PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

THE ROOIKAT HYDROELECTRIC POWER SITE, ORANGE RIVER (NEAR HOPETOWN), THEMBILIHLE LOCAL MUNICIPALITY, NORTHERN CAPE, SOUTH AFRICA

DATE: 2014-03-20

REPORT TO:

JENNA LAVIN (South African Heritage Resources Agency - SAHRA)
Tel: 021 462 4505; Fax: 021 462 4509;
Postal Address: P.O. Box 4637, Cape Town, 8000;
E-mail: jlavin@sahra.org.za

MARK DAY (Enviroworks)
Tel: 021 853 0682; Fax: 086 601 7507;
Postal Address: P.O. Box 338, Private Bag X15, Somerset West, 7129;
E-mail: officewc@enviroworks.co.za

PREPARED BY:

KAREN VAN RYNEVELD (ArchaeoMaps) & JACO VAN DER WALT
Tel: 084 871 1064; Fax: 086 515 6848;
Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205;
E-mail: kvanryneveld@gmail.com

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/
NEAS Reference Number:	DEAT/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

The Rooikat Hydroelectric Power Site, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape

Specialist:	Archaeologist		
Contact person:	Karen van Ryneveld		
Postal address:	Postnet Suite 239, Private Bag X3, Beacon Bay		
Postal code:	5205	Cell:	084 871 1064
Telephone:	N/A	Fax:	086 515 6848
E-mail:	kvanryneveld@gmail.com		
Professional affiliation(s) (if any)	ASAPA Professional Member [number 163] ASAPA CRM – Field Director: Iron Age, Colonial Period ASAPA CRM – Principle Investigator: Stone Age		

Project Consultant:	Enviroworks		
Contact person:	Mark Day		
Postal address:	P.O. Box 338, Private Bag X15, Somerset West		
Postal code:	7129	Cell:	N/A
Telephone:	021 853 0682	Fax:	086 601 7507
E-mail:	mark@enviroworks.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Karen van Ryneveld, declare that --

General declaration:

I act as the independent specialist in this application
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Signature of the specialist:

ArchaeoMaps

Name of company (if applicable):

2014-03-20

Date:

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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PROJECT TITLE

The Rooikat Hydroelectric Power Site, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape

Specialist:	Archaeologist		
Contact person:	Jaco van der Walt		
Postal address:	Postnet Suite 239, Private Bag X3, Beacon Bay		
Postal code:	5205	Cell:	084 871 1064
Telephone:	N/A	Fax:	086 515 6848
E-mail:	jaco.heritage@gmail.com		
Professional affiliation(s) (if any)	ASAPA Professional Member [number 159] ASAPA CRM – Field Supervisor: Stone Age, Colonial Period, Grave Relocation ASAPA CRM – Field Director: Iron Age		

Project Consultant:	Enviroworks		
Contact person:	Mark Day		
Postal address:	P.O. Box 338, Private Bag X15, Somerset West		
Postal code:	7129	Cell:	N/A
Telephone:	021 853 0682	Fax:	086 601 7507
E-mail:	mark@enviroworks.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Jaco van der Walt, declare that -- General

declaration:

I act as the independent specialist in this application
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

N/A
Name of company (if applicable):

2014-03-20
Date:

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

THE ROOIKAT HYDROELECTRIC POWER SITE, ORANGE RIVER (NEAR HOPETOWN), THEMBILIHLE LOCAL MUNICIPALITY, NORTHERN CAPE, SOUTH AFRICA

EXECUTIVE SUMMARY

TERMS OF REFERENCE –

Enviroworks has been appointed by the project proponent, Sidala, to prepare and submit the EIA and EMPr for the proposed construction of the *Rooikat Hydroelectric Power Site*, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape. The *Rooikat Hydroelectric Power Site* will be constructed on a portion of the Orange River, at general development co-ordinate S29°27'03.5"; E23°54'58.3", between the properties Deelfontein 237/3 and Eskdale 204/3. The approximate 18MW facility will comprise of a weir and associated infrastructure, including a 132kV power line, relevant access roads and maximum inundation impact estimated at 1044masl.

ArchaeoMaps was appointed by Enviroworks to prepare the Phase 1 AIA for the *Rooikat Hydroelectric Power Site*. The Phase 1 AIA follows up on initial assessment information submitted for the project, then as the *South Hydroelectric Power Site*, in a report referenced as:

- Van Ryneveld, K. (ArchaeoMaps). 2013a. *Phase 1 Archaeological Impact Assessment. The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa.*

The proposed *Rooikat Hydroelectric Power Site* is situated approximately 1km upstream from the original proposed *South Hydroelectric Power Site* study site.

THE PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT –

PROJECT AREA: *Rooikat Hydroelectric Power Site* – general development co-ordinate S29°27'03.5"; E23°54'58.3", Deelfontein 237/3 and Eskdale 204/3, near Hopetown, Thembilihle Local Municipality, Northern Cape, including power line and access road alignments and maximum inundation impact estimated at 1044masl [1:50,000 map ref – 2923BD; 2923DB and 2924CA].

COVERAGE & GAP ANALYSIS: Pre-feasibility and field assessment. [Spot assessment along south-eastern approximate 10km inundation area.]

FIELD METHODOLOGY: Fifteen day field assessment; GPS co-ordinates – Garmin Oregon 550; Photographic documentation – Pentax K20D. Site significance assessment – SAHRA 2007 system.

SUMMARY:

Site Code	Alternative Site Name	Site Description	Co-ordinates	Recommendations
RH-01	-	Rock Art, LSA	S29°26'33.1"; E23°54'47.8"	Phase 2 mitigation
RH-02	-	Stone wall, Colonial Period	S29°26'36.3"; E23°54'35.2"	Conservation – no additional requirements
RH-03	-	Knapping site, MSA & LSA	S29°26'35.6";E23°54'28.6"	Conservation – no additional requirements
RH-04	-	Cemetery, Colonial Period	S29°26'57.1"; E23°54'11.3"	Formal conservation & permanent sign posting
RH-05	SH-S2 (VR 2013a)	Farmstead, Colonial Period	S29°26'47.6"; E23°54'30.6"	Phase 2 mitigation & permanent sign posting
RH-06	SH-A2.3 (VR 2013a)	Stone Age occurrence, MSA & LSA	S29°26'52.0"; E23°54'32.1"	Phase 2 mitigation
RH-07	-	Rock Art, LSA	S29°26'58.1"; E23°54'26.3"	Temporary conservation
RH-08	-	Cemetery, Colonial Period	S29°27'07.3"; E23°55'20.8"	Temporary conservation & permanent sign posting
RH-09	-	Livestock enclosure, Colonial Period	S29°26'31.4"; E23°56'50.9"	Temporary conservation
RH-10	-	Livestock enclosures, Colonial Period	S29°26'11.4"; E23°57'57.9"	Temporary conservation & slight realignment
RH-11	-	Settlement, Colonial Period	S29°25'57.4"; E23°59'15.3"	Phase 2 mitigation OR Temporary conservation and realignment (including Phase 1 AIA of realigned road)
RH-12	-	Settlement / lookout point,	S29°27'16.7"; E23°54'48.4"	Phase 2 mitigation

		Colonial Period		
RH-13	-	Grave, LSA	S29°27'21.3"; E23°54'46.9"	Phase 2 mitigation
RH-14	-	Settlement, LSA	S29°27'21.4"; E23°54'49.3	Phase 2 mitigation
RH-15	-	Rock Art panels & lithic artefacts, (MSA &) LSA	S29°27'24.7"; E23°54'48.9"	Phase 2 mitigation
RH-16	-	Stone wall, Colonial Period	S29°27'27.5"; E23°54'46.7"	Conservation – no additional requirements
RH-17	SH-S3 (VR 2013a)	Livestock enclosure, Colonial Period	S29°27'29.3"; E23°54'45.8"	Conservation – no additional requirements
RH-18	-	Stone wall, Colonial Period	S29°27'31.7"; E23°54'49.2"	Conservation – no additional requirements
RH-19	-	Rock Art panels & lithic artefacts, LSA	S29°27'31.7"; E23°54'49.3"	Phase 2 mitigation. Annual site monitoring & permanent sign posting
RH-20	-	Livestock enclosure, Colonial Period	S29°27'46.2"; E23°54'50.9"	In situ conservation OR Destruction under SAHRA permit
RH-21	-	Livestock enclosure, Colonial Period	S29°27'48.5"; E23°54'55.8"	In situ conservation OR Phase 2 mitigation
RH-22	-	Artefact occurrence, MSA & LSA	S29°27'47.1"; E23°55'00.9"	In situ conservation OR Destruction under SAHRA permit
RH-23	-	Settlement, (MSA &) LSA	S29°27'55.1"; E23°55'08.3"	Phase 2 mitigation
RH-24	-	Livestock enclosures, Colonial Period	S29°27'47.6"; E23°55'30.7"	Conservation – no additional requirements
RH-25	SH-S4 (VR 2013a)	Livestock enclosure, Colonial Period	S29°28'08.9"; E23°54'24.2"	Temporary conservation
RH-26	-	Livestock enclosure, Colonial Period	S29°28'07.9"; E23°54'20.0"	Temporary conservation
RH-27	-	Stone Age occurrence, MSA & LSA	S29°28'16.3"; E23°54'24.1"	Phase 2 mitigation
RH-28	-	Stone Age occurrence, MSA & LSA	S29°28'15.5"; E23°55'49.5"	Conservation – no additional requirements
RH-29	-	Cemetery, Colonial Period	S29°28'40.9"; E23°55'45.1"	Phase 2 grave relocation
RH-30	-	Settlement, Colonial Period	S29°28'44.9"; E23°55'48.7"	Phase 2 mitigation
RH-31	-	Stone wall, Colonial Period	S29°28'45.3"; E23°55'46.8"	Destruction under SAHRA permit
RH-32	MMK 2923BD-024	Stone Age occurrence, LSA	S29°28'45.3"; E23°55'49.4"	Phase 2 mitigation
RH-33	MMK 2923BD-023 Historical Site 1	Rock Art panels & lithic artefacts, MSA & LSA	S29°28'43.3"; E23°55'40.8"	Phase 2 Rock Art recording & monitoring and permanent sign posting
RH-34	Historical Site 2	Settlement, Colonial Period and Stone Age occurrence, MSA & LSA	S29°28'57.7"; E23°55'52.8"	Permanent sign posting
RH-35	-	Stone Age occurrence, LSA	S29°29'06.1"; E23°56'36.5"	Destruction under SAHRA permit
RH-36	-	Stone Age occurrence, MSA & LSA	S29°29'19.8"; E23°58'39.8"	Phase 2 mitigation
RH-37	-	Rock Art panels & lithic artefacts, LSA	S29°27'03.0"; E23°54'51.3"	Phase 2 mitigation

Rooikat Hydroelectric Power Site: RH-05, RH-06 & RH-37

Power Lines:

1. New Alternative 1 & New Alternative 2: RH-07; RH-25; RH-26, RH-27 & RH-37
2. Substation / switching site: RH-27

Access Roads:

1. South Access Road: RH-04; RH-05; RH-06 & RH-07
2. North Access Road: RH-08; RH-09; RH-10; RH-11
3. Alternative Construction Road & spoil site: RH-12; RH-13; RH-14; RH-15; RH-16; RH-17; RH-19; RH-20; RH-21; RH-22; RH-23; RH-26 & RH-27

Inundation Area: RH-01; RH-05; RH-06; RH-12; RH-13; RH-14; RH-15; RH-16; RH-17; RH-18; RH-19; RH-20; RH-21; RH-22; RH-23; RH-24; RH-28; RH-29; RH-30; RH-31; RH-32; RH-33; RH-34; RH-35, RH-36 & RH-37

RECOMMENDATIONS –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Rooikat Hydroelectric Power Site*, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape, proceed as applied for provided the developer comply with the abovementioned summarized recommendations.

CONTENTS

LIST OF TABLES –

LIST OF FIGURES –

LIST OF MAPS –

LIST OF PLATES –

1) TERMS OF REFERENCE

Enviroworks has been appointed by the project proponent, Sidala Energy Solutions (Pty) Ltd (Sidala), to prepare and submit the Environmental Impact Assessment (EIA) and Environmental Management Plan report (EMPr) for the proposed construction of the *Rooikat Hydroelectric Power Site*, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape. The *Rooikat Hydroelectric Power Site* will be constructed on a portion of the Orange River, at general development co-ordinate S29°27'03.5"; E23°54'58.3", between the properties Deelfontein 237/3 and Eskdale 204/3. The approximate 18MW facility will comprise of a weir and associated infrastructure, including a 132kV power line, relevant access roads and maximum inundation impact estimated at 1044masl.

ArchaeoMaps was appointed by Enviroworks to prepare the Phase 1 Archaeological Impact Assessment (AIA) for the *Rooikat Hydroelectric Power Site*. The Phase 1 AIA follows up on initial assessment information submitted for the project, then as the *South Hydroelectric Power Site*, in a report referenced as:

- Van Ryneveld, K. (ArchaeoMaps). 2013a. *Phase 1 Archaeological Impact Assessment. The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa.*

The proposed *Rooikat Hydroelectric Power Site* is situated approximately 1km upstream from the original proposed *South Hydroelectric Power Site* study site.

❖ Development Location, Details and Impact

Sidala is a South African based development company operating in the emergent renewable energy industry. Initially 2 sites namely the *North* and *South Hydroelectric Power Sites* were identified for development along the Orange. At present development attention is focused on the *Rooikat Hydroelectric Power Site*, originally proposed as the *South Hydroelectric Power Site*. The Rooikat development will form part of the Department of Energy's *Renewable Energy Independent Power Producer Procurement Program* (Enviroworks 2013b, Pers. Comm.: Mark Day, Enviroworks).

The proposed *Rooikat Hydroelectric Power Site* will be constructed on a portion of the Orange River, at general development co-ordinate S29°27'03.5"; E23°54'58.3", between the properties Deelfontein 237/3 and Eskdale 204/3, roughly 1km upstream from the original *South Hydroelectric Power Site* study site and approximately 25km north-west of Hopetown. The decision to move the *Rooikat Hydroelectric Power Site* upstream from the original proposed locale is based on engineering technicalities indicating that the current proposed locale is more suitable for the proposed development type. Accordingly proposed power line alignments has changed and access routes re-defined, while maximum inundation levels for the Rooikat inundation area were calculated (Pers. Comm.: Mark Day, Enviroworks) [1:50,000 map ref 2923BD; 2923DB and 2924CA].

The *Rooikat Hydroelectric Power Site* will utilize the flows released from the Vanderkloof Dam on the Orange River (the longest river in South Africa) to move through the hydroelectric facility and mechanize the turbine for generation of electricity. Finalization of the Rooikat study site is based on topographical features, physical appropriateness and hydrological flow data (Pers. Comm.: Mark Day, Enviroworks).

The approximate 18MW *Rooikat Hydroelectric Power Site* facility will comprise of a weir with powerhouse, switchyard, head and tailrace, a small dam, an access road and a 132kV power line (Enviroworks 2013a, 2013b):

- *THE ROOIKAT HYDROELECTRIC POWER SITE:* High flood peaks of the structure necessitate the need for the spillway to be as lengthy as possible resulting in a concrete gravity structure for the entire weir. The layout shall comprise (Enviroworks 2013b):
  1. An ogee-type spillway with a stilling basin;
  2. A river outlet system constructed near the riverbed to minimize the excavation and if required a bridge structure will be constructed to provide access thereto;
  3. The system will include an intake structure, dam wall and outlet component; and
  4. A powerhouse with intake area, powerhouse facility and outlet.

- *POWER LINES:* A 132kV overhead transmission line will be necessary (Enviroworks 2013b): Two power line options are investigated, namely New Alternative 1 and New Alternative 2, both running from the existing substation, the Ovaal-Disselfontein substation on Disselfontein 77 at S29°28'22.3"; E23°54'20.0" to the *Rooikat Hydroelectric Power Site* study site.

