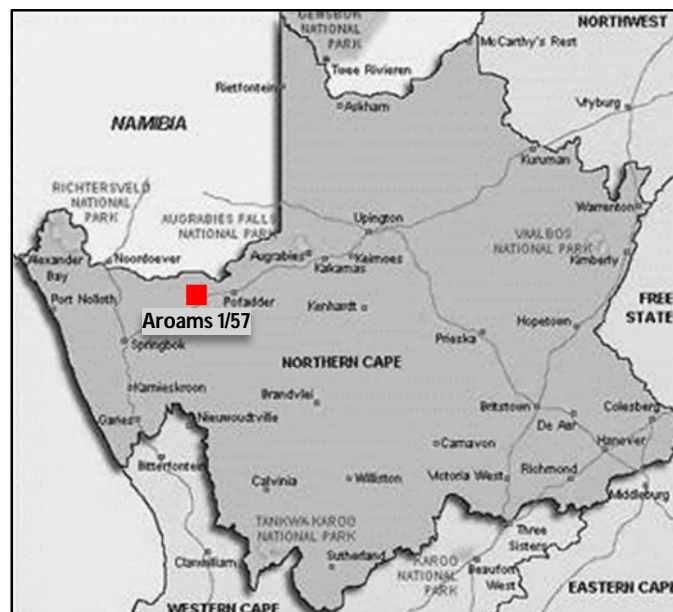
Field mapping (including soil and litho-sampling) will focus on potential prospecting areas to define the structure and geology for employment of geophysical exploration techniques and interpretation.

3. Semi-Regional Geophysical Ground Based Survey –

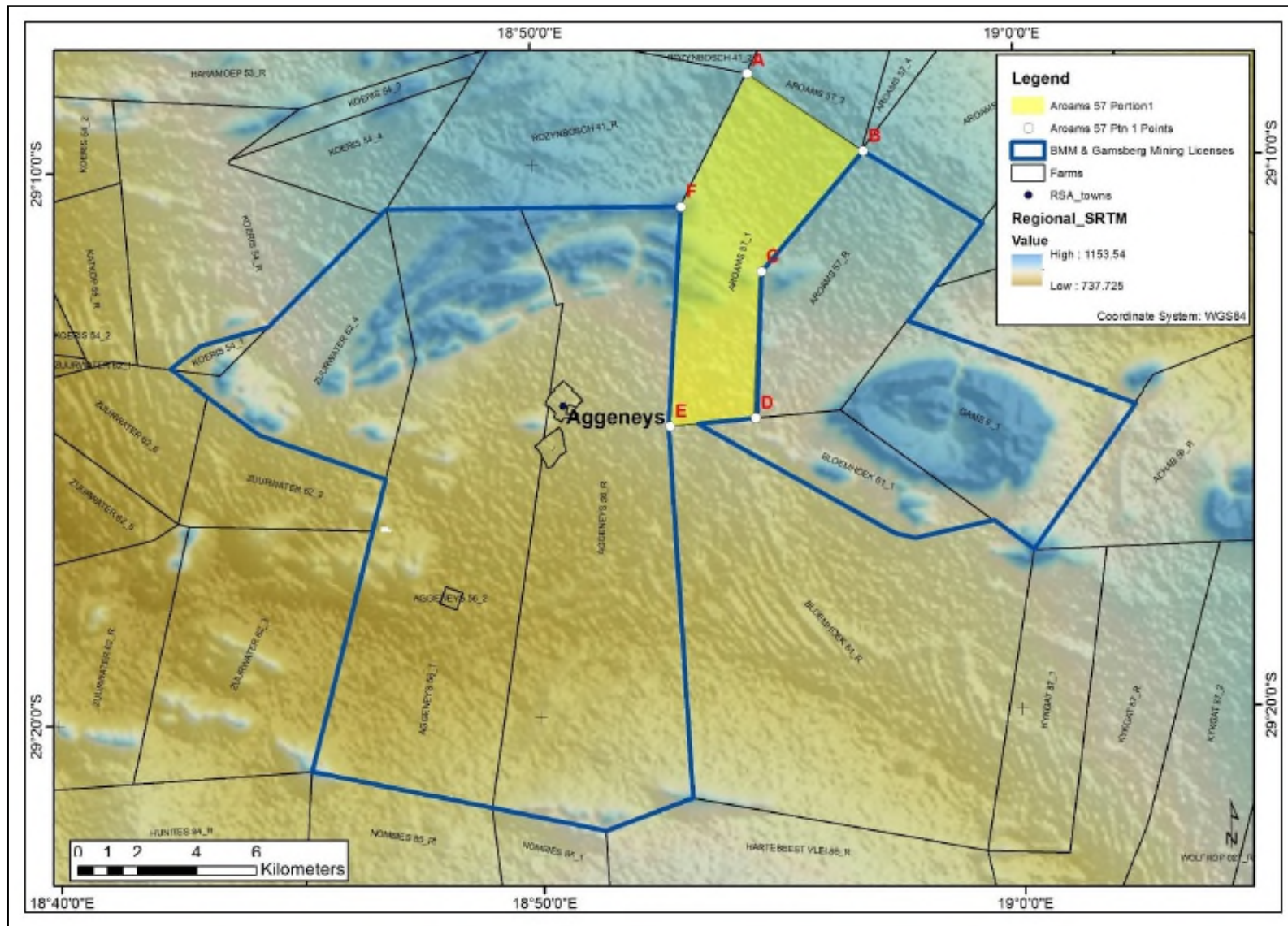
Ground based geophysical exploration will primarily be based on time-domain electromagnetics (TDEM). Existing airborne electromagnetics (EM) and aeromagnetic coverage will guide ground based geophysical exploration. Additional techniques such as controlled source audio magnetotellurics (CSAMT) and direct current resistivity / induced polarization might be employed

4. Invasive Activities –

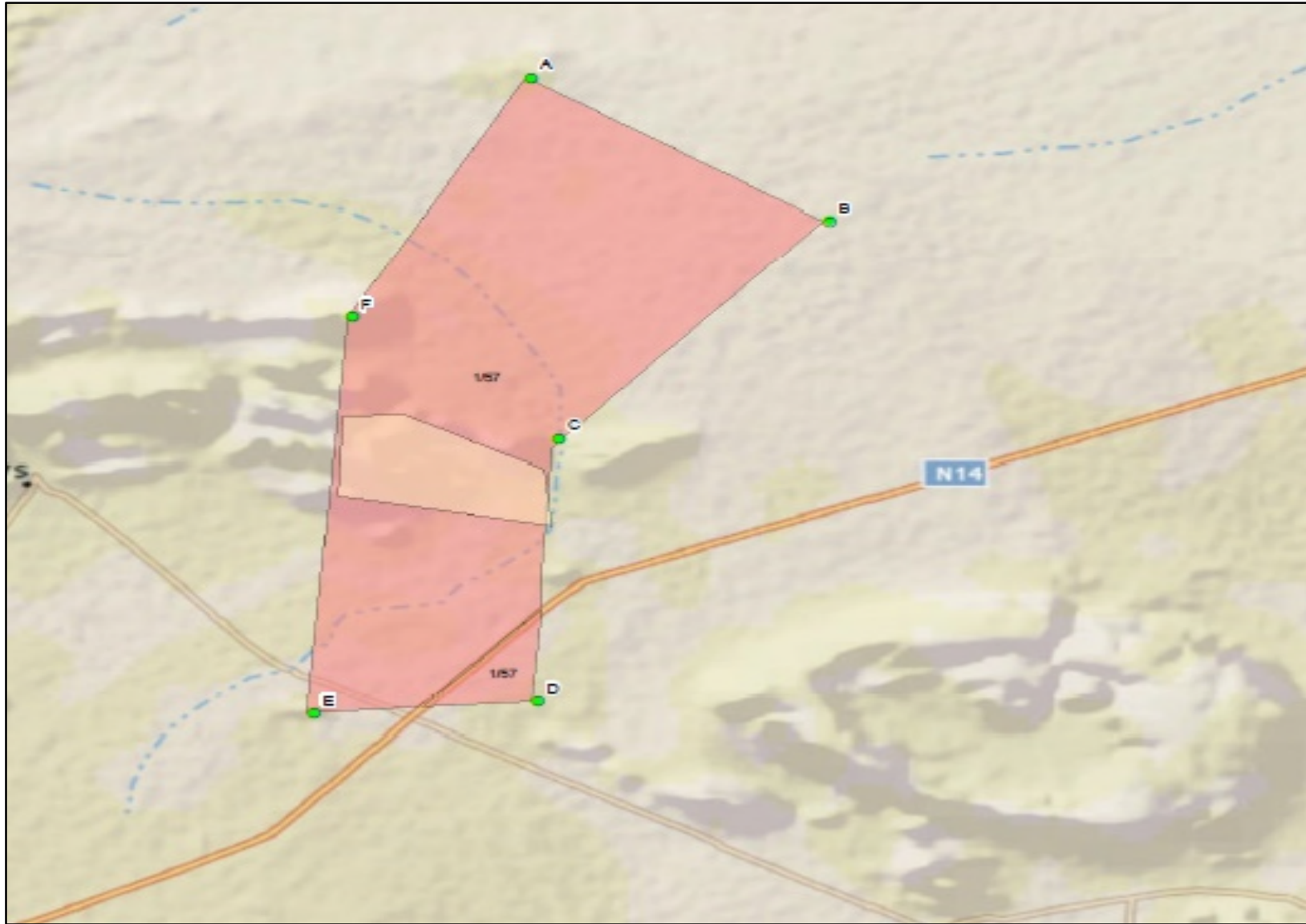
Geological field mapping and geophysical survey results are used to determine drilling locations. Five (5) drill locations have been identified, namely BH0281, BH0291, BH0261, BH0301 and BH0271. Vertical (down the hole) geophysical surveys will be done upon completion of exploratory boreholes. Assaying (rock chip / soil samples) and borehole cored samples will be sent for laboratory metallurgical testing.