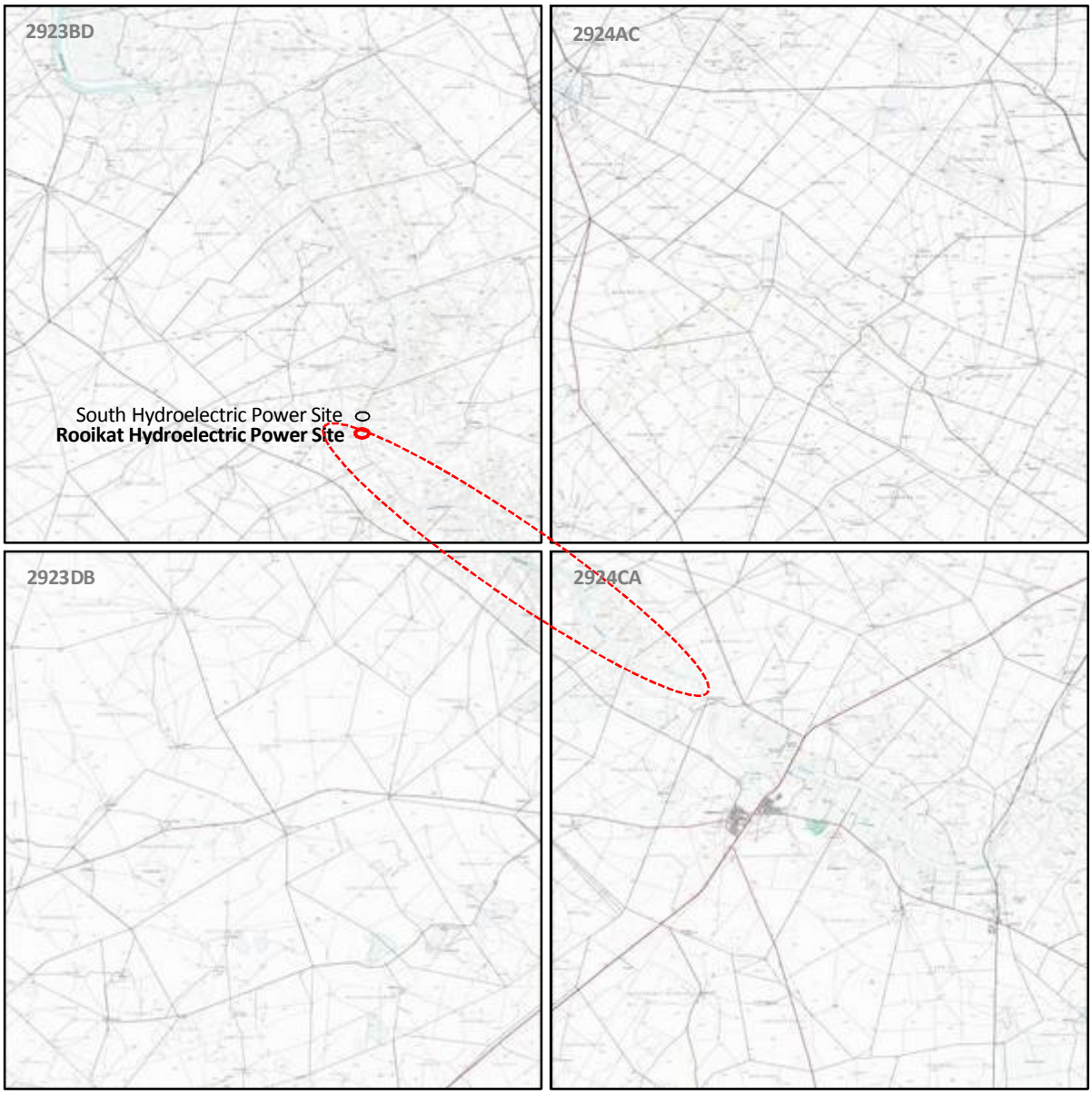
- *ACCESS ROADS:* Three access road options are investigated, namely a South Access Road, a North Access Road and an Alternative Construction Access Road. Access roads connecting the *Rooikat Hydroelectric Power Site* to any of the regional roads (R357 and R385) will be built, where possible, over the applicable existing access roads / tracks, minimizing impact on the surrounding environment (Enviroworks 2013b).

- *INUNDATION AREA:* Increased inundation levels, as a result of the development, are expected to have a maximum effect up to the 1044masl contour. This level shall not increase, but may decrease once the feasibility study has been completed and the final development design has been prepared. Maximum inundations levels (1044masl) will have an impact on the levels of the Orange to approximately 20km upstream, but with limited impact on the south eastern approximate 10km inundation area due to steep gradients of the Orange River banks limiting the general impact of inundation on the landscape (Pers. Comm.: Mark Day, Enviroworks).

THE ROOIKAT HYDROELECTRIC POWER SITE									
AFFECTED PROPERTIES AND RELEVANT DEVELOPMENT IMPACT ASPECTS									
Property Name	Impact				Property Name	Impact			
South Bank	**RHPS**	**PL**	**AR**	**IA**	**North Bank**	**RHPS**	**PL**	**AR**	**IA**
Deelfontein 237/3	✓	✓	✓	✓	Eskdale 204/3	✓	-	✓	✓
Disselfontein 77/5	-	✓	-	✓	Eskdale 204/5	-	-	-	✓
Disselfontein 77/8	-	-	-	✓	Eskdale 204/7	-	-	-	✓
Disselfontein 77/9	-	-	-	✓	Eskdale RE/204	-	-	-	✓
Naauwtesfontein 78	-	-	-	✓	Wicklow 218	-	-	-	✓
Stoffelshoek 81/1	-	-	-	✓	Kalkwal 230	-	-	-	✓
Zuurgat 82	-	-	-	✓					
Zoetgat RE/84	-	-	-	✓					
Vaalkoppie RE/85	-	-	-	✓					
Vaalkoppie 85/3	-	-	-	✓					

*RHPS – Rooikat Hydroelectric Power Site; *PL – Power Line alignments; *AR – Access Road alignments; *IA – Inundation Area

Table 1: The *Rooikat Hydroelectric Power Site* development and affected properties per development aspect



Map 1: General locality of the *Rooikat Hydroelectric Power Site* and affected study area [1:50,000 map ref 2923BD; 2923DB and 2924CA]

Map 2: General locality of the proposed *Rooikat Hydroelectric Power Site* in relation to Douglas and Hopetown, Northern Cape

2) THE PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

❖ Archaeological Legislative Compliance

The Phase 1 Archaeological Impact Assessment (AIA) for the *Rooikat Hydroelectric Power Site*, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape, was done for purposes of compliance to the South African Heritage Resources Agency's (SAHRA) requirements in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Sections 34-38.

The Phase 1 AIA was requested as specialist sub-section with findings and recommendations thereof to be included in the Environmental Impact Assessment (EIA) and Environmental Management Plan report (EMPr) of the development, in compliance with requirements of the National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2010) and the NHRA 1999.

The Phase 1 AIA aimed to locate, identify and assess the significance of cultural heritage resources, inclusive of archaeological deposits / sites, built structures older than 60 years, burial grounds and graves, graves of victims of conflict and basic cultural landscapes or viewscapes as defined and protected by the NHRA 1999, that may be affected by the proposed development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment. The assessment includes comments on the cultural landscape of the *Rooikat Hydroelectric Power Site* and cumulative impact of the Rooikat and other hydroelectric power sites on the landscape.

❖ Methodology and Gap Analysis

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

- The pre-feasibility assessment is based on the Appendix 1 introductory archaeological literature. In addition the SAHRA 2009 Mapping Project Database, SAHRIS and the SAHRA Built Environment Database on Declared Provincial Heritage Sites of the Northern Cape were consulted. The pre-feasibility assessment includes consultation of the 1:50,000 map and card database of the McGregor Museum, Kimberley. Database results are however limited to the 1:50,000 map ref 2923BD information, pertaining to the *Rooikat Hydroelectric Power Site* study site, relevant access roads and power lines but excluding the 2923DB and the 2924CA information, relevant to the remainder of the inundation area.

- The field assessment was done over a 15 day period between 2014-02-08 and 2014-02-25 by 2 archaeologists. The assessment was done by foot and off-road vehicle and limited to a Phase 1 surface survey. GPS co-ordinates were taken with a Garmin Oregon 550 (Datum: WGS84). Photographic documentation was done with a Pentax K20D camera. A combination of Garmap and Google Earth software was used in the display of spatial information.

The field assessment focused on the footprint of the *Rooikat Hydroelectric Power Site*, the alignments of both power line routes and the 3 access roads. The general inundation area was assessed with the 1044masl as maximum guideline, with recommendations contained in this report made according to possible maximum impact,

although it is known that this level may decrease upon preparation of the final design. Maximum inundations levels (1044masl) will have an impact on the levels of the Orange to approximately 20km upstream at estimated co-ordinate S29°33'31.1"; E24°03'48.2". However, raised levels of inundation will have little effect on the south eastern approximate 10km of the Orange as a result of landscape gradient, where the banks of the Orange are characterized by steep slopes with limited moderate gradients along the south bank, primarily used as commercial farmland (roughly from the Naauwtesfontein78 – Eskdale RE/204 line) . As such field assessment focused on the north western approximate 10km inundation area from the *Rooikat Hydroelectric Power Site*, with spot assessment along the south eastern approximate 10km inundation area.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations were done according to the system prescribed by SAHRA (2007).

SAHRA ARCHAEOLOGICAL AND CULTURAL HERITAGE SITE SIGNIFICANCE ASSESSMENT			
Site Significance	Field Rating	Grade	Recommended Mitigation
High Significance	National Significance	Grade I	Site conservation / Site development
High Significance	Provincial Significance	Grade II	Site conservation / Site development
High Significance	Local Significance	Grade III-A	Site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	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 archaeological mitigation required prior to or during development / destruction

Table 2: SAHRA archaeological and cultural heritage site significance assessment

Environmental Impact ratings were done according to environmental requirements and following the specified Enviroworks format (Pers. Comm.: Mark Day, Enviroworks).

❖ Assessor Accreditation

1. *KAREN VAN RYNEVELD* (ArchaeoMaps):
   - Qualification: MSc Archaeology (2003) WITS University.
   - Accreditation: Association of Southern African Professional Archaeologists CRM Section (ASAPA member nr 163):
     1. Field Director (Iron Age, Colonial Period).
     2. Principle Investigator (Stone Age).

   Karen van Ryneveld is a SAHRA / AMAFA / EC PHRA listed CRM archaeologist.

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of more than 250 Phase 1 AIA studies. Phase 1 AIA work is centered in South Africa, focusing 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 consultancy. In 2010 she was awarded ASAPA 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 aKwa-Zulu Natali (2004).

2. *JACO VAN DER WALT*:
    - Qualification: MA Archaeology (2012) WITS University.
    - Accreditation: Association of Southern African Professional Archaeologists CRM Section (ASAPA member nr 159):
        1. Field Supervisor (Stone Age, Colonial Period and Grave Relocation).
        2. Field Director (Iron Age).

    Jaco van der Walt is a SAHRA / AMAFA listed CRM archaeologist.

Jaco started his career in CRM archaeology in 2000, and has been the author (including selected co-authored reports) of more than 300 CRM studies. Phase 1 AIA work focusses on South African developments, but with experience throughout a number of African countries, including Botswana, Zimbabwe, Mozambique and Tanzania. He has been involved in a number of Phase 2 projects, primarily focusing on the Iron Age and Grave Relocation, but including Stone Age work (shell middens) in Mozambique, amongst others.

Aside from his direct involvement in CRM archaeology, Jaco has lectured graduate courses of the Wits CRM curriculum 2007-2010, whilst he managed the heritage contracts unit at WITS University.

Jaco was elected CRM council member of ASAPA for the period 2011-2012.

2.1) PRE-FEASIBILITY ASSESSMENT

Based on the basic introductory literature assessment of South African archaeology (see Appendix – A) the probability of archaeological and cultural heritage sites within the proposed *Rooikat Hydroelectric Power Site* study site can briefly be described as:

1. Early Hominin : Probability – *None*

2. Stone Age
   a. ESA : Probability – *Low*
   b. MSA : Probability – *High*
   c. LSA : Probability –*High* (Human remains may be expected; if identified of both scientific and social significance)
      i. Rock Art : Probability – *High*
      ii. Shell Middens : Probability – *None*

3. Iron Age
   a. Early Iron Age : Probability – *None*
   b. Middle Iron Age : Probability – *None*
   c. Later Iron Age : Probability – *None-Low*

4. Colonial Period
   a. Colonial Period : Probability – *Medium-High* (Human remains expected to be primarily associated with formal cemeteries)
   b. Iron Age / Colonial Period Contact : Probability – *Low*
   c. Industrial Revolution : Probability – *Low-Medium*

❖ The SAHRA 2009 Database

A number of archaeological Cultural Resources Management (CRM) projects are recorded in the SAHRA 2009 Mapping Project Database situated within an approximate 60km radius from the *Rooikat Hydroelectric Power Site*. CRM studies recorded in the SAHRA 2009 Mapping Project Database are listed as:

- Beaumont, P.B. (McGregor Museum). 2005. *Heritage Study for an EMP Covering a Portion of the Remainder of Kransfontein 19, Northern Cape Province.*
- Beaumont, P.B. (McGregor Museum). 2007. *Phase 1 Heritage Impact Assessment Report on the Farm Riets Drift 18, on the South Bank of the Orange River Between Douglas and Prieska, Karoo District Municipality, Northern Cape Province.*
- Dreyer, C. (Private). 2007. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed Borrow Pit Sites and R385 Road Upgrading Between Douglas and Campbell, Northern Cape.*
- Dreyer, C. (Private). 2008. *Archaeological and Cultural Heritage Assessment of the Proposed MTN Mast at the Farm Elandsdraai 88, near Orange River Station, Hopetown District, Northern Cape.*

- Dreyer, C. (Private). 2008. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed Diamond Prospecting Developments at the Farm Kameeldrift 40, Douglas, Northern Cape.*
- Morris, D. (McGregor Museum). 1997. *Archaeological Impact Assessment for Gypsum Industries in Respect of Proposed Mining at Kraankuil on the Farms Zeerust and Springbokspoor.*
- Morris, D. (McGregor Museum). 2003. *Archaeological Survey of the Farm Koodoosberg No.141, Northern Cape*.
- Morris, D. (McGregor Museum). 2005a. *Archaeological Impact Assessment at Abrahamoos Fontein near Plooysburg, Northern Cape.*
- Morris, D. (McGregor Museum). 2005b. *Archaeological Impact Assessment at Taaibosch Fontein near Plooysburg, Northern Cape.*
- Morris, D. (McGregor Museum). 2008. *Report on a Phase 1 Archaeological Impact Assessment of the Proposed Prospecting on Uitkyk 106, Locks Verdiet 105 and Brakpan 107, West of Kimberley, Northern Cape.*
- Van Schalkwyk, J.A. (National Cultural History Museum). 2008. *Heritage Impact Survey Report for the Development of Visitor Facilities in the Mokala National Park, Northern Cape Province.*
- Van Ryneveld, K. (McGregor Museum). 2004. *Cultural Resources Management Impact Assessment: (Portions of) Ettrick 182, Hopetown District, Northern Cape, South Africa.*
- Van Ryneveld, K. (McGregor Museum). 2005a. *Cultural Resources Management Impact Assessment: (Portions of) Leewpoort 161, Kimberley District, Northern Cape, South Africa.*
- Van Ryneveld, K. (McGregor Museum). 2005b. *Cultural Heritage Impact Assessment: Erf 1, Douglas, Herbert.*
- Van Ryneveld, K. (McGregor Museum). 2005c. *Cultural Heritage Site Inspection Report for the Purpose of a Prospecting Right EMP- (Portion of) De Kalk 37, Herbert District, Northern Cape, South Africa.*
- Van Ryneveld, K. (McGregor Museum). 2005d. *Cultural Resources Management Impact Assessment Portions of Paardeberg 154, Kimberley.*
- Van Ryneveld, K. (McGregor Museum). 2005e. *Cultural Resources Management Impact Assessment: Portion 1 of Roodepan 146, Kimberley District, Northern Cape, South Africa.*
- Van Ryneveld, K. (ArchaeoMaps). 2007a. *Phase 1 Archaeological Impact Assessment Portions of Erf 1, Douglas, Herbert District, Northern Cape, South Africa.*
- Van Ryneveld, K. (ArchaeoMaps). 2007b. *Phase 1 Archaeological Impact Assessment: A 1.1ha Mining Development, Portion of Erf 1, Douglas, Northern Cape, South Africa.*
- Van Ryneveld, K. (ArchaeoMaps). 2007c. *Portion of Erf 314, Douglas, Herbert District, Northern Cape, South Africa.*
- Van Ryneveld, K. (ArchaeoMaps). 2008. *Phase 1 Archaeological Impact Assessment: Diamond Mining, Portions of Erven 1 & 341, Douglas, Northern Cape, South Africa.*

A notable number of archaeological CRM studies have been done post compilation of the SAHRA 2009 Mapping Project Database with study sites situated in the general vicinity of the *Rooikat Hydroelectric Power Site*. CRM studies available on SAHRIS include, but are not limited to:

- Becker, E. (Hatch). 2013. *Transnet Capital Projects Ngqura 16 MTPA Manganese Rail. Phase 1 Heritage Impact Assessment Rail Kimberley to De Aar.*
- Dreyer, C. (Private). 2006. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed New Oxidation Ponds at Prieska, Northern Cape*.