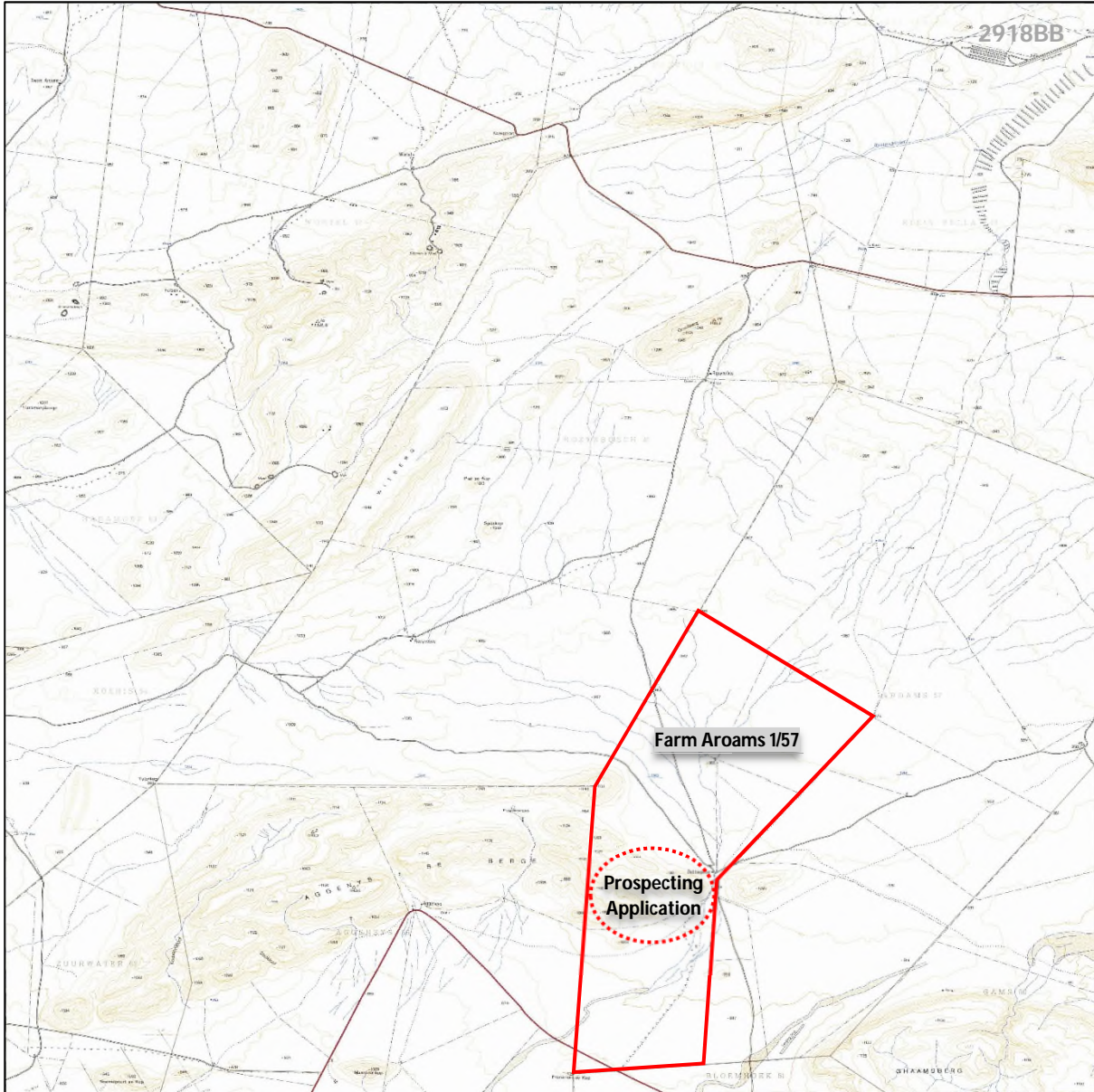
Map 1: General locality of the Aroams 1/57, near Aggeneys, Northern Cape (Base Map – Mapstudio 2008)



Map 2: Location of the Farm Aroams 1/57 (yellow) in relation to BMM and Gamsberg Mining Licensed areas (blue outlines) (EIMS 2017)



Map 3: Sketch plan for the proposed prospecting application on the Farm Aroams 1/57 (light pink) (EIMS 2017)



Map 4: Farm Aroams 1/57, near Aggeneys, Namakwa District Municipality, Northern Cape [1:50,000 Map Ref – 2918BB]

4 – Scope of Work and Terms of Reference

ArchaeoMaps have been appointed by EIMS to compile the Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape*. The Phase 1 AIA comprises a specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR and EMPr. The Scope of Work (SoW) for the Phase 1 AIA is two-fold in nature, including:

- To undertake an archaeological assessment of the study site (drill positions) in order to document heritage sites and develop a heritage sensitivity map of the proposed prospecting right application area; and
- To develop a heritage management plan for the prospecting right application.

Specific Terms of Reference (ToR) for the Phase 1 AIA are summarized as:

- Describe the existing area to be directly affected by the proposal in terms of its archaeological and cultural heritage characteristics as formally protected by the National Heritage Resources Act, No 25 of 1999 (NHRA 1999) and the general sensitivity of these components to change;
- Describe the likely scope, scale and significance of impacts (positive and negative) on the archaeological and cultural heritage resources of the area associated with the 1) construction (drilling) and 2) operation or use phases of the proposal;
- Make recommendations on the scope of any mitigation measures that may be applied during the 1) construction (drilling) and 2) operation or use phases to reduce / avoid the significance of identified related impacts. Mitigation measures could be design recommendations as well as operational controls, monitoring programmes, Phase 2 mitigation, management procedures and the like;
- Broadly describe the implication of a 'No-Go' option;
- Broadly comment on the cumulative impact (positive or negative) on archaeological or cultural heritage resources associated with the 1) construction (drilling) and 2) operation or use phases of the proposal; and
- Confirm if there are any outright 'fatal flaws' to the proposal at its current location from an archaeological and cultural heritage perspective.

5.1) Archaeological & Cultural Heritage Legislative Compliance

The Phase 1 AIA for the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape*, was requested to meet the South African Heritage Resources Agency's (SAHRA) requirements with reference to archaeological and basic cultural heritage resources in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Section 38(1)(e). This report is submitted in (partial) fulfilment of the NHRA 1999, Section 38(3) requirements, for purposes of a NHRA 1999, Section 38(4) / Section 38(8) Heritage Impact Assessment (HIA) Comment by SAHRA.

NHRA 1999, Section 38	
1)	Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorized as –
a)	The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
b)	The construction of a bridge or similar structure exceeding 50m in length;
c)	Any development or other activity which will change the character of a site –
i.	Exceeding 5,000m ² in extent; or
ii.	Involving three or more existing erven or subdivisions thereof; or
iii.	Involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
iv.	The costs which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d)	The rezoning of a site exceeding 10,000m ² in extent;
e)	Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,
	Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Table 1: Extract from the NHRA 1999, Section 38

The Phase 1 AIA aimed to locate, identify and assess the significance of archaeological and cultural heritage resources, inclusive of archaeological deposits / sites (Stone Age, Iron Age and Colonial Period), rock art and shipwreck sites, built structures older than 60 years, sites of military history older than 75 years, certain categories of burial grounds and graves, graves of victims of conflict, basic living heritage and cultural landscapes and viewsapes as defined and protected by the NHRA 1999, Section 2, 34, 35 and 36, that may be affected by the development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment only. The report was prepared in accordance with the 'Minimum Standards' specifications for Phase 1 AIA reports, as stipulated by SAHRA (2007).

Additional relevant legislation pertaining to the Phase 1 AIA is listed as:

- National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2014); and
- Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA 2002).

5.2) Methodology and Standard Practice Compliance

The Phase 1 AIA includes a basic pre-feasibility study and field assessment:

- The pre-feasibility assessment is based on the Appendix A schematic outline of South Africa's Pre-colonial and Colonial past, associated with introductory archaeological as well as general and scientific literature available and relevant to the study site. Databases consulted include the SAHRA 2009 Mapping Project Database (MPD), the South African Heritage Resources Information System (SAHRIS) and SAHRA database(s) on declared Provincial Heritage Sites (PHS) pertaining to the study site. The study excludes consultation of museum and university databases.

- The field assessment was done over a 1 day period (2017-06-08) with fieldwork conducted by the author. The assessment was done by vehicle and foot and limited to a Phase 1 surface survey. GPS co-ordinates were taken with Garmin Montana 650 (Datum: WGS84) Photographic documentation was done with a Canon EOS 1300D camera. A combination of Garmap (Base Camp) and Google Earth software was used in the display of spatial information.

The Phase 1 AIA was done according to the system and 'Minimum Standards' prescribed for the 3-tiered Phase 1-3 HIA process (SAHRA 2007):

- Phase 1 HIA – A Phase 1 HIA is compulsory for development types as stipulated in the NHRA 1999, Section 38(1) and Section 38(8), including any other development type or study site as required by the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Authority (PHRA). A Phase 1 HIA comprises at minimum of an archaeological (AIA) and palaeontological (PIA) study, but aims to address all heritage types protected by the NHRA 1999 and to alert developers to additional heritage specialist study requirements, if and where relevant to a development. Phase 1 HIA studies focusses on pre-feasibility and desktop studies, routinely coined with field assessments in order to locate, describe and assign heritage site significance ratings to identified resources that may be impacted by development. The aim of a Phase 1 AIA is to make site specific and general development recommendations regarding identified heritage resources for development planning and implementation purposes and may include recommendations for conservation, heritage site declaration, monitoring, Phase 2 mitigation (excavation), or destruction.
- Phase 2 HIA – Phase 2 HIAs are as a norm required where heritage resources of such significance have been identified during the Phase 1 HIA that mitigation (excavation) thereof is necessary for development purposes. Aside from large scale Phase 2 mitigation (routinely to precede development impact), lower keyed Phase 2 requirements may well include sampling, testing and monitoring during the construction or implementation phase of a development. Phase 2 HIA work is as a norm done under a compulsory heritage permit.
- Phase 3 HIA – As an extension to Phase 2 HIA work or cases where recommendations for heritage declaration formed part of a development's heritage compliance requirements, heritage resources of such scientific or heritage tourism significance, that their long-term conservation and continued research would be necessary within a development framework is proposed as a Phase 3 HIA.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations are done according to the combined NHRA 1999, Section 7(1) and SAHRA (2007) system.