- Dreyer, C. (Private). 2012. *Letter of Recommendation for the Exemption from a First Phase Archaeological and Heritage Investigation of the Proposed Establishment of a Photovoltaic (Solar Power) Installation on the Farm Wicklow 218, near Hopetown, Northern Cape.*
- Kaplan; J. (Agency for Cultural Resource Management). 2012. *Archaeological Impact Assessment. The Proposed Disselfontein Keren Energy Solar Plant near Hopetown, Northern Cape Province.*
- Morris, D. (McGregor Museum). 2010. *Heritage Impact Assessment of the Proposed Hydropower Station on the Orange River at Neus Island on the farm Zwartbooisberg, east of Kakamas, Northern Cape.*
- Morris, D. (McGregor Museum). 2011a. *Screening Phase Heritage Assessment of the Proposed PV Solar Park near Douglas, Northern Cape.*
- Morris, D. (McGregor Museum). 2011b. *Archaeological Impact Assessment Phase 1: Gannahoek N12 Quarry near Hopetown, Northern Cape.*
- Morris, D. (McGregor Museum). Undated. *Heritage Impact of the Proposed Douglas Solar Energy Project. Northern Cape.* (Not an Original Report Name).
- Opperman, H. (Epog Navorsings Maatskappy). 2012. *First Phase Archaeological and Cultural Heritage Assessment of the Proposed Residential Development of Portions 14 and 3 of the Farm Vluytjeskraal 149, District: Hopetown, Province: Northern Cape.*
- Orton, J. & Webley, L. (ACO Associates). 2012. *Heritage Impact Assessment for Proposed Hydro-electric Facilities near Riemvasmaak, Northern Cape.*
- Pelser, A. J. (Archaetnos). 2011. *A Report on a Phase 1 Heritage Impact Assessment for Proposed Mining on the Farm Koedoeskloof in the Hay District, Northern Cape*.
- Pelser, A. J. (Archaetnos). 2012. *A Report on a Heritage Impact Assessment (HIA) For a Proposed Photovoltaic Solar Power Generation Plant on Klein Zwartz Bast 188, Kenhardt District, Northern Cape.*
- Pelser, A. J. and Van Vollenhoven, A. C. (Archaetnos). 2011. *A Report on a Heritage Impact Assessment for the Upgrade of Transnets Glosam Siding for PMG'S Bishop Mine (Loading Bay) on Portion 2 and the Remainder of Gloucester 674 near Postmasburg, Tsantsabane Local Municipality, Northern Cape.*
- Van Ryneveld, K. (ArchaeoMaps). 2013b. *Phase 1 Archaeological Impact Assessment. The North Hydroelectric Power Site, Orange River, Siyancuma Local Municipality, Northern Cape, South Africa.*
- Webley, L. & Orton, J. (ACO – UCT). 2012. *Heritage Impact Assessment. Proposed Construction of the Graspan Photovoltaic Power Facility, Pixley Ka Seme District Municipality, Northern Cape Province.*

Of direct relevance to the *Rooikat Hydroelectric Power Site* development is the Phase 1 AIA study conducted for the initially proposed *South Hydroelectric Power Site*, referenced as:

- Van Ryneveld, K. (ArchaeoMaps). 2013a. *Phase 1 Archaeological Impact Assessment. The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa.*

❖ SAHRA Built Environment Database – Northern Cape

Geo-referenced declared Provincial Heritage Sites (buildings older than 60 years) situated in the vicinity of the *Rooikat Hydroelectric Power Site* area recorded in the SAHRA Built Environment – Northern Cape database can be listed as:

SAHRA BUILT ENVIRONMENT – NORTHERN CAPE				
SAHRA Identifier	Site name	Place	NHRA Status	Co-ordinates
9/2/043/0004	Ruins of Jacobs house (pre-1880), De Kalk, Hopetown District	Hopetown	Provincial Heritage Site	S29°16'50"; E23°46'20"
9/2/043/0006	Old wagon bridge, Orange River (built during Anglo Boer war), Hopetown District	Hopetown	Provincial Heritage Site	S29°34'10"; E24°04'20"

Table 3: SAHRA Built Environment, Northern Cape

- The McGregor Museum Archaeological Database

Map 3: Spatial display of the 2923BD McGregor Museum archaeological database, indicating the localities of only 4 geo-referenced heritage records

The McGregor Museum's archaeological database information is limited to the 1:50,000 map and card database information for map nr. 2923BD. The initial request for database information during pre-planning of the project (2012), with project information at the time limited to the relevant map reference, could be made available by the museum for purposes of the study. Unfortunately subsequent requests for database information relating to map nrs. 2923DB and 2924CA (2013 and 2014) could not be met.

The McGregor Museum archaeological database lists a number of specifically Rock Art engraving records but also small surface Stone Age collections in the 2923BD 1:50,000 map database. Consultation with David Morris, HoD Archaeology, McGregor Museum, indicated great concern regarding the record. Morris (Pers. Comm.: 2012) commented on the fact that very few of these records are geo-referenced, resulting in a biased spatial display of

the archaeological sensitivity of the area. In addition the methodology and aim of early, specifically Rock Art research, at the McGregor Museum dating from the times of directorship under Maria Wilman (from 1908) and more specifically Dr. Gerard Fock, the 1st appointed museum archaeologist (from 1958), needs to be considered against standards and practice of today. Many of the McGregor Museum's early Rock Art records are photographed, some traced / rubbed, but as a rule referenced only with farm name. Second thereto logistics have not allowed follow-up visits to monitor preservation and update the heritage record. In accordance with the academic debate regarding the relationship between CRM and research archaeology, Morris is of the opinion that in many cases CRM archaeology for purposes of development will be the last opportunity to update old research records to current standards, an absolutely essential step if we are to consider the very principle of responsible development and our commitment to further knowledge and understanding of our past.

MCGERGOR MUSEUM – ARCHAEOLOGICAL DATABASE – 2923BD	
National Site Number	Site Description
2923BD001	Torquay [unknown co-ords] Rock engravings
2923BD002	De Kalk [unknown co-ords] Rock engravings
2923BD003	De Kalk [unknown co-ords] Rock engravings
2923BD004	De Kalk [unknown co-ords] Rock engravings
2923BD005	Slypsteen [unknown co-ords] Rock engravings
2923BD006	Slypsteen [unknown co-ords] Rock engravings
2923BD007	Slypsteen [unknown co-ords] Rock engravings
2923BD008	Slypsteen [unknown co-ords] Rock engravings
2923BD009	Slypsteen [unknown co-ords] Rock engravings
2923BD010	Slypsteen [unknown co-ords] Rock engravings
2923BD011	Darnysbosch [unknown co-ords] Rock engravings
2923BD012	Deelfontein [unknown co-ords] Rock engravings
2923BD013	Disselfontein 29.4787S 23.9280E (deci degs) Rock engravings
2923BD014	Disselfontein [unknown co-ords] Rock engravings
2923BD015	Disselfontein [unknown co-ords] Rock engravings
2923BD016	Disselfontein [unknown co-ords] Rock engravings
2923BD017	Disselfontein [unknown co-ords] Rock engravings
2923BD018	Ettrick [unknown co-ords] MMK 6405 Grooved stone brought in by farmer
2923BD019	Slypsteen [unknown co-ords] MMK 6418, 2 flakes poss ESA
2923BD020	Slypsteen [unknown co-ords] MMK 6019 Mixed LSA & ESA amongst engravings
2923BD021	Torquay [unknown co-ords] MMK 6601 LSA surface colln
2923BD022	Saratoga [unknown co-ords] MMK 6638, 4 MSA flakes
2923BD023	Disselfontein 29.4787S 23.9280E (deci degs) MMK 6988 Excavated MSA assemblage from hill top amongst engravings
2923BD024	Disselfontein 29.4789S 23.9299E (approx deci degs) MMK 6987 Ceramic LSA on river silt terrace
2923BD025	Disselfontein 29.4793S 23.9202E (approx deci degs) MMK 6989 LSA on river silt terrace
2923BD026	Disselfontein 29.4749S 23.9278E (approx deci degs) MMK 6990 Pottery on river silt terrace
*Note that Site 2923BD13 and Site 2923BD23 refers by virtue of geo-reference to the same site	

Table 4: The McGregor Museum, archaeology database – 2923BD

Of relevance to the *Rooikat Hydroelectric Power Site* study site the McGregor Museum database indicates a single non geo-referenced Rock Art site on the property Deelfontein, 4 non geo-referenced Rock Art sites on the property Disselfontein and 4 geo-referenced sites, also situated on Disselfontein. Of the geo-referenced sites 3 comprise LSA deposits situated on the river silt terrace while 1 constitutes an excavated MSA site, with deposits situated amongst LSA Rock Art on a rock outcrops (The co-ordinate for National Site Nr 2923BD-025 is inferred to be wrong, being situated too far inland for a site recorded to be located on the river silt terrace and co-ordinates for National Site Nr 2923BD-013 is similar to that of National Site Nr 2923BD-023).

[In addition to the McGregor Museum database records, Sidala reported to Enviroworks on more than 270 LSA engraved sites reported on by landowners during initial project consultation for the *North* and *South Hydroelectric Power Sites* (Pers. Comm.: Anri Meintjies, Enviroworks, 2013)].

❖ General Discussion

From the CRM reports consulted the Stone Age record seems by far the most dominant in the region. On the farm Disselfontein Kaplan (2012) recorded a number of ESA bifaces and 2 handaxes while Pelser (2012) reported on additional ESA evidence from Klein Swartz Bast. The MSA record seems to dominate, often in association with LSA assemblages. MSA deposits were reported on by Kaplan (2012), Pelser (2011), Pelser & Van Vollenhoven (2011), Opperman (2012), Van Ryneveld (2005) and Webley & Orton (2012), while MSA and LSA mixed assemblages were reported on by Morris (2010; 2011), Pelser (2011, 2012), Orton & Webley (2012) and Webley & Orton (2012). Despite the rich local and research record on LSA Rock Art engravings this site type seems to largely elude the CRM record, but reports on Rock Art engravings have been made by Morris (2011) at the Gannahoek quarry near Hopetown.

Colonial Period records reflect both the farming and the mining history of the area: Opperman (2012) recorded a historical farmhouse (2012). Morris (2010), Pelser & Van Vollenhoven (2011) and Orton & Webley (2012) reported on additional Colonial Period structures, while Webley & Orton (2012) reported on a number of features and historical dump material that may well reflect, at least in part, early Colonial mining activities and associated development in the region. Colonial Period graves were reported on by Pelser (2011), Opperman (2012), Orton & Webley (2012) and Becker (2013).

The history of Hopetown is intrinsically tied with the 1865 discovery of the 1st diamond in South Africa, the 23.25 carat '*Eureka*' on the farm De Kalk. There is little doubt that diamonds literally created Hopetown, and when the boom ended the town declined into insignificance and almost weathered to oblivion. The town lies on the edge of the Great Karoo on an arid slope leading down to the Orange River and it is believed to have been named by the great explorer Colonel Robert Gordon, in honor of William Prince of Orange. Hopetown came into being in 1850 when Sir Harry Smith extended the northern frontier of the Cape to the mighty Orange and settlers started claiming land by 1854. Hopetown saw some action during the Anglo Boer War, at the skirmish at Houtkraal and a concentration camp is situated on the farm Doornbult. The Old Wagon route and the 1st bridge across the Orange, dating to 1871, carried traffic to the diamond fields and a blockhouse can still be seen standing on the banks of the river (www.heritage.org.za/karoo/hope/htm).

Van Ryneveld (2013) provided a description of the basic cultural sequence of the greater Rooikat development area, summarized as Stone Age followed by Colonial Period resources, with Colonial period sites mainly dating from 1850 onwards. With reference to the Stone Age, Sampson (1972) summarizes the Stone Age of the Orange River Scheme downstream of the Vanderkloof Dam as an infrequent ESA, with a single Fauresmith site of uncertain context as representing the transition between the ESA and MSA. MSA occurrences are common, more than often as widespread surface restricted deposits. He describes 5 Phases of MSA occurrences related in part to geographical location, based on typology and technology. According to Sampson the LSA remains the most prominent Stone Age component within the Orange River Scheme, divided into 3 earlier and 3 transitional phases. Emphasis is again placed on the often surface restricted context of LSA deposits of the greater Orange, but Sampson reiterates the importance of further investigation stating that sealed sites with up to 10 stratigraphic

members, cross-cutting temporal Stone Age divisions, have been found. Such a find would radically alter the significance rating of a surface identified deposit, considering specifically the scarcity of excavated samples.

Sampson (1972) continues to describe the general environment of the Orange, downstream from the Vanderkloof Dam as: '*Most of the valley is little more than 2 thin silt strips on each bank of the river, flanked by steep dolerite rubble slopes or cliffs. In several sections the cliffs and slopes plunge directly into the river. Flooding extends up the narrow gorges of the tributary streams… The area is entirely dominated by dolerite hills and mountains dissected by narrow ravines and gorges, making the whole area difficult to access and restricting cross-country movement…The field evidence suggest no clear-cut 'sequence' of terraces as has been suggested for other parts of the Orange / Vaal basin,… The river is a dominant feature of the environment and the only constant supply of running water in the area… (with an) erratic flow-pattern of the river in this section, with repeated summer floods and a weak flow during the dry winter months. Floods are usually triggered off by heavy downpours in the upstream catchment areas of the Caledon, Orange or Kraai, and need not be related to local rainfall. Minor floods may be produced by local runoff when the small tributary streams come down in spate, sometimes bursting their banks and flooding the adjacent plains. Most floods have a rapid and dramatic built-up… During these 'flash' floods, islands are drowned, trees are carried off and huge sections of the bank are carved away. The velocity of the flow is such that huge boulders are carried for miles downstream. During these periods the river is an effective barrier to human passage, but is fordable at many places during the winter… The character of this environment is altogether menacing to human survival…*'

Sampson (1972) continues to describe the impact of the environment on Stone Age settlement, but the same environmental factors seem to have affected Colonial Period settlement, with an evident emphasis on the slightly more subtle sloped south bank, explained by Rina Wiid (local historian, Doornbult heritage site) also as the probable result of accessibility to Hopetown, where commodities could be acquired year round without having to cross the Orange.

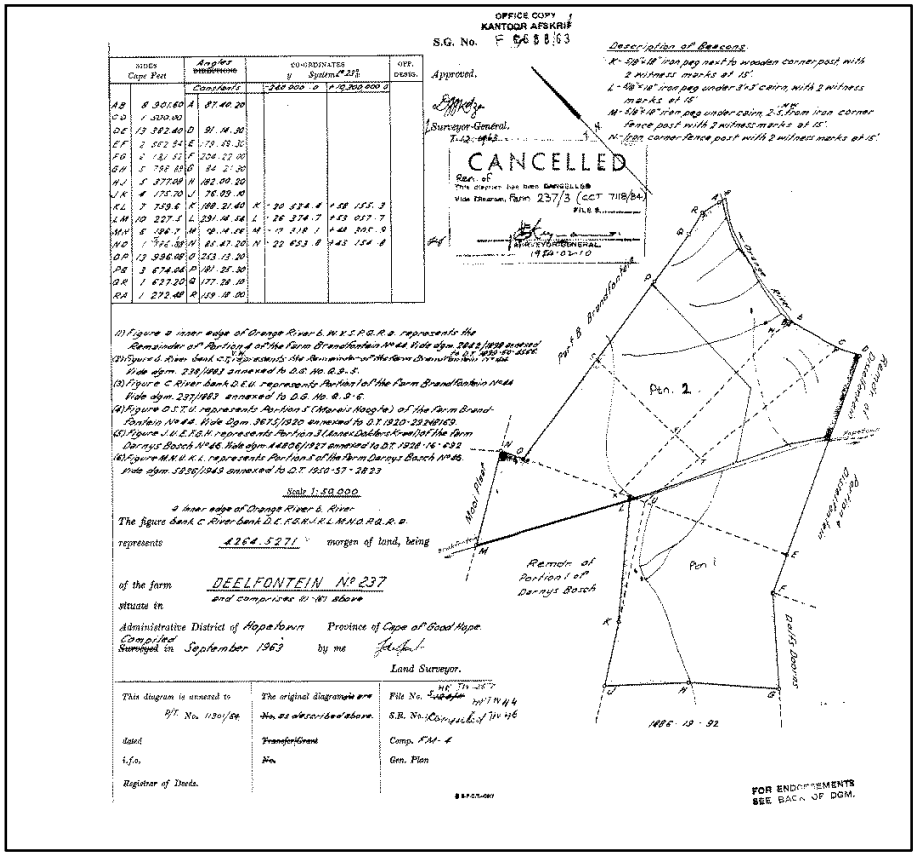


Figure 1: Deelfontein 237, with subdivisions dating to 1963 (CSG Record F6688/1963)

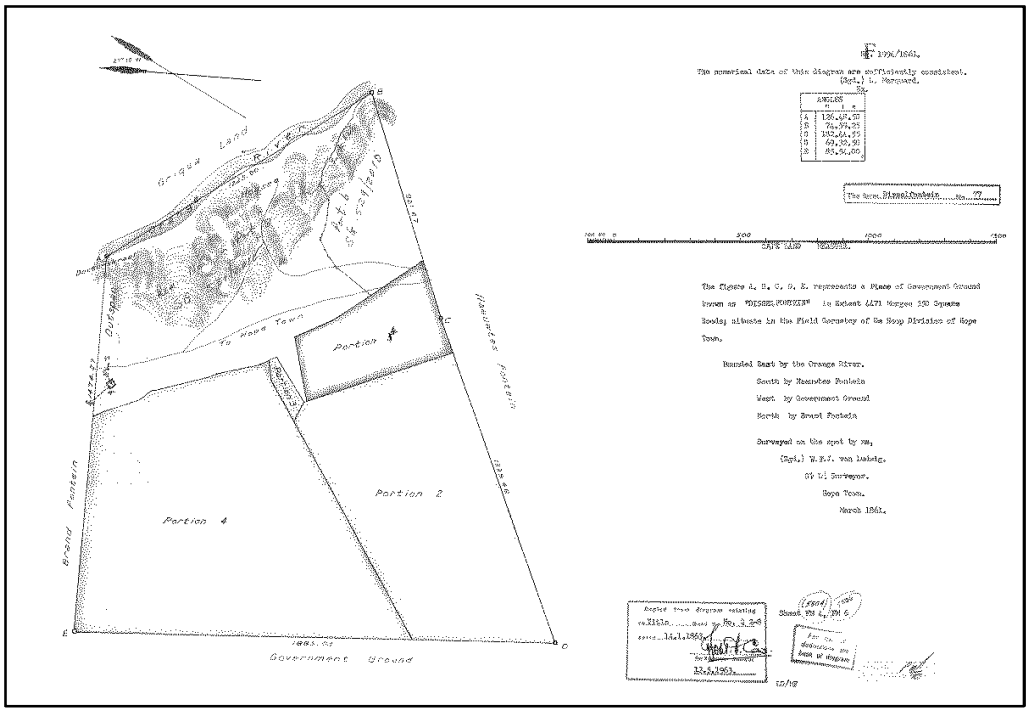


Figure 2: Disselfontein 77, with early registration records dating to 1861 (CSG Record F1994/1861)

2.2) FIELD ASSESSMENT

Thirty seven archaeological and cultural heritage sites, as defined and protected by the NHRA 1999, were identified during the field assessment, labelled Sites RH-01 to RH-37. Of the identified sites 17 are Stone Age sites and 19 are Colonial Period sites, with 1 site, namely Site RH-34, being a Colonial Period site overlying Stone Age deposits.