SAHRA Archaeological & Cultural Heritage Site Significance System			
Site Significance	Field Rating	Grade	Recommended Mitigation
High Significance	National Significance	Grade I	Heritage site conservation / Heritage site development
High Significance	Provincial Significance	Grade II	Heritage site conservation / Heritage site development
High Significance	Local Significance	Grade III-A	Heritage site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Heritage site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Heritage site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	Heritage site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sampling, monitoring or no heritage mitigation required prior to or during development / destruction

Table 2: SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations

6.1) Pre-Feasibility Study

Based on the Appendix A schematic outline of the Pre-colonial and Colonial Periods in South Africa and background literature and database information, the probability of archaeological and cultural heritage resources situated on, or in proximity to the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeney, Namakwa District Municipality, Northern Cape*, can briefly be described as:

Archaeological and Basic Cultural Heritage Probability Assessment – Prospecting Right Application, Farm Aroams 57 Portion 1, Namakwa District Municipality, Northern Cape			
Primary Type / Period	Sub-period	Sub-period type site	Probability
EARLY HOMININ / HOMINID	-	-	None
	Graves / human remains: High scientific significance		
STONE AGE	Earlier Stone Age (ESA)		Low-Medium
	Middle Stone Age (MSA)		Medium
	Later Stone Age (LSA)		Medium
		Rock Art	None-Low
		Shel Middens	None
	Graves / human remains: ESA & MSA - High scientific significance; LSA – High scientific & social significance		
IRON AGE	Early Iron Age (EIA)		None
	Middle Iron Age (MIA)		None
	Later Iron Age (LIA)		None-Low
		Graves / human remains: EIA – High scientific significance; MIA & LIA – High scientific & social significance	
COLONIAL PERIOD	Colonial Period		Low-Medium
		LSA – Colonial Period Contact	Low-Medium
		LIA – Colonial Period Contact	None
		Industrial Revolution	None-Low
		Apartheid & Struggle	Low
	Graves / human remains: Medium-high scientific & high social significance		

Table 3: Archaeological and basic cultural heritage probability assessment

6.1.1) SAHRA Provincial Heritage Site Database – Northern Cape



Map 5: Spatial distribution of geo-referenced PHSs in the SAHRA – Northern Cape database in relation to the prospecting right application on Farm Aroams 1/57 (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape).

No declared geo-referenced Provincial Heritage Sites (PHS) are recorded in the SAHRA – Northern Cape database (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape) and situated within an approximate 15km

radius from the prospecting right application on Farm Aroams 1/57, near Aggeneys, Namakwa District Municipality, Northern Cape, study site, with the closest recorded geo-referenced PHSs being situated in Pella and Pofadder respectively.

6.1.2) The SAHRA 2009 MPD & SAHRIS

No archaeological Cultural Resources Management (CRM) reports are recorded in the SAHRA 2009 Mapping Project Database (MPD) situated within a 15km radius from the prospecting right application on Farm Aroams 1/57. Post compilation of the SAHRA 2009 MPD a rich array of archaeological CRM reports is recorded in the general vicinity of the study site, reflecting not only an increase in development proposals in the greater area, but also a greater commitment by developers to the HIA compliance system. Archaeological CRM studies conducted, and recorded in the South African Heritage Information System (SAHRIS), with study sites situated within a 15km radius from the prospecting right application on Farm Aroams 1/57 are listed as:

- De Kock, S. 2012. (Perception Heritage Planning). *Draft Phase 1 Integrated Heritage Impact Assessment Compiled in Terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999). Proposed Boesmanland Solar Farm (75MW): Portion (300ha) of the Farm Zuurwater 62/6, Namakwaland District, Northern Cape Province.* [SAHRIS CaseID 56 & 3812].
- Morris, D. 2010. (McGregor). *Cultural Heritage Assessment. Gamsberg – Supplementary Observations to a Previous Specialist Report on Archaeological Resources.* [SAHRIS CaseID 2215].
- Morris, D. 2011. (McGregor). *Sato Energy Holdings Zuurwater Photovoltaic Energy Generation Facility Development near Aggeneys, Northern Cape. Heritage Impact Assessment.* [SAHRIS CaseID 2283 & 3812].
- Morris, D. 2013a. (McGregor). *Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and Associated Infrastructure in Northern Cape, South Africa.* [SAHRIS CaseID 2215].
- Morris, D. 2013b. (McGregor). *Heritage Impact Assessment for the Proposed Photovoltaic Solar Energy Facilities on the Farm Zuurwater, near Aggeneys, Northern Cape Province. (Expanded Survey).* [SAHRIS CaseID 2283].
- Morris, D. 2013c. (McGregor). *Solar PV Installation on the Property Dabenoris 44, near Aggeneys, Northern Cape: Scoping Phase Heritage Input.* [SAHRIS CaseID 3212].
- Morris, D. 2013d. (McGregor). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Energy Facility at Bloemhoek near Aggeneys, Northern Cape Province.* [SAHRIS CaseID 4759].
- Orton, J. 2015a. (ASHA). *Final Archaeological Survey for the Proposed Aggeneys Solar Energy Facility, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 125].
- Orton, J. 2015b. (ASHA). *Heritage Scoping Study for Sol Invictus Solar PV Development on Ou Taaibosmond 66/5, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 8762].
- Orton, J. 2016. (ASHA). *Heritage Impact Assessment for the Proposed Sol Invictus 1 PV Facility, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 8762].
- Rossouw, L. (undated a). (Palaeo Field Services). *Phase 1 Heritage Impact Assessment for Proposed Prospecting Drilling on Portion 2 of Rozybosch No 41 and Remaining Extent and Portion 1 of Wortel No 42, Namakwaland District, Northern Cape Province.* [SAHRIS CaseID 7647].
- Rossouw, L. (undated b). (Paleo Field Services). *Phase 1 Heritage Impact Assessment for Proposed Prospecting Drilling in the Big Syncline Area on the Farm Aggeneys 56 Portion 01, Khai-ma Local Municipality, NC Province.* [SAHRIS CaseID 8004].
- Smith, A. B. 2012. (UCT – Department of Archaeology). *Archaeology Report. Proposed 75MW Solar Facility on Farm 62, Zuurwater, Aggeneys, Northern Cape.* [SAHRIS CaseID 3812].
- Webley, L. 2012. (ACO). *Desktop Heritage Impact Assessment: Proposed 1.5ha Extension of Gravel Mine, Portion 2 of the Farm Aroams 57, near Aggeneys, Northern Cape.* [SAHRIS CaseID 119].
- Webley, L. & Halkett, D. 2012. (ACO). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province.* [SAHRIS CaseID 91, 125 & 5801].
- Webley, L. & Halkett, D. 2017a. (ACO). *Heritage Impact Assessment: Proposed Construction of the Letsoai CSP 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, as well as Water Pipeline to the Orange River, Northern Cape.* [SAHRIS CaseID 10134].
- Webley, L. & Halkett, D. 2017b. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape.* [SAHRIS CaseID 10138 & 10164].

- Webley, L. & Halkett, D. 2017c. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 2 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10139].
- Webley, L. & Halkett, D. 2017d. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 3 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10163].
- Webley, L. & Halkett, D. 2017e. (ACO). *Heritage Impact Assessment: Proposed Construction of Letsoai and Enamandla 400kV Powerline and Substation Facilities, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10180].

6.1.3) Archaeological and Cultural Heritage Background Description

Archaeological CRM reports consulted sketched a two-tiered cultural layering of the landscape, including a Stone Age and Colonial Period occupation. The extremely arid landscape, characterized by flat drainage plains, or peneplains of red Hutton sands, aeolian sands dating back to the Quaternary, are intersected by granite inselbergs protruding above the peneplains and including amongst others the Aggeneys, Black and Gamsberg Mountains. This landscape is reasonably inferred to represent a basic Holocene landscape (Beaumont *et. al.* 1995), with much wetter conditions having had prevailed throughout the Plio- and Pleistocene, or during Earlier (ESA) and Middle Stone Age (MSA) times.

The ESA Acheulean is poorly represented and documented by means of mostly singular bifaces, or handaxes (Morris 2011; De Kock 2012). Morris (2010, 2011, 2013a) and Smith (2012) reported on low density lithic scatters containing ESA, MSA and Later Stone Age (LSA) typological samples, in cases found in a workshop context. Said deposits identified by Morris (2013a) on Gamsberg probably represents the most significant ESA Acheulean associated deposits as yet identified, but reported on as surface scatters only, with a totally eroded, lagged context, situated on the exposed granite substrate of Gamsberg itself. Of particular ESA significance is the identification of the Victoria West Industry, invariably referred to as ESA, a later ESA, a component of the first transitional period (between the ESA and MSA), and an early expression of a prepared core and flake technique, which came to maturation during the MSA as the *Levallois* technique, although continuous evolution of the Victoria West to the *Levallois* is yet to be proven. Morris (2013d) reported on a Victoria West Industry on the property Bloemhoek characterized by prepared cores, associated with notably long blades and a low incidence of handaxes and cleavers. The report by Morris is of particular significance with direct reference to the reported on extent of the Victoria West Industry, a technological Industry that has received markedly little attention in Stone Age research considering its prominence in lithic technological development.

The MSA is reported on widely in archaeological CRM reports, characterised by an amorphous, fairly crude typology, with quartz having been the primary raw material used, but including production on quartzite and to a lesser extend local dolerite and other raw materials. Deposits are in general described as of low archaeological significance, based on the low ratio of artefacts present at recorded findspots, but including reference to poor typology, a direct result of the primary raw material used; quartz simply not having knapping qualities suitable to prepared technological techniques. Sites identified to date are recorded mostly from the peneplains, but including a few assemblages from mountainous areas, as identified at Gamsberg, but an environmental preference for the peneplains, rather than mountainous areas seems to have prevailed during MSA times. MSA scatters or occurrences are reported on widely in archaeological CRM reports, identified mostly as singular type assemblages, in a few cases associated with ESA lithic samples, and more often in association with LSA types (De Kock 2012; Morris 2010, 2011, 2013a, 2013b, 2013d; Orton 2015a, 2015b, 2016; Webley & Halkett 2012, 2017a, 2017b, 2017c, 2017d).

The LSA of the greater terrain is of intriguing heritage significance, effectively defining the 'Bushmanland' deposits. Prior to 2kya LSA hunter-gatherers (San, or Bushmen) settled primarily along the Orange River and the coastline, with extensive pre-pottery LSA assemblages, in both spatial extent and with reference to deposit depth confirming this. By 2kya LSA herder groups (Khoe, Khoe-khoen or Khoi) moved into South Africa, with the Great Namaqua (or Nama) occupying the greater northern Northern Cape area, but with smaller groups such as the Namnykoa recorded to have settled along the Orange River corridor and the Eniqua in the area west of Aggeneys. The influx of Khoe groups into the original San area of occupation resulted in a forced displacement, with San bands seeking refuge from socio-political pressures deeper into the interior, the hinterland, the area named 'Bushmanland' during Colonial Period times. San occupation of 'Bushmanland' is thus fairly recent, dating to between 2-1kya and extending into Colonial Period times. San bands were small, directly associated with the harsh, arid environmental conditions of 'Bushmanland', an

environment that at its best allowed a notably low carrying capacity, of both humans and game. Accordingly, the 'Bushmanland' LSA hunter-gatherer sites are small, low density sites, more than often characterized by simple ephemeral artefact scatters, reflecting small San bands, extremely mobile across the landscape. San bands may well have gathered in greater numbers during more favourable conditions, for example after a good rainy season, but this also being reported times when hostile Khoe groups would venture into the interior. Competition between LSA herders and LSA hunter-gatherer groups mark the first archaeologically recorded displacement and marginalization of the San in the northern Northern Cape (Beaumont *et. al.* 1995).

By 1770 Colonial 'trekboers' moved into the area, initially, very similar to the San, living a transhumance existence; seasonal migration of farmers with their livestock from the hinterland to the coast were commonplace, and especially in the harsh, arid interior strife competition over natural resources prevailed, often resulting in livestock raids by San groups and farmer commandos retaliating, inevitably ensuing in a number of skirmishes. Early travelogues by Thomson (1827) and Dunn (1931), who visited 'Bushmanland' in 1824 and 1827 respectively provide interesting vestiges of the early Colonial Period / indigenous social geography. As early as 1863 Anthing reported on conflict between the 'trekboers' and the San, locally known as 'Obseses', in the Gamsberg and Namiesberg areas, describing skirmishes as 'genocidal' in nature. Dunn (1931) writes of a 'Gora' (or 'Gorra', '!Gora', or waterhole in the rock) near 'Ghaums' (or 'Gams'), stating that *'At this water an affray took place between the Boers and Bushmen. The Bushmen scherms, made of stones, still remain, as well as the marks of the bullets on the rocks'*. A further record of conflict between the 'trekboers' and the San was relayed in the Cape Argus, July 1973: *'Aggeneys is the name of a kloof on Vickie Burger's farm... Long before the turn of the century, the Bushmen had several strongholds in the mountains between Pofadder and Springbok and from these they carried out raids on the farmers. Finally the farmers could no longer tolerate the marauding Bushmen and formed a commando which followed the spoor of the Bushmen and the livestock that they had stolen to the kloof, which is today known as Aggeneys. Near the kloof they split into three parties which surrounded the trapped bushmen at a spring near the confluence of the three ravines. The Bushmen were wiped out and the kloof became known as The Place of Blood'*.

Fair records of LSA lithic deposits are present in archaeological CRM reports, with sites often being in lagged contexts and associated with earlier MSA deposits, again more than often identified on the peneplains but including small shelter sites. LSA sites are routinely described as small ephemeral scatters of lithic artefacts, with quartz being the primary raw material used for artefact production, and similar to described MSA assemblages, of a poor amorphous typology. Grinding grooves are frequently associated with LSA deposits, and a number of upper grinding stones have been recorded. Ostrich eggshell fragments and fine grit tempered ceramic have been found at select LSA sites. The micro-landscape seems to have been key in LSA site locality, with sites often reported on as situated in close proximity to a 'Gora' or waterhole (De Kock 2012; Morris 2010, 2011, 2013a, 2013b, 2013d; Orton 2015a, 2015b, 2016; Webley & Halkett 2012, 2017a, 2017b, 2017c, 2017d). Morris (2013d) reported on a Rock Art site, situated at the foot of the Swartberg (Black Mountain) on the Farm Zuurwater, but the presence of Rock Art associated with LSA deposits remain extremely low. A limited number of LSA sites yielded typical Colonial Period artefacts, including porcelain fragments, bottle glass and rusted enamel (Morris 2013d; Orton 2015a).

Morris (2013a) reported on a LSA site at an 'inkruip', a crevice to the southern side of Gamsberg, and interpreted the site as a 'genocide' site; most probably the site reported on by Dunn (1931). A word of caution is raised here with regards to the assignation of archaeological sites to historically reported on incidents. Whilst the site description by Morris provides for a confirmed LSA site, and the locale of the site reasonably coincides with that reported on by Dunn, the absence of the historically reported on bullet holes in Morris' text and photographic record remain concerning. It is suggested that clear definition be given for sites described as 'genocide' sites, and that specific conflict related data, such as bullet holes, bullet casings etc. be collected that distinctly differentiates 'genocide' LSA sites from LSA occupation sites.

Records of grave sites are notably low. Orton (2016) reported on a possible grave, while Webley & Halkett (2012) commented on a number of stone cairns present on the Aroams photovoltaic study site, which may or may not be graves. Stone cairns reported on are not georeferenced, though basic recommendations, in the event of these being graves, or graves being encountered during the course of development are included in the report recommendations. Webley & Halkett (2012) speculated that stone cairns identified may also be early prospecting remains. An alternative possibility for stone cairns on the landscape is offered; what is in the Eastern Cape referred to by the Xhosa name 'izivivane', small stone piles that marked the well-wishing of a journey. The practise is reasonably inferred to have been adopted by Later Iron Age (LIA) Xhosa groups after large scale migration into the Eastern Cape during the 18th Century and the associated displacement and marginalization of resident Khoe groups. Demarcation of migration or travel routes have been

reported on amongst various LSA (and LIA) indigenous populations. It needs to be noted that stone cairn graves across 'Bushmanland' may be Khoe graves, with the Khoe known to have periodically ventured into 'Bushmanland', or even Colonial Period graves, but non-Christened LSA hunter-gatherer graves would by virtue of cultural tradition not be surface demarcated.

As mentioned, by 1770 Colonial 'trekboers' moved into the area, essentially living a transhumance existence, a lifestyle that dominated Western Colonial Period occupation of 'Bushmanland' well into the first third of the 20th Century. By 1930 the development of drilling technology allowed the exploitation of sub-surface water resources, boreholes and the characteristic wind pump on the landscape marking the first permanent farming, and associated therewith permanent settlement of farmers in the area (Beaumont *et. al.* 1995). Mineral exploration of the greater area is fairly recent, dating back to 1928 in the Aggeneys area, but it was not until the 1970s that mining started to play vital role in the economic sector of the region (Webley & Halkett 2017e).

With reference to the above, typical Colonial Period sites reported on in archaeological CRM reports remain scarce. Morris (2011) recorded a portion of the old Springbok-Aggeneys-Pofadder road with periodic cast cement milestones still visible (and associated with a fair degree of period related debris, including bottle glass and metal cans). A packed stone walled feature on the Farm Zuurwater can reasonably be ascribed to the Colonial Period (Morris 2013b). Boer War fortifications are still visible in the Aggeneys area (Webley & Halkett 2017e), and low-keyed mining/ prospecting impact have been reported on Webley & Halkett (2012).

The Farm Aroams: Webley (2012) stated that '*According to the Surveyor General's Records, the farm Aroams 57 was surveyed and granted in 1895, suggesting a relatively recent date for settlement in the area*'. Webley's statement however remains unreferenced and not supported by a Chief Surveyor General (CSG) record number or SD diagram. No CSG record number or SD Diagram could be obtained from the relevant department for purposes of this study. The farm name 'Aroams' is of Khoe origin: According to Nienaber & Raper (1977) 'taro' refers to the 'wag-n bietjie' tree (*Ziziphus mucronatus*), while 'am' or 'ams' means 'mouth'. 'Aroams' can thus be translated as 'wag-n bietjebos fontein' / 'wag-n bietjie bush fountain'.

6.2) Field Assessment

Prospecting on Farm Aroams 1/57 is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the five (5) identified drill positions, including BH0281, BH0291, BH0261, BH0301 and BH0271, and relevant access roads and tracks in the vicinity of the drill positions. All 5 drill positions were assessed. Only existing access roads and tracks will be used during the proposed prospecting work; no new roads will be constructed. Surface visibility across the study site proved to be very good.

Proposed drilling will impact on an approximate 10x10m surface area at each of the drill positions, archaeological assessment of the drill positions aimed to assess a minimum 50x50m area to accommodate drilling activities, but in all cases extended beyond these parameters based on the findings of the field assessment, the presence of lithic artefacts in surface gravel lenses at all five (5) of the assessed drill positions. Field assessment resulted in findings contributory to the current general understanding of specifically the Stone Age archaeology of the greater terrain. The majority of archaeological assessments in the area focussed on study sites situated on the peneplains, where low density Stone Age occurrences often feature, including primarily MSA and LSA deposits, and to a lesser extend the ESA, in general described as of low archaeological significance, based on low artefact ratios (artefacts: m²) and a general amorphous, substandard typology. Such MSA-LSA low density occurrences have for example been identified by Webley & Halkett (2012) on the peneplain of Aroams 1/57, just south of the prospecting application area. Field assessment for the proposed Black Mountain Mining prospecting application resulted in the identification of much richer Stone Age deposits at the foot of the inselberg, the eastern foothills of the Aggeneys mountains, with continuing Stone Age deposits characterising varying ESA-MSA-LSA and MSA-LSA lenses intersecting one another. Stone Age lenses flow into one another and it is not possible to demarcate individual lenses. The identification of an ESA at the prospecting application area is of significance, and more importantly the possibility of an ESA Victoria West Industry, supporting identification of the Industry by Morris

(2013d) at the Bloemhoek study site. In general, the notably richer archaeological deposits at the Aroams 1/57 prospecting application study site, and including ESA, MSA and LSA, supports the findings of Morris (2013a) at Gamsberg, based on which Morris concluded that mountainous areas, the inselbergs and associated foothills are archaeologically of higher significance than the surrounding peneplains.