Seventeen of the identified 37 sites will be conserved within the current development layout, with additional temporary conservation measures and limited Phase 2 recording, annual monitoring and permanent sign posting applicable to ensure no accidental impact on heritage resources during the course of construction. Sites that will be conserved include Sites RH-02, RH-03, RH04, RH-07, RH-08, RH-09, RH-10, RH-16, RH-17, RH-18, RH-19, RH-24, RH-25, RH-26, RH-28, RH-33 and RH-34.

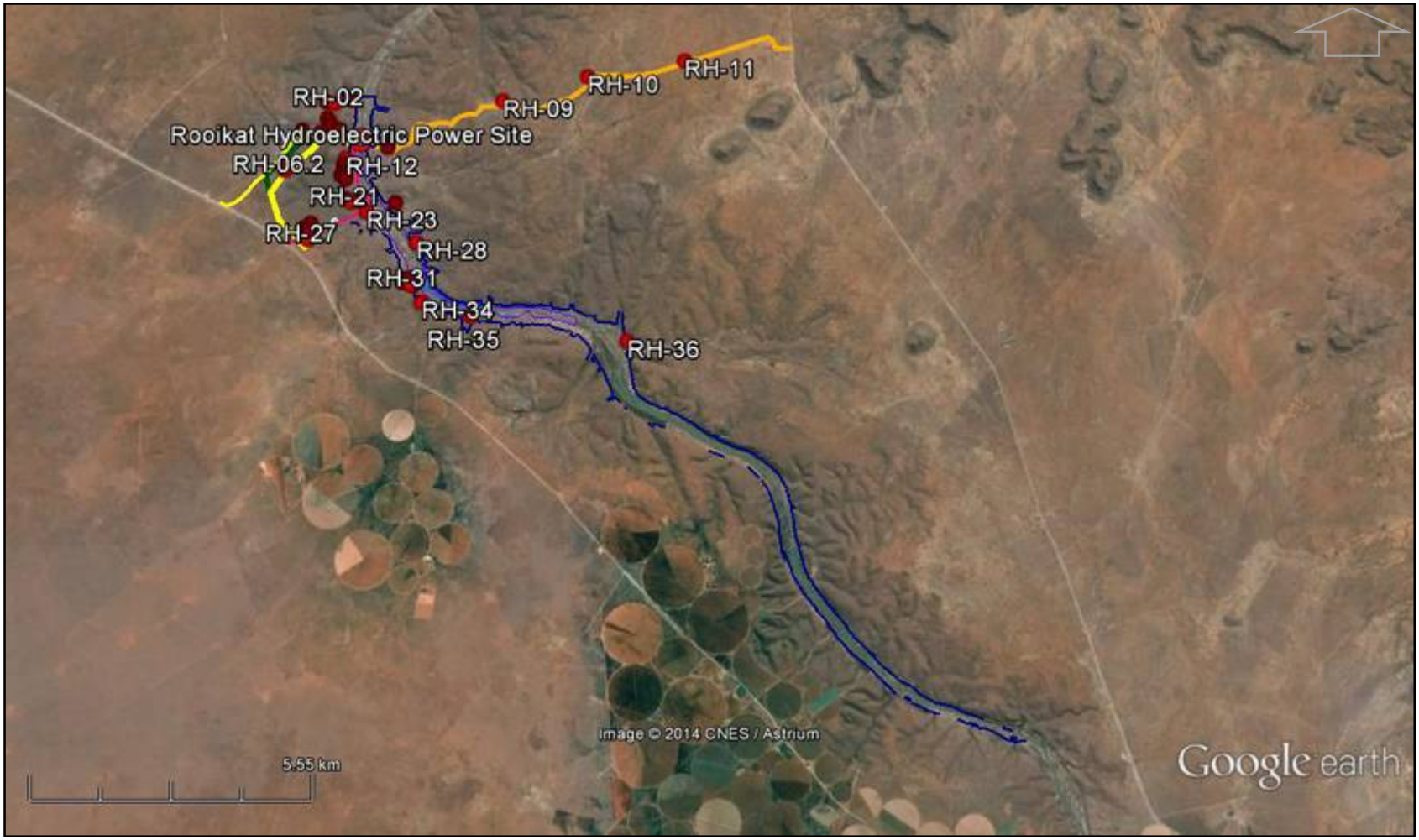
Heritage management options including conservation or mitigation and destruction under a SAHRA permit are applicable to 4 sites, namely Sites RH-11, RH-20, RH-21 and RH-22. Further definition to the maximum inundation level and selection of development options will define necessary courses of action for these sites.

Sites that will be affected, situated either within or in direct proximity to development include Sites RH-01, RH-05, RH-06, RH-12, RH-13, RH-14, RH-15, RH-23, RH-27, RH-29, RH-30, RH-31, RH-32, RH-35, RH-36 and RH-37.

Sites that will be directly impacted on are largely restricted to the *Rooikat Hydroelectric Power Site* study site area itself and more pertinently to the inundation area, but including impact along the power line and access road alignments. The impact on sites and associated recommendations within the inundation area are described according to the maximum inundation level, estimated at 1044masl, although many of the sites will be conserved if expected inundation levels are maintained. However, following Sampson's (1972) description of the area relating to floods in the Orange River Scheme downstream from the Vanderkloof Dam, floods pose the major concern regarding conservation of these sites even within a development framework – The post-depositional fluvial impact on sites, forming as is, notable parts of each site description situated within the flood plain. This raises questions regarding standard 'heritage conservation' associated with the 'no development' option. Should sites not be mitigated as component heritage management option for development, they will not, *per se*, be conserved: Effectively 'no development' in this case equals continued natural weathering, or simply said, slow fluvial destruction.

Notable with regard to distribution patterns of identified sites is the concentration of sites within the approximate 10km area closest to the *Rooikat Hydroelectric Power Site* study site, with sites clustered along the south bank, characterized by its more subtle gradients in comparison with the north bank and the 10km upstream inundation area, with its steep slopes and cliffs, where maximum inundation levels will have little impact on the surrounding landscape. It can reasonably be inferred that specifically landscape gradient was the determining factor in both settlement and land-use during the Stone Age and Colonial Period times.

With reference to geo-referenced sites from the McGregor Museum database, it seems National Site Nr. 2923BD-025, described as situated on the river silt terrace is erroneously referenced. National Site Nr. 2923BD-023 or Site RH-33 is situated on a rock outcrop outside the maximum inundation area and will be conserved. National Site Nrs. 2923BD-024 and 2923BD-026 could not be located. It is inferred that the recorded Site RH-32 may well be the locale of recorded National Site Nr. 2923BD-024, with co-ordinates referenced in the database as approximate. Aside from the locality of RH-32 the river plain of the immediate area proved devoid of Stone Age occurrences, implying that pre-recorded sites have already been destroyed in totality as a result of floods and fluvial impact.



Map 4: Results of the field assessment

Map 5: Geo-referenced sites from the McGregor Museum database in relation to field assessment findings on Disselfontein

Van Ryneveld (2013a) described 3 types of Stone Age occurrences, namely Type SH-A1, SH-A2 and SH-A3. Type SH-A3, with 5 occurrences identified during the 2013 field assessment, proved to be widely scattered across the greater *Rooikat Hydroelectric Power Site* study site, characterizing in varying densities virtually every rock outcrop and many of the plains areas, intersected by anthropogenic sterile Hutton sand surface areas. It is inferred that these low density MSA and LSA Stone Age occurrences may well extend notably beyond the faint boundaries observed on the surface; in lens-like fashion sterile aeolian Hutton sands may well simply overly artefactual lenses, resulting in a general mosaic of Type 3 and anthropogenic sterile surface occurrences. Type 3 conforms closest to Sampson (1972) description of '*widespread surface restricted deposits*'. Initial recommendations for Phase 2 mitigation of a sample of the Type 3 deposits are excluded from the recommendations in this report, based on its widespread occurrence; development will have little impact on Type 3 as a literal integrated part of the landscape. Recommended Phase 2 Stone Age mitigation is focused on occurrences and sites inferred to yield more culture specific information.

Van Ryneveld (2013a) recommended that a Rock Art survey formed part of the additional archaeological requirements for the *South Hydroelectric Power Site*. The recommendation was based on the number of Rock Art sites reported on during the Public Participation Process (PPP) by landowners; many of which were reported to be situated on affected properties, but outside the impact area. Second thereto the recommendation was in support of updating existing Rock Art records of the McGregor Museum. The recommendation was thus not directly compliance restricted, but aimed at also addressing concerns and discussions surrounding the contribution of CRM archaeology to research archaeology.

The SAHRA Interim Comment (2013-10-29) on the initial *South Hydroelectric Power Site* stated that: '*Rock art may be impacted by the proposed development and as such, this survey for rock art should have been completed as part*

of the AIA.' Clarity on this statement is necessary to avoid confusion. Rock Art is as a norm included as part of the Phase 1 AIA, when found within or in direct proximity to a study site, as evidenced in the referenced Phase 1 AIA for the Phumelela Bulk Water Supply Scheme near the Cornelis River Dam, Free State, where Rock Art and Colonial Period sites were reported on and concerns regarding possible impact on Iron Age sites situated within the inundation area raised (Van Ryneveld 2012; 2013b). In the case of the proposed Rock Art survey for the then *South Hydroelectric Power Site* the intention was to expand the survey beyond the study site area and include all known sites, with the aim of supplementing essentially old McGregor Museum research records.

With the change in study site and associated secondary impact from the *South Hydroelectric Power Site* to the *Rooikat Hydroelectric Power Site,* landowners were invited to report on known sites within the altered project study site. Only 1 landowner, Leon Ferreira, reported on known sites on the property Disselfontein, recorded in his records as Historical Site 1 and Historical Site 2, being a Rock Art and Colonial Period site respectively. It thus seems that the majority of the known Rock Art sites are situated further north, an assumption supported by McGregor Museum database records, which records, though not geo-referenced, the majority of the known sites situated on properties north of the *Rooikat Hydroelectric Power Site*.

Rock Art sites reported on in the 'Site Descriptions' section of this report are all directly compliance related with reference to the *Rooikat Hydroelectric Power Site*. An additional Rock Art survey is no longer applicable, based on the amended project impact area in relation to known additional sites, both McGregor Museum database and landowner related.

2.2.1) SITE DESCRIPTIONS

- Site RH-01 – Rock Art Panel, LSA – S29°26'33.1"; E23°54'47.8"

Located on a widespread dolerite outcrops, the Site RH-01 single panel of Rock Art, a pecked engraving (petroglyph) of an unidentified antelope, measures approximately 25x20cm in size. The site may be impacted on by inundation impact in the area immediately downstream from the *Rooikat Hydroelectric Power Site,* being situated within 10m from the 1044masl maximum inundation level.

- ***RECOMMENDATIONS:*** The Site RH-01 Rock Art panel is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. Proximity of the site to the maximum inundation level necessitates Phase 2 mitigation.
  PHASE 2 MITIGATION –
  1. It is recommended that the panel be formally recorded (tracing / rubbing) and that the panel be relocated to an accredited repository for permanent curation.

Plate 1: View of the Site RH-01 pecked engraving

❖ Site RH-02 – Stone Wall, Colonial Period – S29°26'36.3"; E23°54'35.2"

The RH-02 circular stone walling measures approximately 1.5m in diameter, with walls still partially standing to no higher than 30cm. The small feature is inferred to represent the locality of a Colonial Period cooking place or wind break and may well relate to early prospecting activities across the wider terrain. No artefacts were found in the vicinity of the site, in accordance with records of rather ephemeral camp sites dating to the time. The site will not be impacted on by development.

- ***RECOMMENDATIONS:*** Site RH-02 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site is situated approximately 180m from the closest development impact (inundation levels) and will be conserved. No additional conservation measures on behalf of the developer are is recommended.

Plate 2: View of Site RH-02

❖ Site RH-03 – Knapping Site, MSA & LSA – S29°26'35.6"; E23°54'28.6"

Site RH-03 comprises of an approximate 40x50m area, located on a stone outcrops. Lithic artefacts are scattered about the outcrops with artefact densities approaching an average artefact ratio (artefacts: m²) of ≥15:1. The primary raw material used comprises an unidentified stone, but what seems to be a fine grained metamorphic material, green in color. Additional raw material used, but in far less quantities than the green stone includes a siliceous black material, while a few lithics produced from quartzite and hornfels were identified. The assemblage is ascribed to a mixed Volman (1984) MSA 2b-3 and LSA, consisting primarily of macrolithic samples, but including a definite microlithic component. Typologically scrapers dominate the assemblage, but cores and flake-blades formed notable parts of the MSA component of the assemblage, while cores, small scrapers and flakes comprised the LSA component of the deposit. The site RH-03 deposits are typologically and technologically very similar other Stone Age sites and low density Stone Age occurrences identified across the general study site; what sets the site apart is the raw material used to produce artefacts from, inferred to reflect use of the immediate environment.

The site will not be impacted on by development.

- ***RECOMMENDATIONS:*** Site RH-03 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating.* The site, being situated approximately 300m from the closest development impact (inundation levels) will not be impacted on by development. No additional conservation measures on behalf of the developer are recommended.

Plate 3: General view of Site RH-03 [1]

Plate 5: Close-up of surface Stone Age densities

Plate 4: General view of Site RH-03 [2]

Plate 6: Selected lithic samples from Site RH-03

❖ Site RH-04 – Cemetery, Colonial Period – S29°26'57.1"; E23°54'11.3"

Site RH-04 comprises a Colonial Period cemetery containing 16 identifiable graves. Graves are all stone cairn demarcated, some marked with additional stone headstones, the majority of which contain no inscriptions, or of which inscriptions has been weathered to such an extent that they are no longer legible. Two gravestones still contain legible inscriptions, the 1st being: '*Grafsteen / van O. J. / Liebenberg / Geboren het jaar / 1816 DE 27 Augustu / Overleden het / Jaar 1887 DE 14 Sep / tember Zalig / zynde doode die / ende heere ster / ven*' and the 2nd: '*Grafsteen / Johann / Stifan / Jacobs / G:B:D: 4M:/ 1812 O:L:D:/12A: 1877 / O: B9J: 1M/ 8:D:*' A 3rd gravestone, inscribed with a cursive font is difficult to decipher despite its good preservation, but being the grave of Johanna Jacobs with a legible date of 1858, though with uncertainty weather this date refers to the date of birth or death. Gravestone references to Liebenberg and Jacobs confirm the cemetery as that of 1 of the early settler families of the area and further serves to identify ownership of the nearby Site RH-05 farmstead.

At present a contemporary farm camp fence runs through the cemetery.

Development will not impact on the site, but proximity of specifically the South Access Road and to a lesser extent the power lines does call for caution. The site will need to be permanently conserved and current impact should be mitigated. It is preferable that the site be permanently sign posted.

- ***RECOMMENDATIONS:*** Site RH-04 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *High Significance* and a *Generally Protected IV-A Field Rating*. The site will not be impacted on by development, but current impact as well as proximity of specifically the South Access Road (50+m) but also the power line alignments necessitates formal conservation of the site:
  FORMAL CONSERVATION & PERMANENT SIGN POSTING -
  1. Current impact should be mitigated (the farm camp fence that runs through the site should be removed).
  2. The site should be permanently fenced with an access gate, with a minimum 5m conservation buffer between the stone cairn graves and the conservation fence.
  3. It is preferable that the site be permanently sign posted. The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:

     > Site RH-04
     > Colonial Period Cemetery
     > This site is formally protected by the NHRA 1999
  4. [At present an approximate 50m 'conservation buffer' is maintained between the cemetery and the closest proposed road alignment. Rerouting of the road alignment is not necessary.]

Plate 7: General view of the Site RH-04 cemetery

Plate 8: The Liebenberg gravestone

Plate 9: Stone cairn graves, some with stone headstones at Site RH-04

Plate 10: Close-up of the grave of Johanna Jacobs

❖ Site RH-05 – Farmstead, Colonial Period – S29°26'47.6"; E23°54'30.6"

Site RH-05 was first recorded and reported on by Van Ryneveld (2013a) as Site SH-S2. The site was inferred to be the original Deelfontein 237 farmstead and directly relates to the Site RH-04 Liebenberg and Jacobs cemetery, dating to the 1800's: The site is formally protected by the NHRA 1999. The site, with site features scattered across an approximate 300x650m area, running along the tributary channel towards the Orange will be affected by inundation levels downstream from the *Rooikat Hydroelectric Power Site,* with the South Access Road in direct proximity to site features and in part running through the site.