In addition to Stone Age archaeological resources two (2) Colonial Period farmsteads have been documented.

[It is important to note that prospecting applications are not singular development applications, the aim of which is always to define possible mining areas. Although prospecting in itself will have a negligible impact on identified archaeological deposits, the developer need to be cognisant of the fact that a future mining application in the area will have a direct impact on archaeological resources as well as a visual and cumulative impact on the cultural landscape. Any proposed mining in the prospecting application area will of necessity need to be considered along a Phase 2 archaeological mitigation programme].

6.2.1) Drill Position BH0281 / Site ARS-01 – MSA and LSA Lithic Scatter – S29.20951°; E18.90576°

Drill position BH0281 is situated on the peneplain south of the Aggeneys Mountains. The locale is characterized by a gravel lens containing MSA and LSA lithic artefacts in a lagged surface context. Depth to the deposit can reasonably be inferred. Based on artefact size the MSA is described as a Voman (1984) MSA3, but the assemblage remains typologically amorphous, comprising a variety of flakes and cores. The LSA is represented by both macrolithic and microlithic samples. Quartz constitutes the primary raw material used to produce artefacts, but including samples from quartzite, with infrequent microliths knapped from siliceous material. Artefact ratios (artefacts: m²) vary notably across the surface of the gravel lens, with ratios of 5-15:1 recorded. Despite higher recorded artefact ratios, the anthropogenic character of the Site ARS-01 lens is very similar to MSA and LSA low density artefact scatters observed in gravel lenses further south on the said peneplain as recorded by Webley & Halkett (2012).

- **Site Significance and Recommendations:** The Site ARS-01 anthropogenic gravel lens comprises a Stone Age archaeological site / occurrence, and is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0281 will directly impact on the identified archaeological occurrence. Based on the small impact footprint of drilling and the large occurrence extent, it is recommended that development proceed without the developer having to comply with additional heritage compliance requirements.

6.2.2) Drill Position BH0291 / Site ARS-02 – ESA, MSA and LSA Lithic Scatter – S29.20519°; E18.90244°

Drill position BH0291 is situated in a valley between 2 inselbergs at the foothills of the Aggeneys Mountains. The general locale, for purposes of drill position BH0291 recorded as Site ARS-02, but extending along the valley to drill position BH0261, recorded as Site ARS-03, comprise a continuous lens of raw material / gravel, directly associated with varying temporal Stone Age Industry lithic artefact types, including ESA, MSA and LSA material. Surface lithic artefacts were found in a lagged context. Artefact lenses characterised by varying artefact types flow onto one another; there is no clear demarcations between the various lenses. ESA artefacts are represented by a number of rough bifacial tools, primarily handaxes (Acheulean), but including prepared cores and flakes, which may indicate a Victoria-West Industry. The MSA remain amorphous in typology; comprising primarily amorphous flakes, but including some rough blade or flake-blade types and cores. Based on artefact size the MSA is classed as a Volman (1984) MSA2 and MSA3. LSA lithic samples include both macrolithic and microlithic artefacts. Quartz and quartzite comprise the primary raw material used to produce artefacts, but local dolerite as well as siliceous material were utilized to a lesser extent, preferred by ESA and LSA toolmakers respectively. Artefact ratios (artefacts: m²) are fairly high with specific consideration to the presence of an identified ESA, with ratios of 5-15:1 recorded in ESA-MSA-LSA lag deposits and 10-25 in MSA-LSA rich lenses. Systematic collection or recording of artefacts, with specific reference to LSA types may well radically increase the recorded artefact ratio.

- **Site Significance and Recommendations:** The Site ARS-02 anthropogenic gravel lens comprises a Stone Age archaeological site / occurrence and is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0291 will directly impact on the identified Site ARS-02 area of the

archaeological lithic occurrence. Based on the small impact footprint of drilling versus the extensive lithic occurrence size it is recommended that drilling proceed without the developer having to comply with additional heritage compliance recommendations.

6.2.3) Drill Position BH0261 / Site ARS-03 – ESA, MSA and LSA Lithic Scatter – S29.20137°; E18.89798°

Drill position BH0261 is situated north-west of drill position BH0291 along the described valley. The general drill position BH0261 area is characterized by ESA, MSA and LSA artefacts scattered amongst surface gravels. Labelled Site ARS-03, the lithic surface occurrence at drill position BH0261 is effectively an extension of the Site ARS-02 anthropogenic gravel lens described for drill position BH0291 (see BH0291 / Site ARS-02 for site description).

- **Site Significance and Recommendations:** The Site ARS-03 anthropogenic gravel lens, a Stone Age archaeological site / occurrence, is an extension of the described Site ARS-02 lithic occurrence and accordingly ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0261 will directly impact on the Site ARS-03 portion of the described lithic occurrence. Based on the small impact footprint of drilling versus the extensive lithic occurrence size it is recommended that drilling proceed without the developer having to comply with additional heritage compliance recommendations.

6.2.4) Drill Position BH0301 / Site ARS-04 – MSA and LSA Lithic Scatter – S29.19630°; E18.90701°

Drill position BH0301 is situated on a penneplain gravel lens containing MSA and LSA lithic artefacts in a lagged surface context. Depth to the deposit can reasonably be expected. MSA lithics are typologically amorphous (MSA3, Volman 1984), comprising primarily flakes and associated cores, while both a macrolithic and microlithic LSA seem to be present. Artefacts were primarily produced from local quartz, to a lesser extent from quartzite, with selected microliths having been produced from siliceous material. Artefact ratios (artefacts: m²) vary notably across the surface of the gravel lens, with ratios of 5-25:1 recorded. Systematic collection or recording of artefacts, with specific reference to microliths, may well radically increase the recorded artefact ratio. Despite higher recorded artefact ratios, the anthropogenic character of the Site ARS-04 lens is very similar to MSA and LSA low density artefact scatters observed in gravel lenses on the southern penneplain of the Farm Aroams 1/57, as recorded by Webley & Halkett (2012).

- **Site Significance and Recommendations:** Site ARS-04 comprise a formally protected Stone Age archaeological heritage site / occurrence. The Site ARS-04 anthropogenic gravel lens is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0301 will directly impact on the identified archaeological occurrence. Based on the small impact footprint of drilling and the large occurrence extent, it is recommended that development proceed without the developer having to comply with additional heritage compliance requirements.

6.2.5) Drill Position BH0271 / Site ARS-05 – ESA, MSA and LSA Lithic Scatter – S29.19426°; E18.90080°

Drill position BH0271 is situated north of the inselberg, and north of the BH0291 and BH0261 valley. The BH0271 drill position is situated amidst a vast Stone Age lens or surface gravel occurrence, labelled Site ARS-05, with the anthropogenic character of the occurrence in basic temporal Industry associated and associated typological character similar to deposits identified at ARS-02 and ARS-03, thus comprising a primary ESA-MSA-LSA lens, but intersected by areas characterized only by MSA-LSA lithics. Raw material usage for artefact production are similar to that reported on south of the inselberg, and with similar artefact ratios (artefacts: m²); 5-15:1 recorded in ESA-MSA-LSA lag deposits and 10-25 in MSA-LSA rich lenses, resulting in a basic conclusion that deposits around the foothills of the inselberg should be regarded as continuing deposits.

- **Site Significance and Recommendations:** The Site ARS-05 anthropogenic gravel lens comprises a Stone Age archaeological site / occurrence and is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0271 will directly impact on the identified Site ARS-05 area of the archaeological lithic occurrence. Based on the small impact footprint of drilling versus the extensive lithic

occurrence size it is recommended that drilling proceed without the developer having to comply with additional heritage compliance recommendations.

6.2.6) Site ARS-06 – Colonial Period Farmstead – S29.20019°; E18.91069°

Site ARS-06 comprises the Colonial Period Farm Aroams 1/57 farmstead, including the main residence, related outbuildings and a stone built rectangular dam and associated wind pump situated approximately 130m south-east thereof. The main residence, a vernacular structure, pre-dates 60 years of age and can reasonably be expected to be approximately 100 years old. The Colonial Period main residence is no longer in use, but still in a very fair condition. Associated buildings at the farmstead, not all dating to Colonial Period times, are still in use. The Colonial Period dam, still in use, has been repaired and maintained throughout the years, with at least some of the repairs in themselves of heritage temporal significance. Not the farmstead or any individual structures are at present formally fenced. The Colonial Period farmstead is situated on a lens of low density mixed MSA and LSA artefacts; infrequent lithic artefacts are found strewn across the surface of the site.

- **Site Significance and Recommendations:** Site ARS-06 comprise a heritage site (structure older than 60 years of age) and is formally protected by the NHRA 1999. The site receives automatic SAHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*.

The farm access road running through the site will be utilized during the proposed prospecting development. It is recommended that temporary heritage signage, indicating the Colonial Period main residence as a '*Caution – Heritage Site*', be placed in direct proximity to the site for the duration of drilling activities. Temporary signage should be removed once drilling has been completed. [It is not recommended that the site be permanently conserved (permanent fence, access gate and conservation buffer zone), based on the fact that the site is an operational farmstead. Rerouting of the access road for purposes of development will result in unnecessary impact on the cultural landscape and natural environment].

6.2.7) Site ARS-07 – Colonial Period Farmstead – S29.20331°; E18.91306°

Site ARS-07 comprises a Colonial Period farmstead, situated along the public gravel access road to the study site, but on the adjacent property, Farm Remainder of Aroams 57 (Aroams RE/57). The residence pre-dates 60 years of age and may well be in the region of 100 years old. The building is no longer in use, poorly maintained and dilapidated. A rectangular stone built kraal, or livestock enclosure, an outbuilding and the remains of an old wind pump is situated in direct proximity to the residence. A permanent fence, fairly unkept, is in place.

- **Site Significance and Recommendations:** Site ARS-07 comprise a heritage site (structure older than 60 years of age) and is formally protected by the NHRA 1999. The site receives automatic SAHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*. However, from an architectural, aesthetic and maintenance or conservation perspective the site is ascribed a *SAHRA Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted by the proposed development.

Site ARS-07 is situated along the public gravel access road to the study site, approximately 20m from the road. It is recommended that temporary heritage signage indicating the site as '*Caution – Heritage Site*' be erected in the immediate vicinity of the site to ensure no accidental impact thereon during the course of development. Temporary heritage signage should be removed once drilling had been completed. [Permanent heritage conservation (permanent fence, access gate and conservation buffer zone) is not recommended. Light weight vehicular traffic associated with the proposed prospecting development does not warrant formal conservation of heritage sites situated adjacent to existing public access roads, specifically Colonial Period residences, reasonably expected to be located in proximity to existing infrastructural development.]



Plate 1: General view of BH0281 / Site ARS-01



Plate 3: General view of BH0291 / Site ARS-02



Plate 2: Lithic artefacts from Site ARS-01



Plate 4: Lithic artefacts from Site ARS-02[1]



Plate 5: Lithic artefacts from Site ARS-02[2]



Plate 7: Continuing surface gravels containing lithic artefacts between BH0291 and BH0261



Plate 6: Lithic artefacts from Site ARS-02[3] (crude handaxe)



Plate 8: General view of BH0261 / Site ARS-03



Plate 9: Lithic artefacts from Site ARS-03[1]



Plate 11: General view of BH0301 / Site ARS-04



Plate 10: Lithic artefacts from Site ARS-03[2] (crude prepared core)



Plate 12: Lithic artefacts from Site ARS-04



Plate 13: General view of BH0271 / Site ARS-05



Plate 14: Dry streambed near BH0271 / Site ARS-05



Plate 15: Lithic artefacts from Site ARS-05[1]



Plate 16: Lithic artefacts from Site ARS-05[2] (incl. two cores, rough blade and hand one handaxe / pick)



Plate 17: Lithic artefacts from Site ARS-05[3] (rough flake-blade)



Plate 19: Site ARS-06 stone built dam associated with the Colonial Period residence



Plate 18: Site ARS-06 Colonial Period residence



Plate 20: Site ARS-07 Colonial Period residence

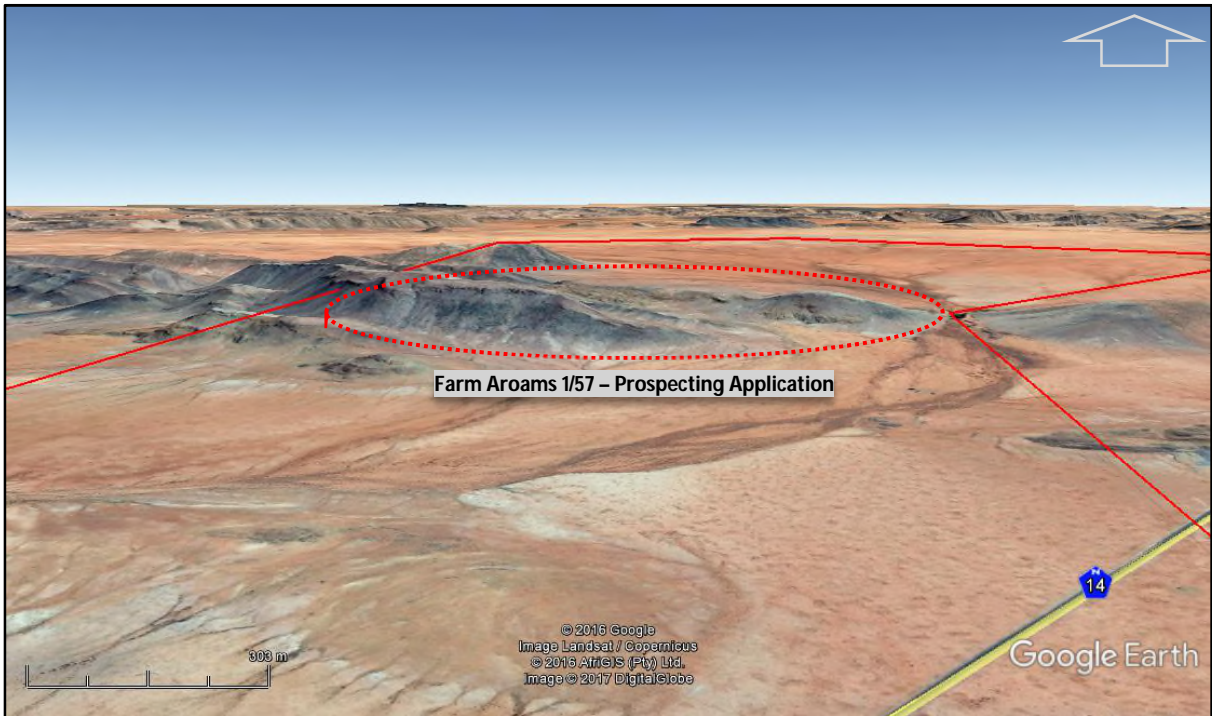
7 – Consideration of Related / Significant Aspect Management Plans in the Area

The proposed Black Mountain Mining prospecting application study site on Farm Aroams 1/57 does not overlap, in whole or in part, any other known development application, declared conservation area or formal heritage conservation initiative.

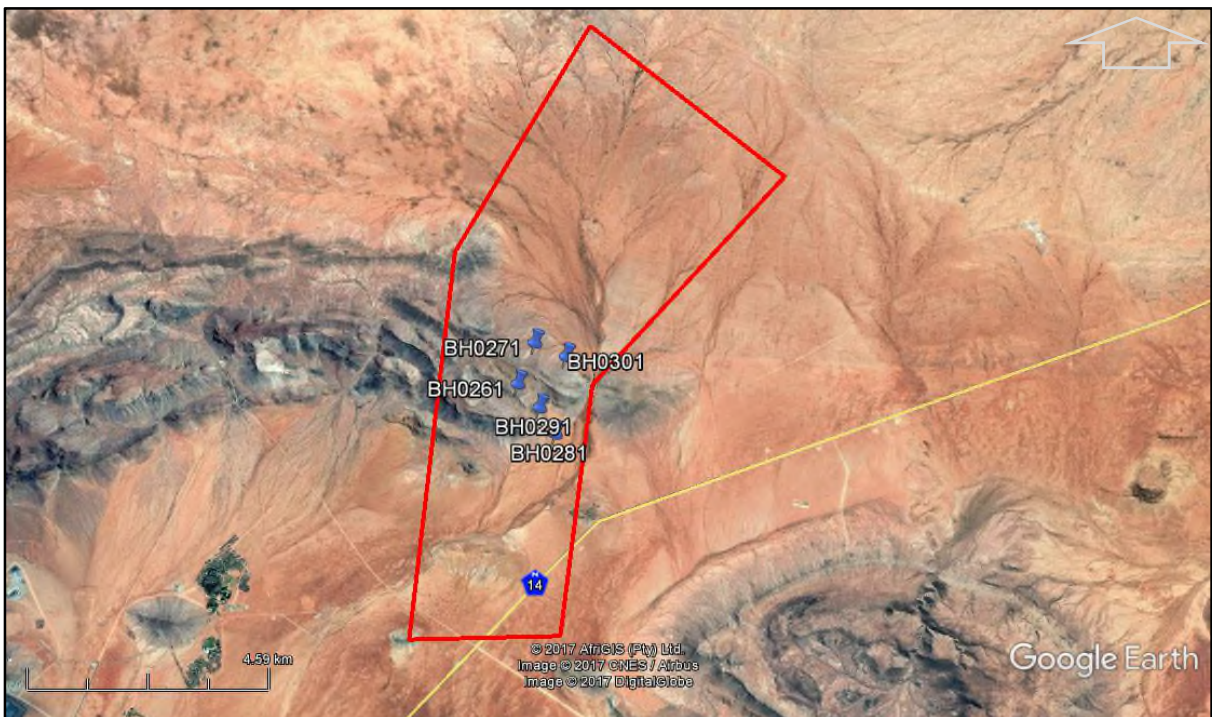
A development application for the Aggeneys Photovoltaic Solar Power Plant has been approved, with the relevant study site being situated on the peneplain immediately south of the prospecting application area on Farm Aroams 1/57. The Phase 1 AIA / HIA for the development is of relevance, referenced as:

- Webley, L. & Halkett, D. 2012. (ACO). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province*. [SAHRIS CaseID 91, 125 & 5801].

Development recommendations for the photovoltaic development has been made by Webley & Halkett (2012) for inclusion in the EMPr. It is unlikely that construction phases of the two developments will overlap, but should this be the case it is advised that developers familiarize themselves with basic Management Plans and procedures of the adjoining development.