The Site RH-05 farmstead was described as (Van Ryneveld 2013): '*… typified by the stone built 2 roomed residential remains of the inferred original farmhouse. The larger of the 2 rooms measures approximately 8x10m in size while the smaller averages roughly 4x4m. Ruined wall remains are in places still standing to roof height. Associated with the residential remains are a number of livestock enclosures, all rectangular in shape and stone built with conservation of the wall remains varying quite radically. Close to the farmhouse ruins are 2 livestock enclosures or 'kraals' of roughly 8x8m and 10x12m in size respectively, with adjoining calf camps, with walls still standing in places to approximately 70cm in height but elsewhere weathered down to foundation level. Just west of the access track is another livestock enclosure ruin (roughly 8x8m in size with walls standing to approximately 40-50cm high), situated in quite close proximity to the homestead remains. These may well have been the early 'kraals' associated with the origin of the settlement. Across the stream to the south of the homestead is a notably large double-lobed rectangular stone built kraal with camps in excess of 20m in length and walls standing to 1+m in height. Walls seem to have been maintained for a significant time. Just east of the large 'kraal' is the remains of a weathered small enclosure, approximately 6x6m in size with walls standing to an average of 70cm high in places. A number of related smaller features can reasonably be expected on site upon more detailed assessment.*'

Additional survey results added to further description of significant site features:

1. Feature RH-05.1 (S29°26'52.6"; E23°54'24.4") demarcates the locality of a stone wall associated with additional livestock enclosures. The stone wall, situated to the north of the tributary or drainage line is clearly identifiable on the landscape and standing to between 60cm-1m in height, measuring more or less 350m in length. Traces of a similar structure, though with only ephemeral foundation level remains left, is present on the south bank of the tributary. The purpose of the wall remains unknown: Situated too high above the tributary to be directly associated with flood management, the walls may well have been a funnel to channel livestock movement between the Site RH-05 farmstead and the Orange. Two additional rectangular 'kraals' measuring approximately 6x6m in size are situated along the RH-05.1 stone wall feature.

2. Feature RH-05.2 (S29°26'55.4"; E23°54'40.4") demarcates the locality of an additional circular livestock enclosure situated along the tributary line towards the Orange. The stone walled enclosure, measuring approximately 6m in diameter is characterized by an approximate 3cm thick dung deposit, which is busy being eroded away.

    - ***RECOMMENDATIONS:*** Site RH-05 pre-dates 60/100 years of age and is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be impacted on by inundation levels downstream from the *Rooikat Hydroelectric Power Site* while proximity of the South Access Road, in places cutting through the site as well as basic proximity of the power line routes calls for additional Phase 2 mitigation. Portions of the site will be conserved, but specific

site features will be impacted on, specifically by inundation levels. It is recommend that a Phase 2 mitigation project precedes development in the vicinity of Site RH-05:

PHASE 2 MITIGATION & PERMANENT SIGN POSTING –

1. The notably large Site RH-05 farmstead should be systematically mapped and test pit excavations done at significant site features, focusing on features that will highlight cultural practice, including those that will with surety be impacted on, such as the SH-05.2 enclosure deposits. Phase 2 mitigation should aim at collecting enough data to provide for a reasonable interpretation of the site, considering at least permanent partial impact on the site. Phase 2 mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report should be submitted to SAHRA.
2. Upon completion of the Phase 2 mitigation the developer should apply for SAHRA Site Destruction Permits for all features that will be permanently impacted on.
3. It is preferable that the site be permanently sign posted (at a portion of the site that will not be impacted on, such as the residence). The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:

   > Site RH-05
   > Colonial Period Farmstead
   > This site is formally protected by the NHRA 1999

4. Additional on-site information displays, based on Phase 2 information, may be considered.

Plate 11: Residential remains at Site RH-05

Plate 13: Large livestock enclosure remains across the stream from the homestead

Plate 12: A stone built 'kraal' with residential remains in the background

Plate 14: Livestock enclosure remains at Site RH-05

Plate 15: View of the RH-05.1 stone wall

Plate 16: Close-up of wall remains at RH-05.1

Plate 17: View of the SH-05.2 feature remains

Plate 18: Close-up of dung deposits at RH-05.2

❖ Site RH-06 – Stone Age Occurrence, MSA & LSA – S29°26'52.0"; E23°54'32.1

Site RH-06 was first reported on and described by Van Ryneveld (2013a). The Stone Age occurrence directly underlies the Colonial Period remains of Site RH-05.

The RH-06 Stone Age occurrence is typical of the deposits described in Van Ryneveld (2013a) as Type SH-A2, of which 3 occurrences were identified, and including for purposes of this report RH-06.1 (S29°28'04.4"; E23°54'25.1") and RH-06.2 (S29°27'26.9"; E23°54'00.7"). The type deposits were described as (Van Ryneveld 2013): "*… Stone Age artefact types are inferred to be a direct result of the immediate geology: Quartz rich deposits resulted in collections dominated by quartz artefacts, including white and to a much lesser extend poor rose quartz lithics. In addition to quartz siliceous material and other local raw materials were used. Artefact types include primarily flake forms of both the MSA and LSA, again with an emphasis on a Volman (1984) MSA 3 and microlithic LSA samples. Rough artefact ratios (artefacts: m²) of approximately 8:1 were recorded, but ratios vary across indicated occurrence areas…'*

- ***RECOMMENDATIONS:*** Stone Age deposits at Site RH-06, with similar deposits identified at localities RH-06.1 and RH-06.2, as better assemblages of large scale low density occurrences across the landscape are ascribed a *SAHRA Low Significance* and a *Generally Protected IV-C Field Rating*.
  PHASE 2 MITIGATION –
  1. It is recommended that a systematic surface collection coined with test pitting be done at Site RH-06 to ensure collection of a representative sample of the identified deposit type. Phase 2 mitigation should be done under a SAHRA Excavation Permit.
  2. Due to large scale conservation of similar type deposits application for a SAHRA Destruction Permit by the developer upon submission of a Phase 2 report is not recommended.

Plate 19: A selection of artefacts from Site RH-06

❖ Site RH-07 – Rock Art Panel, LSA – S29°26'58.1"; E23°54'26.3"

The Site RH-07 single panel of Rock Art was discovered on a dolerite outcrops. The panel comprise a pecked engraving (petroglyph) of an unidentifiable animal / antelope, measuring approximately 40x20cm in size. The discovery of the single panel may well be indicative of additional single panels of Rock Art amongst the widespread outcrops. However the identified panel is situated more than 100m from the closest proposed development alignments (power line routes and the South Access Road). The site will be conserved. However site sensitivity warrants additional conservation measures to ensure no accidental impact on the site.

- ***RECOMMENDATIONS:*** Site RH-07 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will not be impacted on by development, but site sensitivity necessitates additional conservation measures during the construction phase.

  TEMPORARY CONSERVATION –

  1. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.

Plate 20: View of Site RH-07

❖ Site RH-08 – Cemetery, Colonial Period – S29°27'07.3"; E23°55'20.8"

Site RH-08 demarcates the locality of a number of graves situated underneath a tree. Two graves are clearly identifiable, marked with stone headstones, 1 being intact and the other fallen over but still situated in immediate proximity to the grave. Further stones, most probably weathered stone cairns are present at the site and may indicate 2-3 additional graves, originally marked only with stone cairns without any headstones. The site will not be impacted on by development of the North Access Road, but proximity to the road necessitates additional conservation measures to be instated.

- ***RECOMMENDATIONS:*** Site RH-08 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *High Significance* and a *Generally Protected IV-A Field Rating*. The site will not be impacted on by development, but proximity to the North Access Road necessitates formal conservation of the site:
  TEMPORARY CONSERVATION & PERMANENT SIGN POSTING –
  1. Permanent conservation measures (permanent fence with access gate) are not recommended as this may have a negative effect on vegetation growth which will in turn impact on site preservation, ultimately with negative impact on the cultural landscape.
  2. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation should be in place for the tenure of the construction phase. Temporary conservation measures should be removed after construction.
  3. It is preferable that the site be permanently sign posted. The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:

     > Site RH-08
     > Colonial Period Cemetery
     > This site is formally protected by the NHRA 1999

Plate 21: General view of Site RH-08

Plate 23: A grave stone from Site RH-08

Plate 22: A weathered stone cairn at Site RH-08

Plate 24: Graves from Site RH-08

❖ Site RH-09 – Livestock Enclosure, Colonial Period – S29°26'31.4"; E23°56'50.9"

Site RH-09 is situated approximately 70m north of the North Access Road and will not be impacted on by development. The site was recorded, and is reported on for purposes of proximity to the study site only.

Site RH-09 comprises the remains of a former stone built rectangular livestock enclosure, which must have measured approximately 7x7m in size with a portion of the wall still standing to more or less 1m in height, but with at least 2 walls having weathered away in totality, with only faint traces of stone foundations left. Slightly to the east of the wall remains a small stone pile indicate a further stone feature at the site, but no longer identifiable. A snuff box lid hosted the inscription 'CT'. Rusted metal and glass were found, sparsely scattered across the surface of the site.

The site will not be impacted on by development, but it is recommended that temporary conservation measures be in place for the tenure of development to ensure no accidental impact.

- ***RECOMMENDATIONS:*** The Site RH-09 livestock enclosure is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by the North Access Road, but proximity of the site to the road alignment does call for caution to ensure no accidental impact on the site during the construction phase of development.
  TEMPORARY CONSERVATION –
  1. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.

Plate 25: General view of Site RH-09

Plate 26: Close-up of stone walling at Site RH-09

Plate 27: A stone feature near the RH-09 stone walling

Plate 28: Selected metal and glass artefacts from Site RH-09

❖ Site RH-10 – Livestock Enclosures, Colonial Period – S29°26'11.4"; E23°57'57.9"

Site RH-10 is characterized by the remains of 12 linear aligned livestock enclosures, all measuring approximately 5x5m in size. Enclosure remains stand as a norm to between 10-30cm high, but have in places been weathered away in totality. The site is situated in close proximity to a homestead, but of fairly recent origin, post-dating 60 years of age. The homestead itself is thus not protected by the NHRA 1999, but may well have been built over older settlement remains, directly associated with the livestock enclosures.

- ***RECOMMENDATIONS:*** The Site RH-10 livestock enclosures are formally protected by the NHRA 1999. The enclosures are ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by the North Access Road, but proximity of the site to the road alignment does call for caution.

  TEMPORARY CONSERVATION & SLIGHT REALIGNMENT –

  1. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.
  2. Final alignment of the North Access Road should be placed at least 15m from the temporary conservation fence and within 70m thereof to ensure applicability of the field assessment results.

Plate 29: View of the Site RH-10 livestock enclosure remains

❖ Site RH-11 – Settlement, Colonial Period – S29°25'57.4"; E23°59'15.3"

The Site RH-11 ephemeral Colonial Period settlement site is situated partly within the existing access road, with the access track and fence cutting through the site. Settlement remains are characterized by the circular foundation outline of a structure that measured approximately 3m in diameter – with structure remains having been impacted by the current access track. The remains of a further enclosed structure may be present, but scant wall remains and the general stone rich terrain makes further identification of the feature speculative. At least 3 linear walls are present at the site; all compiled in single stone alignment with only foundation remains left. Wall or partition remains runs in excess of 10m each but further investigation is necessary to verify their feature association at the site. The site is inferred to represent the ephemeral remains of an early prospecting camp.

The site has already been impacted on by the access track and will be impacted on by development of the North Access Road.

- ***RECOMMENDATIONS:*** Site RH-11 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site has already been impacted on by the existing access track and will be further impacted on by development of the North Access Road. Alternatively the access road should be realigned to ensure a minimum 15-20m conservation buffer around the site. It is recommended:

  PHASE 2 MITIGATION –

  1. Development be preceded by a Phase 1b archaeological recording of the site features associated with Phase 2 test pitting prior to development impact, with Phase 2 test pitting done under a SAHRA Excavation Permit. A Phase 1b and Phase 2 report should be submitted to SAHRA.
  2. After Phase 2 mitigation the developer should apply for a destruction permit for the site to ensure that the site be legally destroyed.

  OR

  TEMPORARY CONSERVATION & REALIGNMENT –

  1. Rerouting of the North Access Road in the vicinity of RH-11. The realigned portion should be subjected to a Phase 1 AIA and relevant recommendations made.
  2. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.

Plate 30: General view of Site RH-11 [1]

Plate 32: A stone wall at Site RH-11

Plate 31: General view of Site RH-11 [2]

Plate 33: Close-up of a stone wall at Site RH-11

❖ Site RH-12 – Settlement / Lookout Point, Colonial Period – S29°27'16.7"; E23°54'48.4"

The Site RH-12 stone structure remains are inferred to represent a settlement or lookout point type Colonial Period structure. Structure remains measure approximately 1.5+m in length, but alluvial impact has taken a negative toll on the structure itself. A number of fragmented pieces of blue and white porcelain are present on the surface of the site with the potential of classification to type level that will assist with at least dating of the site, should any diagnostic pieces be uncovered. In addition to porcelain pieces, earthenware, glass and rusted metal form part of the surface artefact assemblage. The site will be impacted on by inundation levels and Phase 2 archaeological mitigation should precede development.

- ***RECOMMENDATIONS:*** Site RH-12 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will be impacted on by development and a Phase 2 archaeological mitigation program should precede development.
  PHASE 2 MITIGATION –
  1. The site, already subjected to severe alluvial impact, will be directly impacted on by inundation levels and a Phase 2 archaeological mitigation project should precede development. Mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report submitted to SAHRA prior to development impact.
  2. The developer should apply for a SAHRA Site Destruction Permit after Phase 2 mitigation.

Plate 34: General view of Site RH-12

Plate 35: Selected artefacts from Site RH-12

Plate 36: Selected artefacts from Site RH-12 (ceramic may rather be associated with the nearby LSA deposits)

❖ Site RH-13 – Grave, LSA – S29°27'21.3"; E23°54'46.9"

The remains of a rough single piled stone outlined demarcation in (half) circle shape characterizes the locality of the Site RH-13 Later Stone Age (LSA) grave. Weathered bone fragments are present on the surface, while molars and ribs are busy eroding out of context.

The site will be directly impacted on by expected inundation levels of the Rooikat development and considering the current state of the grave, mitigation of site should be prioritized.

- ***RECOMMENDATIONS:*** Site RH-13 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *High Significance* and a *Generally Protected IV-A Field Rating*. The site will be impacted on by inundation levels and with the grave busy eroding out of context priority should be given to the mitigation thereof. By definition, and directly associated with the Site RH-14 LSA deposits, the grave remains archaeological in nature and mitigation should follow the process of archaeological rescue excavation, not grave relocation.
  PHASE 2 MITIGATION –
  1. The site will be directly impacted on by inundation levels and a Phase 2 archaeological mitigation project should be prioritized. Mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report submitted to SAHRA prior to development impact.
  2. After Phase 2 mitigation the developer should apply for a destruction permit for the site to ensure that the site be legally destroyed.

Plate 37: View of the Site RH-13 LSA grave [1]

Plate 39: Surface fragmented pieces of bone eroding out of context

Plate 38: View of the Site RH-13 LSA grave [2]

Plate 40: Close-up of molars and rib pieces

❖ Site RH-14 – Settlement, LSA – S29°27′21.4″; E23°54′49.3″

Site RH-14 is situated on alluvial deposits adjacent to an erosion gully: The site is directly threatened by silt deposits being washed away. The ephemeral LSA encampment is characterized by clusters of LSA artefacts, including a number of macrolithic pieces but with a notable emphasis on microliths. A description of artefact density remain problematic – alluvial post-depositional processes have evidently taken its toll on the site, but not excluding the possibility that better deposits may be buried in sub-surface context. A fair average surface artefact ratio (artefacts: m²) can be described as 5:1, with artefacts produced from a variety of raw material sources including hornfels, but with a focus on siliceous types. In addition to surface lithic artefacts 2 lower grinders, thin walled pottery and a number of ostrich eggshell pieces constitute the surface artefact assemblage.

The site will be impacted on by inundation levels of the Rooikat development.

- ***RECOMMENDATIONS:*** Site RH-14 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be impacted on by development and a Phase 2 archaeological mitigation program should precede development.
  PHASE 2 MITIGATION –
  1. The site will be directly impacted on by inundation levels and a Phase 2 archaeological mitigation project should precede development. Mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report submitted to SAHRA prior to development impact.
  2. After Phase 2 mitigation the developer should apply for a destruction permit for the site to ensure that the site be legally destroyed.

Plate 41: General view of Site RH-14

Plate 42: Selected surface artefacts from Site RH-14

Plate 43: A lower grinder from Site RH-14

❖ Site RH-15 – Rock Art Panels & Lithic Artefacts, (MSA &) LSA – S29°27'24.7"; E23°54'48.9"

Site RH-15 is situated on a small dolerite outcrops. Stone Age lithic artefacts are scattered across the hill and immediate surrounds. These artefacts are primarily ascribed to the Later Stone Age (LSA) including macrolithic and microlithic samples, produced from a variety of raw material sources, including siliceous material as well as dolerite, quartzite and hornfels. Artefact ratios (artefact: m²) vary radically across the site, being clustered in solution pockets on the hill itself and scattered across the Hutton sand context. Maximum recorded ratios equal 25:1, but a fair average is estimated at around 8-10:1. While LSA artefacts may well be directly associated with the Rock Art on the hill a few MSA tools are also present; inferred to be in secondary context and primarily the result of past fluvial disturbance.

At least 9 engraved panels comprise the Rock Art at the site, while a few panels have been located downhill from the site, again inferred to be the result of past floods and fluvial disturbance. Rock Art at the site all comprise of pecked engravings (petroglyphs), including a number of motives: Most prominent amongst these are animal figurines, including 2 antelope on a broken piece of dolerite and a large zebra and giraffe, both individual panel pieces and in excess of 45x30cm in size. No human or anthropomorphic figurines were found at the site. Twirling lines and rough geometrics dominate the panel engravings, but many are quite weathered; testimony to past fluvial impact on the site. Motives identified on panels that rolled downslope (located at approximate co-ordinate S29°27'22.5"; E23°54'49.6") includes a pecked engraving of an eland on a boulder half buried under the sand. More engraved panels may be present in the area – hill wash may well have resulted in art being submerged in sand.