Map 6: Aerial view of the Farm Aroams proposed prospecting application area



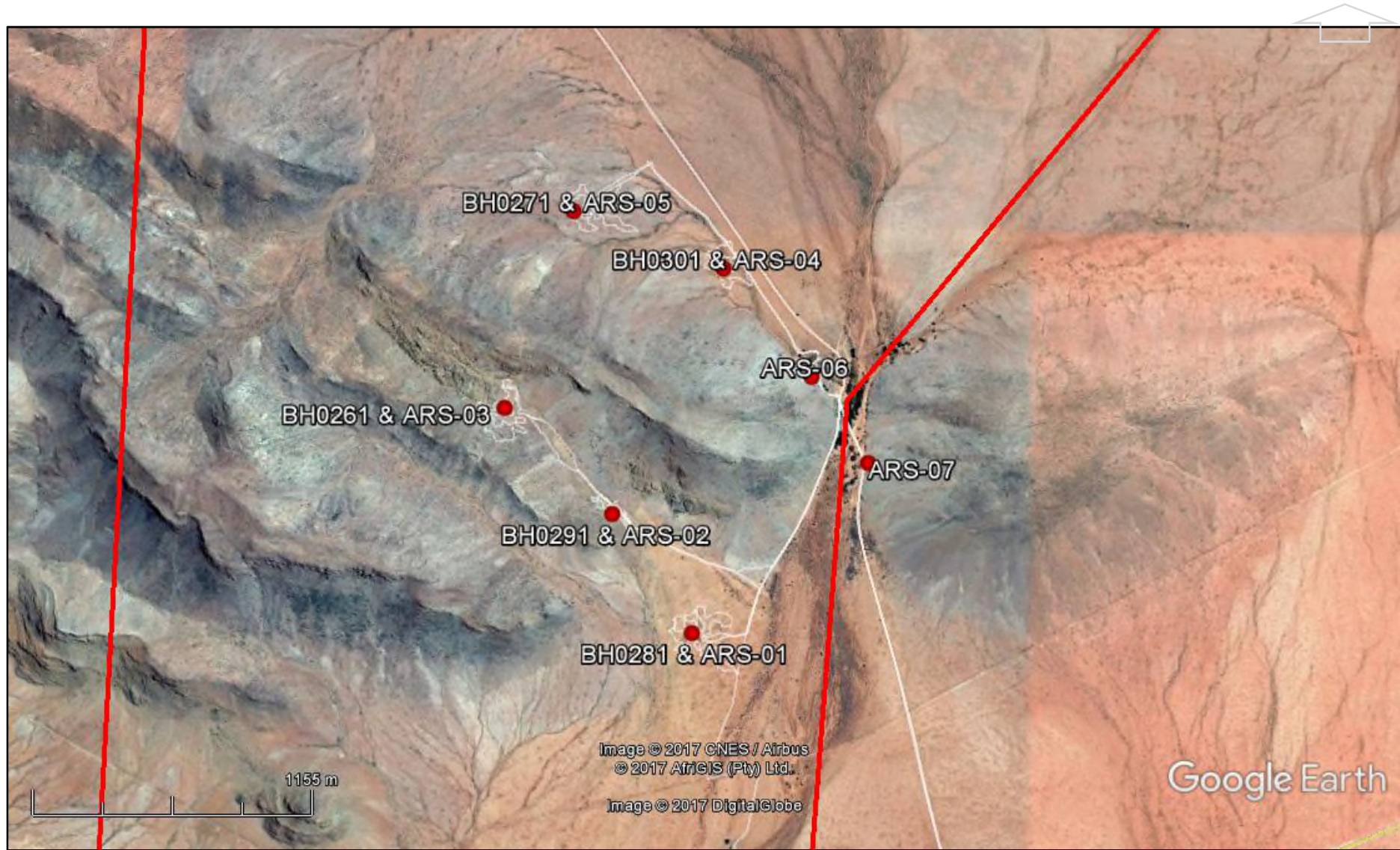
Map 7: Aerial view of the Farm Aroams indicating the proposed drill locations BH0281, BH0291, BH0261, BH0301 and BH0271



Plate 21: View of drill position BH0281 and the valley in which drill positions BH0291 and BH0261 is situated



Plate 22: View of the general locales of drill positions BH0301 and BH0271



Map 8: Results of the Phase 1 AIA for the Farm Aroams 1/57 proposed prospecting application (track log – white)

9 – Environmental Impact Rating

Environmental impact rating of identified heritage resources is done according to the system used by EIMS, as described in the NEMA 1998, EIA Regulations (2010).

Environmental Impact Assessment Rating: Sites ARS-01, ARS-02, ARS-03, ARS-04 & ARS-05					
Impact Name	Drilling impact on identified lithic scatters				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	1	1
Extent	2	2	Reversibility	3	1
Duration	1	5	Probability	5	4
Environmental Risk (Pre-mitigation)				-1.75	
Mitigation Measures:					
Drilling impact on identified lithic scatters recommended without the developer having to comply with additional heritage compliance requirements					
Environmental Risk (Post-mitigation)				-2.25	
Degree of confidence in impact prediction				High	
Impact Prioritisation:					
Public Response				0 (N/A)	
Low: Issue not raised in public responses					
Cumulative Impacts				1	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources				2	
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor				+3	
Final Significance				+1 (Low)	

Table 4: Environmental Impact Assessment rating for Sites ARS-01, ARS-02, ARS-03, ARS-04 and ARS-05

Environmental Impact Assessment Rating: Sites ARS-06 & ARS-07					
Impact Name	Conservation				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	+1	Magnitude	2	1
Extent	2	2	Reversibility	3	1
Duration	1	2	Probability	5	4
Environmental Risk (Pre-mitigation)				-2	
Mitigation Measures:					
Temporary heritage signage during the construction (drilling) phase					
Environmental Risk (Post-mitigation)				+1.5	
Degree of confidence in impact prediction				High	
Impact Prioritisation:					
Public Response				0 (N/A)	
Low: Issue not raised in public responses					
Cumulative Impacts				1	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources				2	
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor				+3	
Final Significance				+1 (Low)	

Table 5: Environmental Impact Assessment rating for Sites ARS-06 and ARS-07

Archaeological and Cultural Heritage Impact Assessment (AIA) – Heritage Protocol for Incidental Finds during the Construction (Drilling) and Operational or Use Phases

Should any palaeontological, archaeological or cultural heritage resources, including human remains / graves, as defined and protected by the NHRA 1999, and not reported on in this report, be identified during the construction (drilling) phase of development, it is recommended that the process described below be followed.

➤ On-site Reporting Process:

1. The identifier should immediately notify his / her supervisor of the find.
2. The identifier's supervisor should immediately (and within 24 hours after reporting by the identifier) report the incident to the on-site SHE / SHEQ officer.
3. The on-site SHE / SHEQ officer should immediately (and within 24 hours after reporting by the relevant supervisor) report the incident to the appointed ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should immediately notify the nearest SAPS station informing them of the find].
4. The ECO / ELO officer should ensure that the find is within 72 hours after the SHE / SHEQ officers report reported on SAHRIS and that a relevant heritage specialist is contacted to make arrangements for a heritage site inspection. [Should the find relate to human remains the ECO / ELO officer should ensure that the archaeological site inspection coincides with a SAPS site inspection, to verify if the find is of forensic, authentic (informal / older than 60 years), or archaeological (older than 100 years) origin].
5. The appointed heritage specialist should compile a 'heritage site inspection' report based on the site-specific findings. The site inspection report should make recommendations for the destruction, conservation or mitigation of the find and prescribe a recommended way forward for development. The 'heritage site inspection' report should be submitted to the ECO / ELO, who should ensure submission thereof on SAHRIS.
6. SAHRA / the relevant PHRA will state legal requirements for development to proceed in the SAHRA / PHRA Comment on the 'heritage site inspection' report.
7. The developer should proceed with implementation of the SAHRA / PHRA Comment requirements. SAHRA / PHRA Comment requirements may well stipulate permit specifications for development to proceed.
 - Should permit specifications stipulate further Phase 2 archaeological investigation (including grave mitigation) a suitably accredited heritage specialist should be appointed to conduct the work according to the applicable SAHRA / PHRA process. The heritage specialist should apply for the permit. Upon issue of the SAHRA / PHRA permit the Phase 2 heritage mitigation program may commence.
 - Should permit specifications stipulate destruction of the find under a SAHRA / PHRA permit the developer should immediately proceed with the permit application. Upon the issue of the SAHRA / PHRA permit the developer may legally proceed with destruction of the palaeontological, archaeological or cultural heritage resource.
 - Upon completion of the Phase 2 heritage mitigation program the heritage specialist will submit a Phase 2 report to the ECO / ELO, who should in turn ensure submission thereof on SAHRIS. Report recommendations may include that the remainder of a heritage site be destroyed under a SAHRA / PHRA permit.
 - Should the find relate to human remains of forensic origin the matter will be directly addressed by the SAPS: A SAHRA / PHRA permit will not be applicable.

NOTE: Note that SAHRA / PHRA permit and process requirements relating to the mitigation of human remains requires suitable advertising of the find, a consultation, mitigation and re-interment / deposition process.

➤ Duties of the Supervisor:

1. The supervisor should immediately upon reporting by the identifier ensure that all work in the vicinity of the find is ceased.
2. The supervisor should ensure that the location of the find is immediately secured (and within 12 hours of reporting by the identifier), by means of a temporary conservation fence (construction netting) allowing for a 5-10m heritage conservation buffer zone around the find. The temporary conserved area should be sign-posted as a 'No Entry – Heritage Site' zone.
3. Where development has impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context, and artefacts / objects / remains that have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer. It is imperative that where development has impacted on palaeontological, archaeological and cultural heritage resources the context of the find be preserved as good as possible for interpretive and sample testing purposes.
4. The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

➤ **Duties of the SHE / SHEQ Officer:**

1. The SHE / SHEQ officer should ensure that the location of the find is recorded with a GPS. A photographic record of the find (including implementation of temporary conservation measures) should be compiled. Where relevant a scale bar or object that can indicate scale should be inserted in photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisors report, GPS co-ordinate and photographic record of the find be submitted to the ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report].
3. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO officer, be deposited in a safe place (preferably on-site) for safekeeping.

➤ **Duties of the ECO / ELO officer:**

1. The ECO / ELO officer should ensure that the incident is reported on SAHRIS. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case with SAHRIS authorship to the case at the time of appointment to enable heritage reporting).
2. The ECO / ELO officer should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO officer should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage site inspection.
4. The ECO / ELO officer should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.
5. The ECO / ELO officer should facilitate coordination of the heritage site inspection and the SAPS site inspection in the event of a human remains incident report.
6. The ECO / ELO officer should facilitate heritage reporting and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

➤ **Duties of the Developer / Construction Consultant:**

The developer / construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of identification of incidental palaeontological, archaeological and cultural heritage resources during the course of development, including as a norm during vegetation clearing, surface scraping, trenching and excavation phases, when resources not visible at the time of the surface assessment may well be exposed.