The site will be directly impacted on by maximum inundation levels, though expected levels will not impact on the site. However maximum inundation levels associated with evidence of current water impact does necessitate Phase 2 recording and mitigation.

- ***RECOMMENDATIONS:*** Site RH-15 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly impacted on by maximum inundation levels.
  PHASE 2 MITIGATION –
  1. It is recommended that the Rock Art be formally recorded (rubbed / traced) and arrangements made for the removal thereof to a SAHRA accredited repository. Phase 2 Rock Art recording and removal should be done under a SAHRA Permit and a Phase 2 report submitted to SAHRA.
  2. Stone Age deposits should be mitigated by means of test pitting prior to development impact, under a SAHRA Excavation Permit. A Phase 2 report should be submitted to SAHRA.
  3. Upon submission of the Phase 2 reports the developer should apply for a SAHRA Site Destruction Permit to legally destroy the site.

Plate 44: View of the Site RH-15 dolerite hill

Plate 46: Two antelope on a broken dolerite panel

Plate 45: Twirling lines and a circle shape

Plate 47: Lines and rough geometric shapes [1]

Plate 48: Engraved lines

Plate 50: Lines and rough geometric shapes [2]

Plate 49: Pecked engraving of a zebra

Plate 51: Engraving of a giraffe

❖ Site RH-16 – Stone Wall, Colonial Period – S29°27'27.5"; E23°54'46.7"

The Site RH-16 circular stone walled structure remains measure approximately 2.5m in diameter, with walls still standing to an average 60cm in height and with the enclosure entrance facing the river. Infrequent artefacts were found scattered about the surface of the site, comprising exclusively of rusted metal, including a fairly large can / drum in the center of the site. The site will not be impacted on by development. The site is situated more than 60m from the maximum inundation level and will be conserved.

- ***RECOMMENDATIONS:*** Site RH-16 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by development. No additional conservation measures on behalf of the developer are recommended.

Plate 52: General view of Site RH-16

❖ Site RH-17 – Livestock Enclosure, Colonial Period – S29°27'29.3"; E23°54'45.8"

Site RH-17 was first recorded and reported on by Van Ryneveld (2013a) as Site SH-S3. The site, a livestock enclosure, was described as comprising of '*… a small, rectangular shaped, stone built livestock enclosure, measuring roughly 4x4m in size with walls still standing to more or less 70cm in height. The structure can reasonably be inferred to pre-date 60 years of age*.' The site is situated approximately 130m from maximum inundation levels – site conservation is not threatened by development.

- ***RECOMMENDATIONS:*** Site RH-17 is inferred to pre-date 60 years of age and is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Being situated approximately 130m from maximum inundation levels the site will be conserved. No additional conservation requirements on behalf of the developer are recommended.

Plate 53: View of Site RH-17

❖ Site RH-18 – Stone Wall, Colonial Period – S29°27'29.7"; E23°54'49.2"

The Site RH-18 circular stone walling measures approximately 1.5x2m in size with walls standing to an approximate height of 40cm. Though stone artefacts are scattered about the general vicinity the lack of knapping evidence suggests a definite Colonial Period origin. Based in the size of the structure, too small for a livestock enclosure unless it was used as a calf camp, the structure may rather have been built as a wind break or cooking place, perhaps to serve a temporary settlement of prospectors in the area.

Site RH-18 is situated approximately 50m from proposed maximum inundation levels and will not be impacted on by development.

- ***RECOMMENDATIONS:*** Site RH-18 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by development, no additional conservation measures on behalf of the developer are recommended.

Plate 54: The Site RH-18 Colonial Period stone walling

❖ Site RH-19 – Rock Art Panels & Lithic Artefacts, LSA – S29°27'31.7"; E23°54'49.3"

Site RH-19 is characterized by a fairly small dolerite outcrop where a number of Rock Art panels are present. All Rock Art comprise of pecked engravings (petroglyphs), with motives varying from animal figurines, including a large eland and what may well be a hyena together with unidentified antelope, human and anthropomorphic figurines, lines and dots. At least 5 individual engraved panels are present at the site.

Scatters of lithic artefacts are present in the area immediately surrounding the dolerite outcrop. A few of these samples can be ascribed to the Middle Stone Age (MSA), but Later Stone Age (LSA) artefacts, including both macrolithic and microlithic samples characterize the site. Raw material used is dominated by siliceous types but a few quartzitic, granite and hornfels tools are present. Artefact ratios (artefacts: m²) of up to 15:1 were recorded, but densities do vary providing for an average artefact ratio of 8-10:1.

The site is situated on the 1044masl contour maximum inundation level. Direct proximity to development impact necessitates Phase 2 recording and monitoring.

- ***RECOMMENDATIONS:*** Site RH-19 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will not be directly impacted on by development, but immediate proximity of the site to the inundation area does call for caution.
  PHASE 2 MITIGATION, ANNUAL MONITORING & PERMANENT SIGN POSTING –
  1. It is recommended that the Rock Art be formally recorded (rubbed / traced) and monitored annually for at least 5 years after development. Should flood lines necessitate removal of the Rock Art panels provision therefor should be made and relocation of the panels be arranged under a SAHRA permit.
  2. Stone Age deposits should be mitigated by means of test pitting prior to development impact, under a SAHRA Excavation Permit. A Phase 2 report should be submitted to SAHRA. Should annual monitoring indicate a threat to the site further recommendations regarding relevant mitigation should be submitted to SAHRA for consideration.
  3. It is preferable that the site be permanently sign posted. The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:
     > Site RH-19
     > Rock Art Panels & Lithic Artefacts
     > This site is formally protected by the NHRA 1999
  4. Additional on-site information displays, based on Phase 2 information, may be considered.

Plate 55: General view of the Site RH-19 Rock Art outcrops

Plate 57: A panel of engraved animal figurines and lines

Plate 56: Pecked line engraving – anthropomorphic figurine

Plate 58: A pecked human figurine [1]

Plate 59: A pecked human figurine [2]

Plate 61: LSA artefacts from the Site RH-19 Rock Art outcrops

Plate 60: A possible pecked human figurine, lines and dots

❖ Site RH-20 – Livestock Enclosure, Colonial Period – S29°27'46.2"; E23°54'50.9"

Site RH-20 comprise of the remains of a large rectangular livestock enclosure. Wall remains are still visible mainly on 2 sides of the old 'kraal', but with the remainder thereof (northern and eastern walls) having been weathered away in totality. Alternatively a perishable material may have been used for these wall portions during initial construction. The enclosure must have measured approximately 8-10m on each side. Where still present, stone wall height varies from foundation stones only to approximately 60cm in height.

Maximum inundation levels in the vicinity of the site are not defined. It is inferred that the site will not be impacted on by development. In the event of impact the developer should ensure that application for a SAHRA Site Destruction Permit is made prior to commencement of construction.

- ***RECOMMENDATIONS:*** Site RH-20 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*.
  IN-SITU CONSERVATION:
  1. It is recommended that the site be conserved without the developer having to comply with additional conservation requirements;

  OR

  DESTRUCTION UNDER SAHRA PERMIT –
  1. Should development necessitate impact on the site the developer should apply for a SAHRA Site destruction permit prior to commencement of construction.

Plate 62: View of the Site RH-20 stone wall remains

❖ Site RH-21 – Livestock Enclosures, Colonial Period – S29°27'48.5"; E23°54'55.8"

Site RH-21 comprises of the remains of 2 livestock enclosures. The first being a rectangular stone built livestock enclosure, measuring approximately 5x5m in size with walls still standing to more or less 40cm in height. The entrance of the structure faces north east, towards the river. The 2nd structure, built in a random shape that approaches a convex narrow triangle has a partial stone partition in the middle of the enclosure. Walls of this approximate 5x3m in size structure still stands to an average of 50-80cm in height. A number of surface artefacts are present, scattered across the general surface terrain, and including a led bully beef can lid, a fragment of blue and white porcelain, together with unidentifiable rusted metal and a few pieces of glass.

Maximum inundation levels in the vicinity of the site are not as yet defined; inundation levels are however not expected to impact on the site, implying site conservation. Should final calculations indicate that inundation levels will affect the site locale a Phase 2 recording and test pitting of the site should be done prior to impact.

- ***RECOMMENDATIONS:*** Site RH-21 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Maximum inundation levels in the vicinity of the site are not as yet defined; the site may thus either be conserved or will be impacted on.
  IN-SITU CONSERVATION –
  1. Should inundation levels not impact on the site, implying site conservation through development then no additional conservation measures on behalf of the developer would be necessary;

  OR

  PHASE 2 MITIGATION –
  1. Should inundation levels impact on the site development should be preceded by a Phase 2 recording and test pitting project aimed at collecting a portion of the artefactual remains at the site for purposes of analysis and interpretation. The Phase 2 mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report should be submitted to SAHRA.
  2. Upon Submission of a Phase 2 report the developer should apply for a SAHRA Site Destruction Permit.

Plate 63: General view of Site RH-21

Plate 65: Close-up of the bully beef can lid

Plate 64: View of Site RH-21

Plate 66: Fragmented blue and white porcelain from Site RH-21

❖ Site RH-22 – Artefact Occurrence, MSA & LSA – S29°27'47.1"; E23°55'00.9"

A number of lithic artefacts are present in the vicinity of the Site RH-22 co-ordinate. Stone artefacts are scattered about the terrain, but an artefact density or ratio (artefacts: m²) approximation is not possible as a result of large scale mining disturbance in the area. Terrain surrounding the mining area indicates a widespread continuation of the deposits with an estimated artefact ratio of 1-5:1. Typologically artefacts can be classed as a rough Volman (1984) MSA 2b-3 and including a Later Stone Age (LSA) component, both macrolithic and microlithic. Artefacts seem to be produced from a mixed raw material, the probable result of river cobbles having been used as raw material source and as such including granites, quartzite and a range of siliceous material. Many artefacts are rolled, evidence that periodic floods have definitely taken its toll on ex-situ deposits situated in direct proximity to the flood plain of the Orange. A large lower grinder confirms the LSA use of the site, located at S29°27'46.4"; E23°55'02.2".

Maximum inundation levels are not as yet defined for the immediate area of the site; the site may thus either be conserved or destroyed by development.

- ***RECOMMENDATIONS:*** Site RH-22 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site has already largely been impacted on by former mining activities, to such an extent that little of Stone Age archaeological value remains aside from confirmation that the higher lying slopes of the river bank, above the flood line, was used for extensive periods of time throughout the MSA and LSA.

  IN-SITU CONSERVATION –

  1. It is recommended that the site be conserved without any additional conservation measures on behalf of the developer;

  OR

  DESTRUCTION UNDER SAHRA PERMIT –

  1. Should final inundation calculations in the vicinity of the site indicate development impact on the site the developer should apply for a SAHRA Site Destruction Permit prior to impact.

Plate 67: Selected stone artefacts from Site RH-22

Plate 69: A large lower grinder from Site RH-22

Plate 68: A core from site RH-22

Plate 70: Large scale mining disturbance at the Site RH-22 area

❖ Site RH-23 – Settlement, (MSA &) LSA – S29°27'55.1"; E23°55'08.3"

Site RH-23 is situated high on the silt terrace of a tributary mouth to the Orange. Steep slopes of the drainage terrace characterized parts of the site, where sheet silt wash have evidently impacted on deposits. The assemblage comprises a mixture of Middle and Later Stone Age (MSA & LSA) lithics, with LSA samples dominating, and including both macro- and microlithic samples. Average artefact ratios (artefacts: m^2) approximates 3-5:1, with artefacts produced from a variety of raw material sources including granite, quartzite, hornfels, but with siliceous material dominating as raw material source. Fragmented ostrich eggshell formed a notable component of the surface assemblage, together with infrequent ceramic sherds, one being a small lip rim, decorated with what seems to be a cross-hatched pattern. A large lower grinder, found washed down the slope of the terrace, serves as evidence of alluvial impact on the site; the ephemeral deposits thus at present threated by natural agents.

Site RH-23 will be impacted on by inundation levels of the Rooikat development.

- ***RECOMMENDATIONS:*** Site RH-23 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly impacted on by inundation levels.
  PHASE 2 MITIGATION –
  1. Development should be preceded by a Phase 2 archaeological mitigation program, done under a SAHRA excavation permit. A Phase 2 report should be submitted to SAHRA.
  2. After Phase 2 mitigation the developer should apply for a destruction permit for the site to ensure that the site be legally destroyed.

Plate 71: General view of Site RH-23 [1]

Plate 73: Selected artefacts from Site RH-23

Plate 72: General view of Site RH-23 [2]

Plate 74: Close-up of a lower grinder

❖ Site RH-24 – Livestock Enclosures, Colonial Period – S29°27'47.6"; E23°55'30.7"

Site RH-24 comprises the remains of 3 stone built livestock enclosures situated in close proximity to one another, all being rectangular in shape. The 1st enclosure, the best preserved of the 3, measures roughly 5x5m in size with walls still standing to more or less 1m in height. The other 2 enclosures are characterized largely by foundation and low rising wall remains, 1 of which measures a mere estimated 3x3m in size whilst partial wall remains indicates another feature, again of more or less 5x5 to 7x7m in size. The site is situated on a hill above the maximum inundation level, approximately 40m away and will not be impacted on by development.

- ***RECOMMENDATIONS:*** Site RH-24 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by inundation levels. The site will thus be conserved. No additional conservation measures on behalf of the developer are recommended.

Plate 75: Close-up of the 1st enclosure at Site RH-24

Plate 76: Rectangular livestock enclosure remains at Site RH-24

Plate 77: Wall remains at Site RH-24 [1]

Plate 78: Wall remains at Site RH-24 [2]

❖ Site RH-25 – Livestock Enclosure, Colonial Period – S29°28'08.9; E25°54'24.2"

Site RH-25, first recorded and reported on by Van Ryneveld (2013a) comprises of a large, rough rectangular shaped livestock enclosure, with the main camp measuring approximately 15x15m in size and the adjoining calf camp more or less 4x4m. Stone walls are still standing in places in excess of 1+m while elsewhere they are weathered down to an average of 40cm in height. The site is inferred to pre-date 60 years of age, implying its formal protected under the NHRA 1999.

The site is situated approximately 70m north of the Alternative Construction Road. The site will not be impacted on by development, but it is recommended that the developer ensures that temporary conservation measures be in place for the tenure of development to avoid accidental impact on the site.

- ***RECOMMENDATIONS:*** Site RH-25 is inferred to pre-date 60 years of age and is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site is situated approximately 70m north of the Alternative Construction Road.
  TEMPORARY CONSERVATION –
  1. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.

Plate 79: View of a portion of the Site RH-25 main 'kraal'

❖ Site RH-26 – Livestock Enclosure, Colonial Period – S29°28'07.9"; E23°54'20.0"

Site RH-26 comprises of the low rising, rectangular, stone wall remains of a former livestock enclosure, measuring approximately 7x7m in size, with walls still standing in places to more or less 40cm in height. The site will not be impacted on by development but temporary conservation measures during construction of the power line and the Alternative Construction Road are recommended, to ensure no accidental impact on the site. (Both development aspects are situated more than 150m from the site.)

- ***RECOMMENDATIONS:*** Site RH-26 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by development; temporary conservation measures recommended are merely to ensure no accidental impact on the site.

  TEMPORARY CONSERVATION –

  1. Temporary conservation measures (temporary fence of construction netting or a similar visually clear demarcation) should be in place for the tenure of the construction phase. The site should be temporarily sign-posted as '*No entry – Heritage Site*'. Temporary conservation measures should be removed after construction.

Plate 80: General view of Site RH-26

❖ Site RH-27 – Stone Age Occurrence - S29°28'16.3"; E23°54'24.1"

Site RH-27 was first recorded and reported on by Van Ryneveld (2013a) and described as: '*…characterized by red Hutton sand scattered with surface raw material nodules amongst which the artefacts are found. Artefacts are produced from the variety of raw material present, including quartzitic material and dolorite but with a notable preference of siliceous material specifically for the production of LSA microlithic samples. The assemblage(s) comprises of mixed MSA and LSA tools, with the MSA preliminary ascribed to a Volman (1984) MSA3 and with the LSA, as mentioned, with an unexpected emphasis on microlithic samples. Microlithic samples are estimated to easily comprise 70% of the collections' artefacts. Artefact ratios (artefacts: m²) vary quite radically, and also within the recorded occurrence extend(s), but with a rough average of 10-15:1 recorded.*'

[A 2nd occurrence of similar nature was identified and described as SA-A1.2 (van Ryneveld 2013a), the occurrence locale now, with amended impact areas relating to the Rooikat versus the initially proposed *South Hydroelectric Power Site* will no longer be affected by development.]

The site will be affected by proposed power line alignments and is in direct proximity to the Alternative Construction Road.

- ***RECOMMENDATIONS:*** Site RH-17 is ascribed SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly affected by power line alignments, although these may well be implemented with little impact on the actual site locale, proximity thereto, and proximity of the power / switching station and the Alternative Construction Road does necessitate Phase 2 mitigation prior to development impact.
  PHASE 2 MITIGATION –
  1. It is recommended that a systematic surface collection coined with test pitting be done at Site RH-06 to ensure collection of a representative sample of the identified deposit type. Phase 2 mitigation should be done under a SAHRA Excavation Permit.
  2. Upon submission of a Phase 2 report the developer should apply for a SAHRA Site Destruction Permit to ensure legal development impact on the site.

Plate 81: Selected artefacts from Site RH-27

❖ Site RH-28 – Stone Age Occurrence, MSA & LSA – S29°28'15.5"; E23°55'49.5"

The Site RH-28 low density Stone Age occurrence is situated high on the river bank slopes above the maximum inundation level. The occurrence is typified by widespread Middle and Later Stone Age (MSA & LSA) lithic artefacts, covering an approximate 40x30m area. Artefacts were found in an ex-situ surface context without any inferred stratigraphic depth and produced from a variety of mixed raw material, including hornfels, granite, a variety of siliceous material, quartzite and quartz. The maximum artefact ratio (artefacts: m²) recorded equals 3:1, but a realistic average for the occurrence would be ≤1:1. The significance of the occurrence is based on the notable lack of Stone Age sites on the north bank in comparison with the number of sites recorded on the south bank, and inferred to be a direct result of the steep north bank slopes in comparison with the more subbtle gradients of the south bank.

- ***RECOMMENDATIONS:*** The Site RH-28 low density MSA & LSA lithic occurrence is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will not be impacted on by inundation levels. No additional conservation measures on behalf of the developer are recommended.

Plate 82: Selected artefacts from Site RH-28

❖ Site RH-29 – Cemetery, Colonial Period – S29°28'40.9"; E23°55'45.1"

Site RH-29 comprises an informal Colonial Period cemetery containing 4 identifiable stone cairn graves. None of the graves have headstones making further identification thereof impossible. The site is directly linked with the nearby residential site (Site RH-30), giving the impression that it may well relate to early Colonial prospecting, providing for a rough late 1860's / early 1870's date, or soon thereafter.

The site will be impacted on by inundation levels and a Phase 2 Grave Relocation project should precede development. [Preliminary consultation with the *Die Erfenisstigting* indicated that they would be interested in, in the event of re-internment of the graves, to accommodate this at the Doornbult heritage site, a site currently proposed as a *Grade I National Heritage Site* (Pers. Comm.: Cecilia Kruger, Die Erfenisstigting, 2014). Motivation behind this proposal is based on the more focused conservation efforts at Doornbult, that at the local municipal cemetery.]

- ***RECOMMENDATIONS:*** Site RH-29 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *High Significance* and a *Generally Protected IV-A Field Rating*.
  PHASE 2 GRAVE RELOCATION –
  1. The site will be directly impacted on by inundation levels and a Phase 2 Grave Relocation project should precede development. SAHRA requirements pertaining to Phase 2 Grave Relocation projects include projects to be managed an ASAPA PI accredited Grave Relocation specialist under a SAHRA permit. In addition minimum standards for Grave Relocation include formal advertising of the site and the SAHRA prescribed social consultation process.

Plate 83: Selected graves from the RH-29 informal cemetery

❖ Site RH-30 – Settlement, Colonial Period – S29°28'44.9"; E23°55'48.7"

Site RH-30 is characterized by the ruined stone wall remains of an approximate 7x3m rectangular structure. The remains are interpreted as early prospecting residential remains without any identifiable sub-divisions in the interior of the structure. A linear wall is attached to the northern side of the site. Aside from a few pieces of rusted metal, including mainly wire, no surface artefacts were present and no associated middens could be identified. In close proximity to the stone wall remains is the surface identifiable evidence of an associated well / pit (S29°28'46.1"; E23°55'48.6"). The feature is characterized by a clear circular mud-brick outline, measuring approximately 1m in diameter. Stone remains in the area are interpreted as a paved platform surrounding the well / pit. Post-depositional water impact has negatively affected the feature. Further investigation is necessary to identify the remains, either as a small well ensuring water for the nearby settlement or alternatively as a cooking place. Settlement remains at Site RH-30 is directly associated with the Site RH-29 informal cemetery.

According to Rina Wiid (local historian, Doornbult heritage site) site remains, including the direct association with the Site RH-29 informal cemetery, may well be an early diamond prospecting camp, considering specifically its location near an Orange tributary mouth. According to Wiid many a poor white flocked to the area in the late 1860's / early 1870's after the discovery of diamonds in the area, consequently many a small prospecting camp raised, many of which fell without much success. Known 'ephemeral' prospecting camps include residences under wagons and zinc '*shacks*'. Site remains at Site RH-30 may well be indicative of a slightly more 'permanent' setup, marking the remains of a more temporary material used for the remainder of the residence such as tarpaulin or zinc. The Site RH-30 settlement site will be impacted on by inundation levels and Phase 2 mitigation, including site specific recording and test pitting should precede development.

- ***RECOMMENDATIONS:*** Site RH-30 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly impacted on by inundation levels.
  PHASE 2 MMITIGATION –
  1. The site should be formally recorded (mapped) and Phase 2 inspection by means of test pitting to further identify site features should be done prior to development impact. The Phase 2 archaeological mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report submitted to SAHRA.
  2. After Phase 2 mitigation the developer should apply for a destruction permit for the site to ensure that the site be legally destroyed.

Plate 84: View of the Site RH-30 residential stone wall remains

Plate 85: Close-up of stone walling at Site RH-30

Plate 86: View of the Site RH-30 well / pit remains

❖ Site RH-31 – Stone Wall, Colonial Period – S29°28'45.3"; E23°55'46.8"

The Site RH-31 Colonial Period rectangular shaped stone walling comprises the remains of a former structure, most possibly a livestock enclosure, but use for settlement purposes cannot be excluded. The structure remains measures more or less 3x4m in size with walls still standing to approximately 20cm in height. No surface artefacts or middens were found in the general vicinity of the site. Based on proximity the site may well be associated with Site RH-30. The site will be impacted on by inundation levels of the Rooikat development.

- ***RECOMMENDATIONS:*** Site RH-31 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site has effectively already been destroyed, with little of mitigation worthy archaeological remains left at the locale for further interpretation.
  DESTRUCTION UNDER SAHRA PERMIT –
  1. It is recommended that the site be destroyed under a SAHRA Site Destruction Permit.

Plate 87: General view of Site RH-31

❖ Site RH-32 – Stone Age Occurrence, LSA – S29°28'45.3"; E23°55'49.4"

The Site RH-32 assemblage is inferred to represent the McGregor Museum record referenced as National Site Nr 2923BD-024, being situated approximately 50m south east of the museum locale. The site is situated on the silt river terrace, with evident fluvial post-depositional impact on the site. Artefacts comprise primarily of Later Stone Age (LSA) macrolithic tools, but including a number of microlithic samples, produced from a variety of raw material sources, with an emphasis on fine grained granite and siliceous material. Despite water impact on the site artefact densities are still fairly high with an artefact ratio (artefacts: m²) of ≥5:1 recorded. Fragmented ostrich eggshell formed a notable component to the surface artefact collection, whilst a single piece of ceramic was located. The association of the ceramic with the LSA deposit is however questionable: The ceramic piece is a thick walled piece, where thin walled ceramic is as a norm associated with typical LSA occurrences. The ceramic may thus well also be associated with the nearby Colonial Period remains, where it is known that early settlers also made vessels from local clay.

Site RH-32 will be directly impacted on by maximum inundation levels.

- ***RECOMMENDATIONS:*** Site RH-32 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly impacted on by maximum inundation levels.
  PHASE 2 MITIGATION –
  1. It is recommended that a Phase 2 mitigation project precedes development in the area. Phase 2 mitigation should be done under a SAHRA Excavation Permit and a Phase 2 report submitted to SAHRA.
  2. Upon submission of the Phase 2 report the developer should apply for a SAHRA Site Destruction Permit to ensure that the remainder of the site be legally destroyed by development.

Plate 88: Selected artefacts from Site RH-32

❖ Site RH-33 – Rock Art Panels & Lithic Artefacts, MSA & LSA – S29°28'43.3"; E23°55'40.8"

Site RH-33, recorded in the McGregor Museum database as National Site Nr. 2923BD023, and in the landowner, Leon Ferreira's records as Historical Site 1, is situated on a prominent dolerite outcrop overlooking the Orange. A number of Rock Art panels are present at the site, with at least 30 observed during the survey. More panels may be present, situated further down slope of the hill, while the possibility of panels subjected to hill wash should not be excluded. All art comprise of pecked engravings (petroglyphs), with a wide variety of motives depicted, including primarily human and animal figurines. Anthropomorphic figurines, lines and dots seem to have been by far secondary '*ganres*' of depiction. Many panels are however quite weathered, making it impossible to identify the original motive.

The outcrops itself is literally scattered with lithic tools, clustered together in solution pockets between dolerite boulders. Identified lithics are primarily ascribed to the Later Stone Age (LSA), and including a variety of macrolithic and micolithic types, with an evident admixture of Middle Stone Age (MSA) samples. Raw material use seems to have centered on siliceous types, but including the variety of river pebble sources, local dolerite and hornfels. A description of artefact density remains problematic; the result of artefacts being clustered in solution pockets, resulting in notably unequal, secondary context distribution patterns. However, artefact densities remain notably high with a rough estimated artefact ratio (artefacts: m^2) being ≥20:0.25. Typical flake technology remains prominent, with flakes, scrapers and cores being the primary types.

The site will not be directly impacted on by inundation levels, being situated approximately 100m from the maximum inundation level. However, considering the significance of the site, proximity to the study site does call for additional recording of the Rock Art. McGregor Museum records indicate that a sample of the Stone Age record at the site has already been excavated.

- ***RECOMMENDATIONS:*** Site RH-33 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will not be directly impacted on by development, but proximity of the site, and its significance to the inundation area does call for additional recording and monitoring.
  PHASE 2 RECORDING & MONITORING & PERMANENT SIGN POSTING –
  1. It is recommended that the Rock Art be formally recorded (rubbed / traced) and monitored annually for at least 5 years after development. (Should flood lines necessitate removal of the Rock Art panels provision therefor should be made and relocation of the panels be arranged under a SAHRA permit.)
  2. Additional Stone Age mitigation is not recommended. McGregor Museum records indicate that a sample of the Stone Age deposits has already been excavated.
  3. It is preferable that the site be permanently sign posted. The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:

     > Site RH-33
     > Rock Art Panels & Lithic Artefacts
     > This site is formally protected by the NHRA 1999

Plate 89: General view of Site RH-33

Plate 91: Engraving of antelope [1]

Plate 90: Pecked engraving of female figurine

Plate 92: Selected artefacts from Site RH-33

Plate 93: Weathered engraving with, the original motive no longer identifiable

Plate 94: Clustered artefact densities at Site RH-33

Plate 95: Engraving of roan antelope

Plate 96: Engraving of antelope [2]

- Site RH-34 – Settlement, Colonial Period & Stone Age Occurrence, MSA & LSA – S29°28'57.7"; E23°55'52.8"

The Colonial component of Site RH-34, also recorded in landowner Leon Ferreira's heritage records as Historical Site 2, is characterized by an approximate 30x20m open saddle clearing. The clearing itself is representative of former occupation, but with little surface traces it is inferred that related structures may have been built of organic material coined with make-shift building material such as tarpaulin and zinc that were pertinently removed. Such interpretation is in accord with reports of early prospecting settlements, where Rina Wiid (local historian, Doornbult heritage site) has reported on known settlements where prospectors lived in wagons and make-shift camps raised across the countryside. In direct proximity to the clearing is further evidence of Colonial Period settlement, including the circular remains of a stone built livestock enclosure, measuring approximately 2.5m in diameter, with walls still standing to more or less 50cm in height. At least 2 piles of stone can be interpreted as former platforms, both measuring approximately 2m in diameter, while partial stone wall remains runs for more or less 6m in length, standing to no higher than 40cm. Slightly uphill from the saddle clearing the remains of a 2nd small circular stone built livestock enclosure is present, again measuring more or less 2.5m in diameter. On a nearby rock weathered Colonial Period graffiti may host the inscription 'JC'. Surface artefacts are concentrated in the cleared area and including high frequencies of rusted metal as well as broken glass and porcelain pieces, representing a number of vessels, but without any diagnostic pieces identified during the surface survey. A large lower grinder may be associated with Colonial Period occupation of the site, but may well rather form part of the Stone Age occupation level immediately underlying Colonial Period remains.

Stone Age artefacts are scattered about the surface of the Colonial Period site and up along the slopes around the saddle clearing. Lithics include a mixture of Middle and Later Stone Age (MSA & LSA) types, produced from a variety of raw material sources, including granite, hornfels and a variety of fine grained metamorphic and siliceous types, not geological types present from the immediate hillside and thus inferred to represent a variety a river cobble types collected from closer to the Orange. Artefacts are typologically ascribed to a rough Volman (1984) MSA 2b-3, while both macrolithic and microlithic types are present on site – evidence of a rather disturbed, lag surface deposit. At the saddle clearing, the area where the highest concentration of artefacts were observed, artefact ratios (artefacts: m²) of up to 10:1 were recorded. Flake-blade and scraper types dominate the MSA component of the assemblage, while the LSA is represented by a number of scraper types and microliths produced for scraper purposes or composite tools. The number of on-site cores indicates local production (knapping site).

The site is situated approximately 120m from the maximum inundation level and will not be impacted on by development.

- ***RECOMMENDATIONS:*** Site RH-34 is formally protected by the NHRA 1999. The combined Colonial Period and Stone Age site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will not be impacted on by development.
  PERMANENT SIGN POSTING –
  1. It is preferable that the site be permanently sign posted. The sign post should indicate that the site is formally protected by the NHRA 1999. Recommended inscription of the sign can read as:

     > Site RH-34
     > Colonial Period settlement & Stone Age site (MSA & LSA)
     > This site is formally protected by the NHRA 1999

Plate 97: View of the cleared area at Site RH-34

Plate 99: A stone feature (platform remains) at Site RH-34 [1]

Plate 98: A circular stone feature at Site RH-34

Plate 100: A stone feature (platform remains) at Site RH-34 [2]

Plate 101: Partial livestock enclosure remains at Site RH-34

Plate 103: Selected artefacts from Site RH-34

Plate 102: Close-up of a lower grinder

Plate 104: Colonial Period inscription 'JC' at Site RH-34

❖ Site RH-35 – Stone Age Occurrence, LSA– S29°29'06.1"; E23°56'36.5"

The low density Site RH-35 Later Stone Age (LSA) occurrence is characterized by the infrequent scatter of lithic artefacts (macro- and microliths) across the silty upper river terrace. Lithic artefacts were found in a too low density to attempt an artefact ratio (artefacts: m²) description. Artefacts were produced from a variety of raw material sources, but with an apparent focus on siliceous types. A low density of weathered and fragmented ostrich eggshell pieces were found on the surface of the site. Large scale impact on the site, including the construction of a pump station at the site locale but perhaps more importantly the evident fluvial impact on the site has destroyed any possible Phase 2 mitigation value: The site has in fact already been destroyed, with only faint traces of its former archaeological value, primarily relating to landscape use still left.

- ***RECOMMENDATIONS:*** The Site RH-35 low density LSA occurrence is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site has effectively already been destroyed.
  DESTRUCTION UNDER SAHRA PERMIT –
  1. It is recommended that the developer apply for a SAHRA Site Destruction Permit to ensure the legal destruction of the remainder of the site.

Plate 105: Surface deposits at Site RH-35

❖ Site RH-36 – Stone Age Occurrence, MSA & LSA– S29°29'19.8"; E23°58'39.8"

Site SH-RH-36 is situated on the silty riverbank context, in an erosion gully on a meander of the north bank. Occurrence size measures no more than 150x100m. Here a mixture of Middle and Later Stone Age (MSA & LSA) lithic artefacts were found, including both a macrolithic and microlithic LSA, with LSA types dominating the deposit. Stone artefacts were again produced from a variety of mixed raw materials, with an emphasis on siliceous types but including granites, hornfels and quartzite. Fragmented ostrich eggshell at the site is directly associated with the LSA occupation and use of the terrain. Lithic artefact ratios (artefacts: m²) remain fairly low with an average of 5:1. Despite the low artefact ratio and the seemingly disturbed context of the site, with post-depositional water impact having evidently taken its toll on the context of the site, Site RH-36 remain significant as the only occurrence of type discovered on the north bank and testimony to less intensive use of the north bank specifically during LSA times, but particularly useful for comparative purposes with similar type sites discovered on the south bank.

- ***RECOMMENDATIONS:*** The Site RH-36 low density MSA & LSA lithic occurrence is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. The site will be impacted on by inundation levels:
  PHASE 2 MITIGATION –
  1. It is recommended that a surface sample of the site be taken prior to development impact, primarily for comparative purposes with south bank type sites. Surface collection should be done under a SAHRA Collections Permit.
  2. After collection the developer should apply for a SAHRA Site destruction permit to ensure legal destruction of the site for development purposes.

Plate 106: Selected artefacts from Site RH-36 on the silty site context

❖ Site RH-37 – Rock Art Panels & Lithic Artefacts, LSA – S29°27'03.0"; E23°54'51.3"

Site RH-37 is situated on the south bank of the *Rooikat Hydroelectric Power Site*, at the dam wall. Proximity to the dam wall and maximum inundation levels threaten the site. The RH-37 locality was first recorded and reported on by Hein Potgieter (botanist). Here a number of Rock Art panels are located along the high lying ridge. Approximately 60 engraved images (petroglyphs) are scattered along the more or less 50-60m area. Images include geometric lines, but seemingly with little focus on human or anthropomorphic figurines and with an emphasis on animal motives, including a hippopotamus, a rare image of a tortoise, a number of images of eland and other antelope and an impressive engraving of a giraffe, but with the top part of the boulder (and the head of the giraffe) broken off. Both boulders and images show signs of natural decay, with some boulders broken and certain images faded to a degree that the original motive can no longer be identified. An infrequent scatter of Later Stone Age (LSA) artefacts, with quantities too low to ascribe an artefact ratio to the occurrence further described LSA activity on the ridge.