Simplified Guide to the Identification of Archaeological Sites:

- ❖ **Stone Age** – Knapped stone display flakes and flake scars that appear unnatural and may result in similar type ‘shaped’ stones often concentrated in clusters or forming a distinct layer in the geological stratigraphy. ESA shapes may represent ‘pear’ or oval shaped stones, often in the region of 10cm or larger. Typical MSA types include blade-like or rough triangular shaped artefacts, often associated with randomly shaped lithics or flakes that display use- or edge-wear around the rim of the artefact. LSA types are similar to MSA types, but generally smaller (≤ 3 cm in size), often informally shaped, and are frequently found in association with bone, pieces of charcoal, ceramic shards and food remains.
 - **Rock Art** – Includes both painted and engraved images.
 - **Shell Middens** – Include compact shell lenses that may be quite extensive in size or small ephemeral scatters of shell food remains, often associated with LSA artefact remains, but may also be of MSA and Iron Age cultural association.
- ❖ **Iron Age** – Iron Age sites are often characterized by stone features, i.e. the remains of former livestock enclosures or typical household remains; huts are identified by either mound or depression hollows. Typical artefacts include ceramic remains, farming equipment, beads and trade goods, metal artefacts (including jewellery) etc. Remains of the ‘Struggle’ – events, histories and landmarks associated therewith are often, based on cultural association, classed as part of the Iron Age heritage of South Africa.
- ❖ **Colonial Period** – Built environment remains, either urban or rural, are of a Western cultural affiliation with typical artefacts representing early Western culture, including typical household remains, trade and manufactured goods, such as old bottle, porcelain and metal artefacts. War memorial remains, including the vast array of associated graves and the history of the Industrial Revolution form important parts of South Africa’s Colonial Period heritage.

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape*, proceed as applied for, provided the developer comply with the below listed heritage recommendations.

Stone Age anthropogenic gravel surface occurrences have been identified at all five (5) of the proposed drill locations, or areas of invasive impact at the proposed study site. Surface identified lithic occurrences are extensive in size, with lenses flowing into one another along the foothills of the inselberg outcrops, the eastern foothills of the Aggeneys Mountains. In addition to identified Stone Age occurrences two (2) Colonial Period farmstead sites have been identified.

- The proposed development poses no 'fatal flaws' with reference to archaeological and cultural heritage resources.
- Consideration of a 'No-Go' option is irrelevant with reference to identified archaeological and cultural heritage resources.
- The development will have a limited negative visual impact on the cultural landscape during the construction (drilling) phase; there will be no visual impact during the operational phase.
- Proposed prospecting will not result in a negative cumulative impact on the cultural landscape, during either the construction (drilling) or operational phases.
- [A future mining application, resulting from the prospecting application, will have a direct impact on archaeological resources as well as a visual and cumulative impact on the cultural landscape].
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development, and not reported on in this report, the process described in '10) Heritage Management Plan' should be followed.]

Heritage Compliance Summary – Prospecting Right Application (without Bulk Sampling), Farm Aroams 57 Portion 1, near Aggeneys, Namakwa District Municipality, Northern Cape				
Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
Aroams 1/57				
BH0281	Site ARS-01	MSA & LSA Lithic Scatter	S29.20951°; E18.90576°	*Drilling impact on identified lithic scatter
BH0291	Site ARS-02	ESA, MSA & LSA Lithic Scatter	S29.20519°; E18.90244°	*Drilling impact on identified lithic scatter
BH0261	Site ARS-03	ESA, MSA & LSA Lithic Scatter	S29.20137°; E18.89798°	*Drilling impact on identified lithic scatter
BH0301	Site ARS-04	MSA & LSA Lithic Scatter	S29.19630°; E18.90701°	*Drilling impact on identified lithic scatter
BH0271	Site ARS-05	ESA, MSA & LSA Lithic Scatter	S29.19426°; E18.90080°	*Drilling impact on identified lithic scatter
-	Site ARS-06	Colonial Period Farmstead	S29.20019°; E18.91069°	Temporary heritage signage
-	Site ARS-07	Colonial Period Farmstead	S29.20331°; E18.91306°	Temporary heritage signage
*Drilling impact on identified lithic scatters recommended without the developer having to comply with additional heritage compliance requirements				

Table 6: Heritage compliance summary

The SAHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

Note:

Should any registered Interested & Affected Party (I&AP) wish to be consulted in terms of Section 38(3)(e) of the NHRA 1999 (socio-cultural consultation / SAHRA SIA) it is recommended that the developer / EAP ensures that the consultation be prioritized within the timeframe of the environmental assessment process.

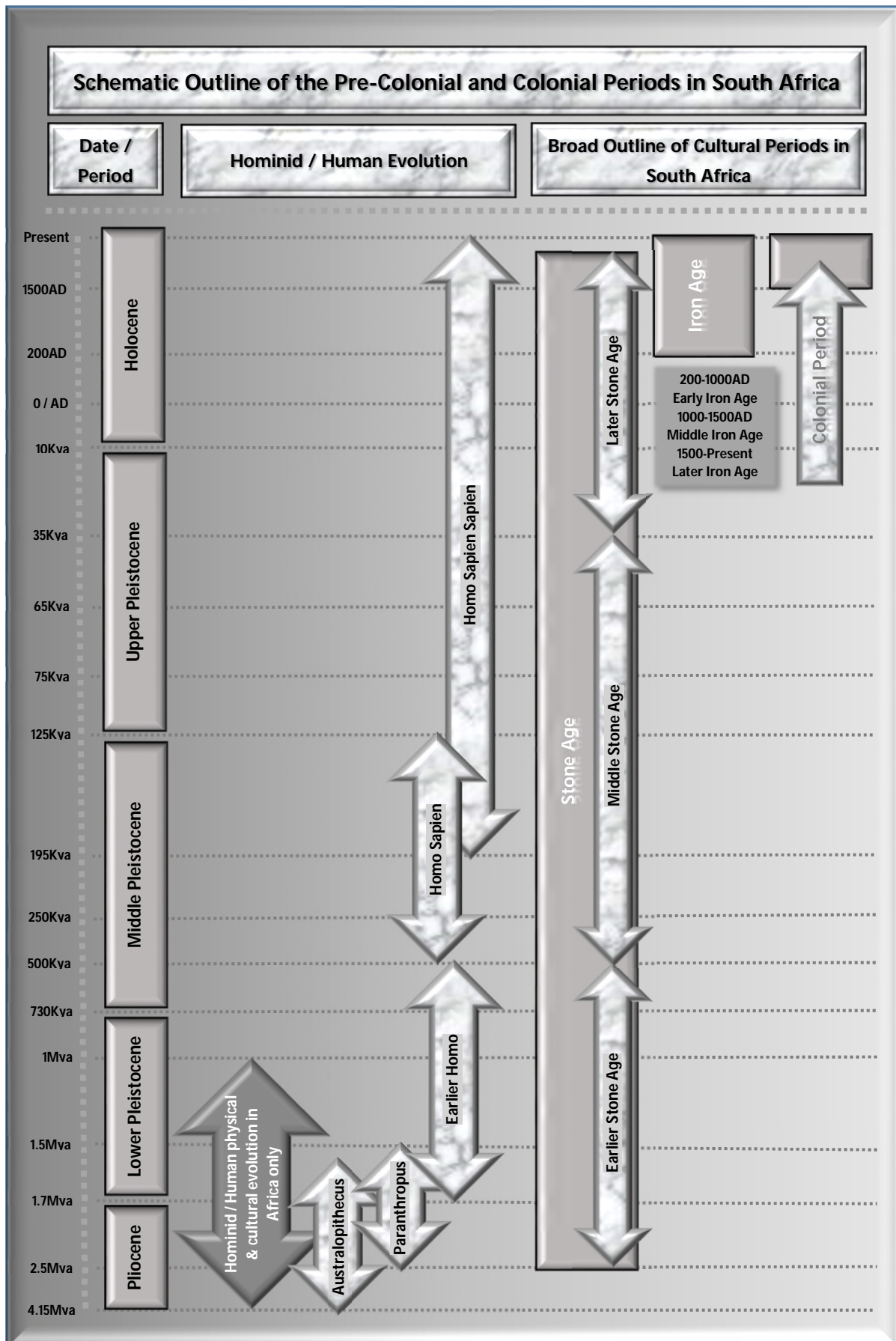
12 – Assumptions, Uncertainties and Gaps in Knowledge

Prospecting on Farm Aroams 1/57 is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the five (5) identified drill positions, including BH0281, BH0291, BH0261, BH0301 and BH0271, and relevant access roads and tracks in the vicinity of the drill positions. All 5 drill positions were assessed. Only existing access roads and tracks will be used during the proposed prospecting work; no new roads will be constructed.

With reference to the above, there are no uncertainties or exclusions to the Phase 1 AIA field assessment results.

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Acronyms & Abbreviations

AD	: Anno Domini (the year 0)
AIA	: Archaeological Impact Assessment
AMAFA	: Amafa aKwaZulu-Natali (Natal PHRA)
ASAPA	: Association of Southern African Professional Archaeologists
BAR	: Basic Assessment Report
BC	: Before the Birth of Christ (the year 0)
BCE	: Before the Common Era (the year 0)
BID	: Background Information Document
BP	: Before the Present (the year 0)
cm	: Centimetre
CMP	: Conservation Management Plan
CRM	: Cultural Resources Management
DAC	: Department of Arts and Culture
DEAT	: Department of Environmental Affairs and Tourism
DME	: Department of Minerals and Energy
EAP	: Environmental Assessment Practitioner
ECO	: Environmental Control Officer
ELO	: Environmental Liaison Officer
EC PHRA	: Eastern Cape Provincial Heritage Resources Authority
EIA ₁	: Environmental Impact Assessment
EIA ₂	: Early Iron Age
EMPr	: Environmental Management Plan / Programme Report
ESA	: Earlier Stone Age
ha	: Hectare
HIA	: Heritage Impact Assessment
HWC	: heritage Western Cape
ICOMOS	: International Council on Monuments and Sites
IEM	: Integrated Environmental Management
km	: kilometre
Kya	: Thousands of years ago
LIA	: Later Iron Age
LSA	: Later Stone Age
m	: metre
m ²	: Square meter
MIA	: Middle Iron Age
Mm	: millimetre
MPRDA 2002	: Mineral and Petroleum Resources Development Act, No 28 of 2002
MSA	: Middle Stone Age
Mya	: Millions of years ago
NEMA 1998	: National Environmental Management Act, No 107 of 1998
NHRA 1999	: National Heritage Resources Act, No 25 of 1999
PIA	: Palaeontological Impact Assessment
PHRA	: Provincial Heritage Resources Authority
PSSA	: Palaeontological Society of South Africa
PPP	: Public Participation Process
SAHRA	: South African Heritage Resources Agency
SAHRIS	: South African Heritage Resources Information System
SIA	: Social Impact Assessment