- ***RECOMMENDATIONS:*** Site RH-37 is formally protected by the NHRA 1999. The site is ascribed a SAHRA *Medium Significance* and a *Generally Protected IV-B Field Rating*. The site will be directly impacted on by construction of the *Rooikat Hydroelectric Power Site* dam wall and maximum inundation levels.
  PHASE 2 MITIGATION –
  1. It is recommended that the Rock Art be formally recorded (rubbed / traced) and arrangements made for the removal thereof to a SAHRA accredited repository. Phase 2 Rock Art recording and removal should be done under a SAHRA Permit and a Phase 2 report submitted to SAHRA.
  2. Upon submission of the Phase 2 report the developer should apply for a SAHRA Site Destruction Permit to legally destroy the site.

Plate 107: An engraved hippopotamus

Plate 109: Image of an eland [2]

Plate 108: Image of an eland [1]

Plate 110: Close-up of a tortoise on an engraved panel

Plate 111: Lines and geometrics comprise sparsely scattered images

Plate 112: Panel containing number of animal and perhaps human figurines

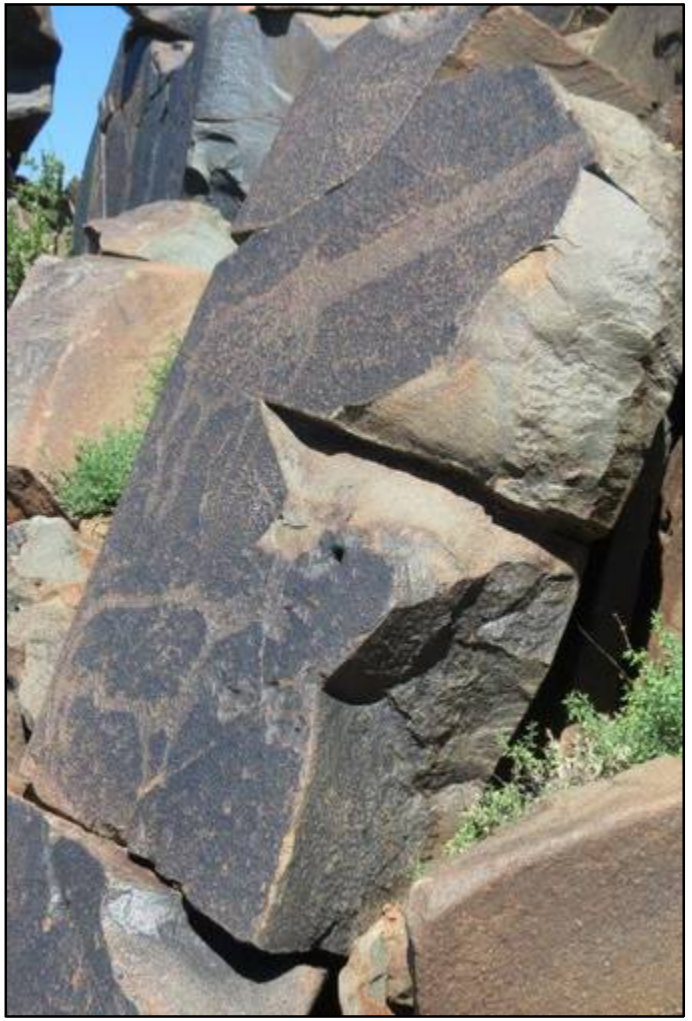
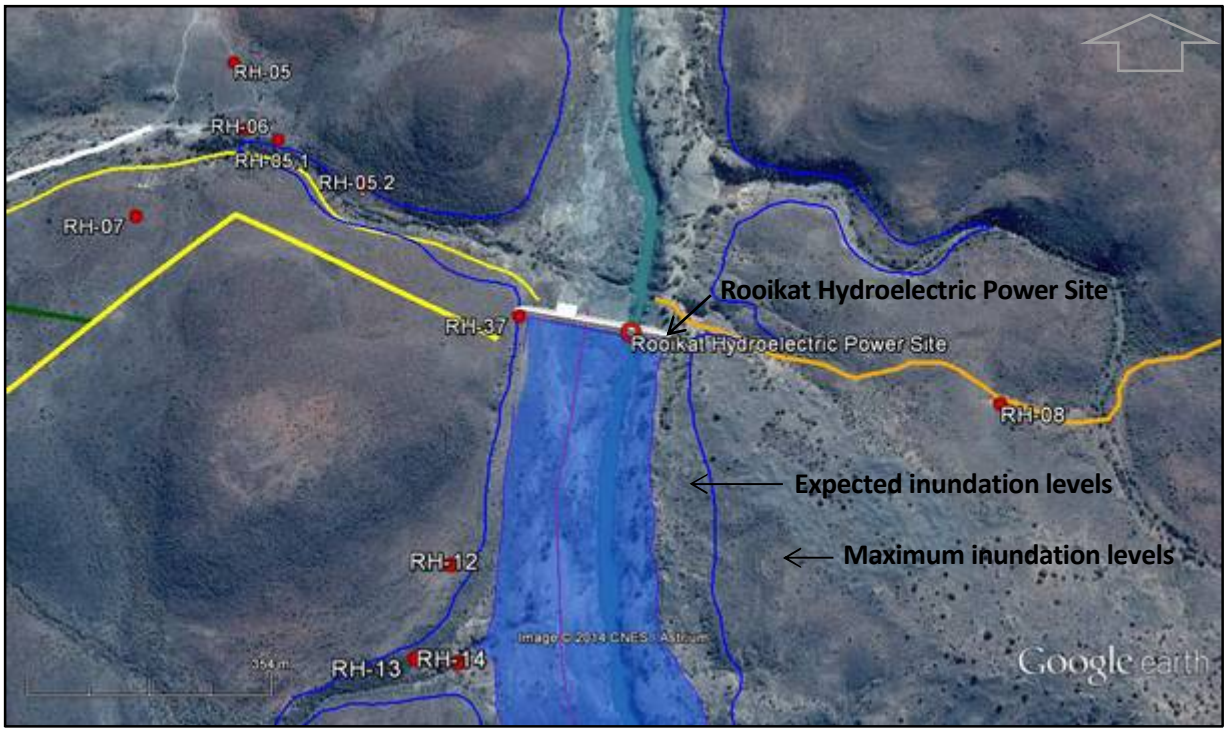


Plate 113: A large boulder displaying an engraved giraffe and eland

2.2.2) DEVELOPMENT ASPECTS

- The Rooikat Hydroelectric Power Site



Map 6: Close-up of the *Rooikat Hydroelectric Power Site*

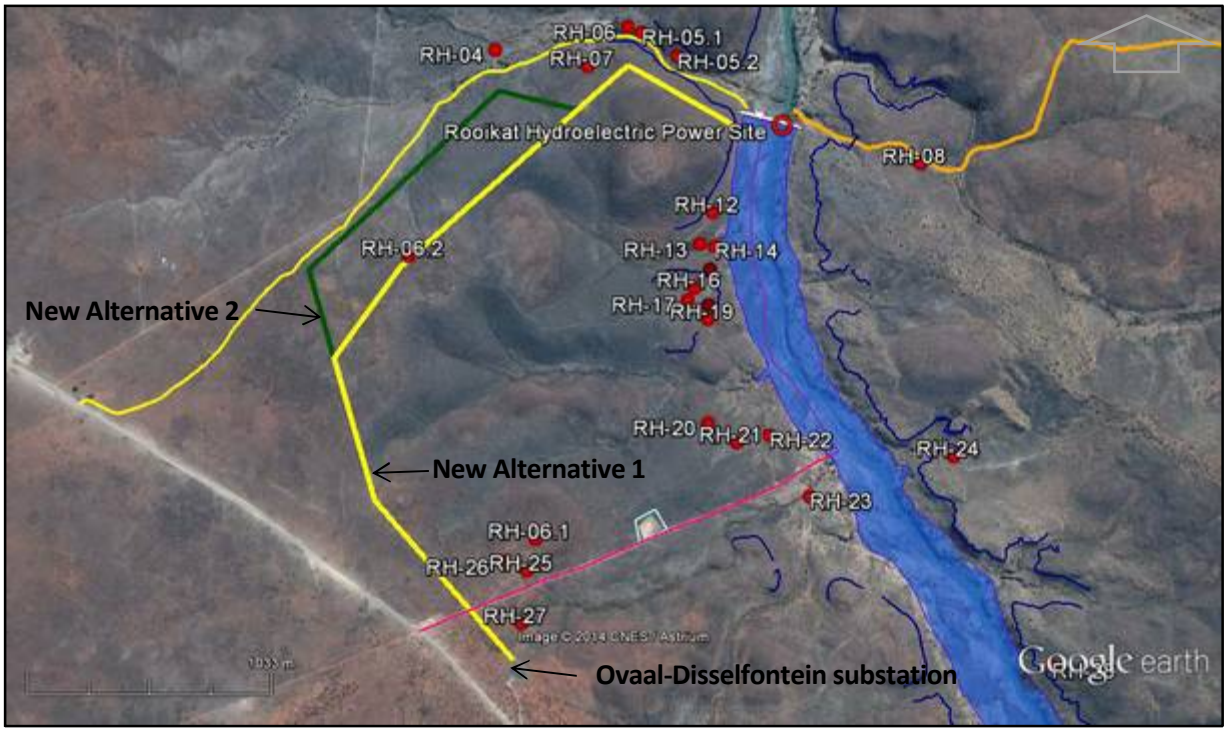
Directly applicable to development of the *Rooikat Hydroelectric Power Site* would be recommendations for Sites RH-05, RH-06 and RH-37.

Figure 3: Modelled impression of the *Rooikat Hydroelectric Power Site* and dam wall (weir), with the power line and South Access Road alignments (left – yellow lines) and the North Access Road (right – orange line)

Plate 114: General view of the *Rooikat Hydroelectric Power Site* from the south bank

Plate 115: General view of the *Rooikat Hydroelectric Power Site* from the north bank

❖ The Power Lines



Map 7: Close-up of the power line alignments

Directly applicable to development of either the New Alternative 1 or New Alternative 2 power line would be recommendations for Sites RH-07, RH-25, RH-26, RH-27 and RH-37.

Directly applicable to the relevant substation / switching site would be recommendations for Site RH-27.

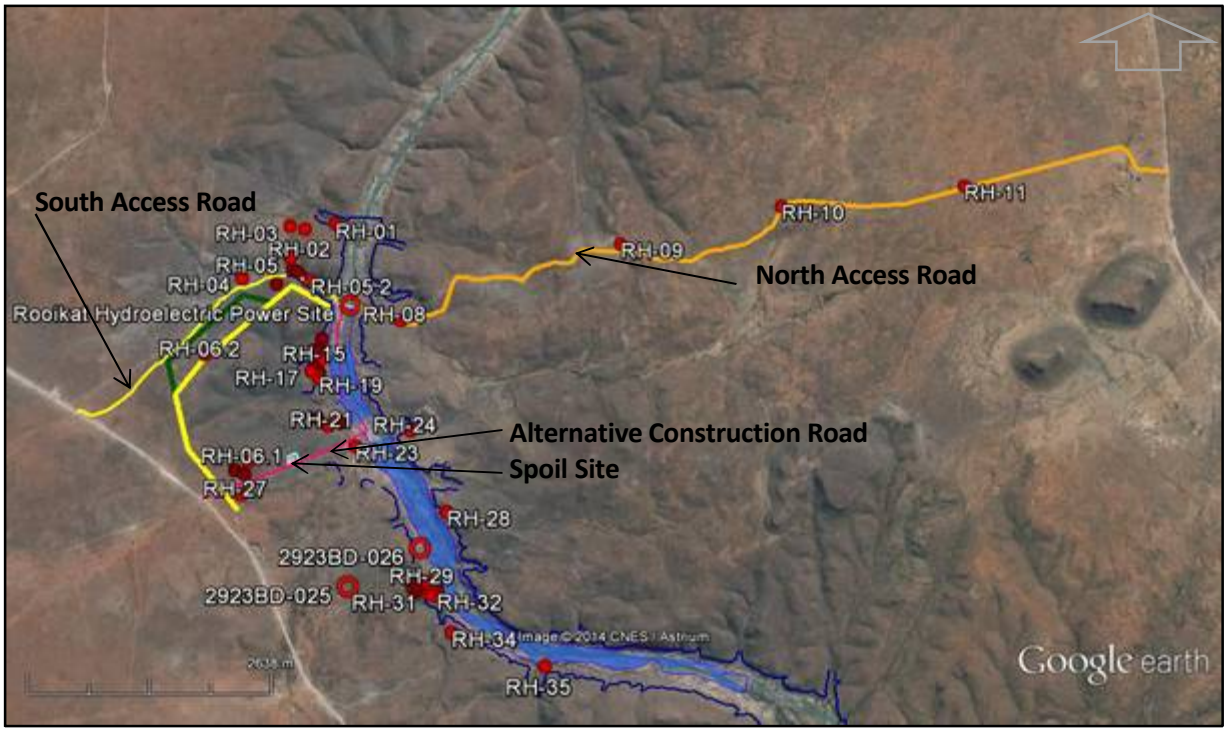
Plate 116: View of the New Alternative 1 & 2 power lines from the Ovaal-Disselfontein sub-station

Plate 117: View of the power lines along the Ovaal-Disselfontein alignment

Plate 118: General view of the New Alternative 1 running in a NE direction

Plate 119: General view of New Alternative 2 running in a NE direction

❖ The Access Roads



Map 8: Close-up of the access roads

Directly applicable to development of the South Access Road would be recommendations for Sites RH-04, RH-05, RH-06 and RH-07.

Directly applicable to development of the North Access Road would be recommendations for Sites RH-08, RH-09, RH-10 and RH-11.

Directly applicable to development of the Alternative Construction Road (and use of the spoil site along the road portion) would be recommendations for Sites RH-12, RH-13, RH-14, RH-15, RH-16, RH-17, RH-19, RH-20, RH-21, RH-22, RH-23, RH-25, RH-26 and RH-27.

Plate 120: General view of the South Access Road [1]

Plate 122: General view of the South Access Road [3]

Plate 121: General view of the South Access Road [2]

Plate 123: View of the South Access Road in the vicinity of the weir

Plate 124: General view of the North Access Road [1]

Plate 126: General view of the North Access Road [3]

Plate 125: General view of the North Access Road [2]

Plate 127: View of the North Access Road in the vicinity of the weir

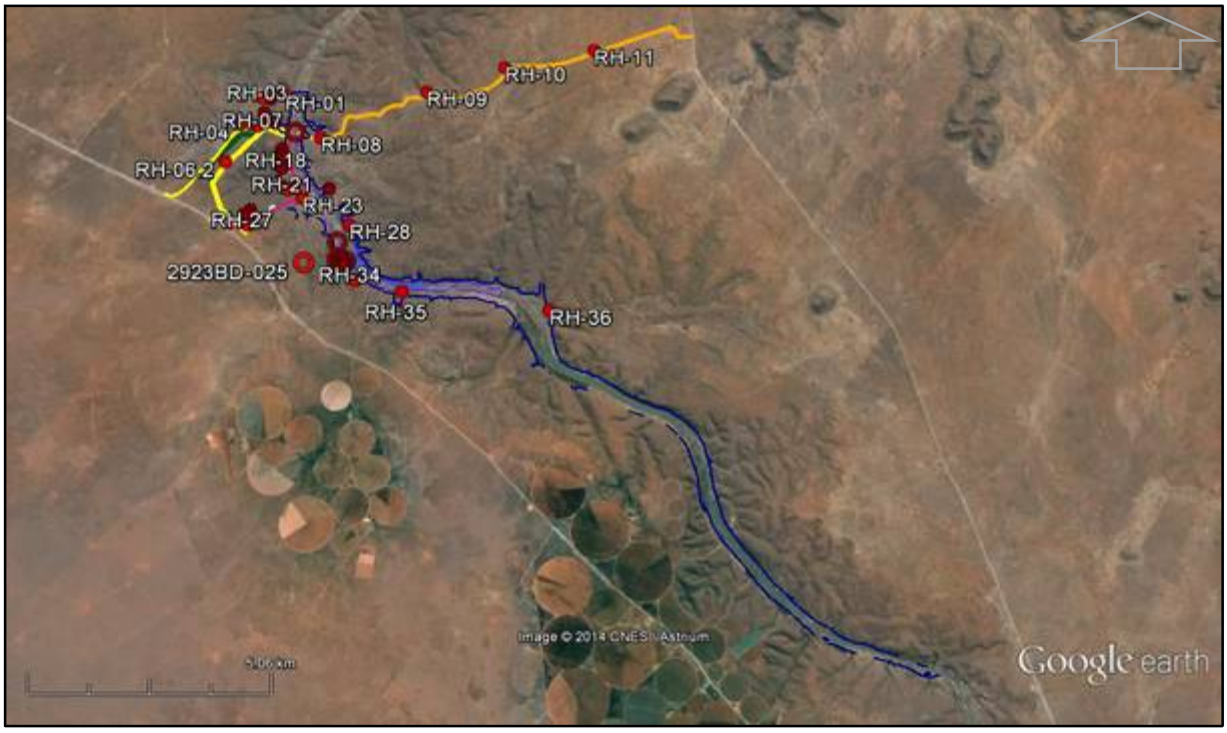
Plate 128: General view of the Alternative Construction Road [1]

Plate 130: General view of the Alternative Construction Road [2]

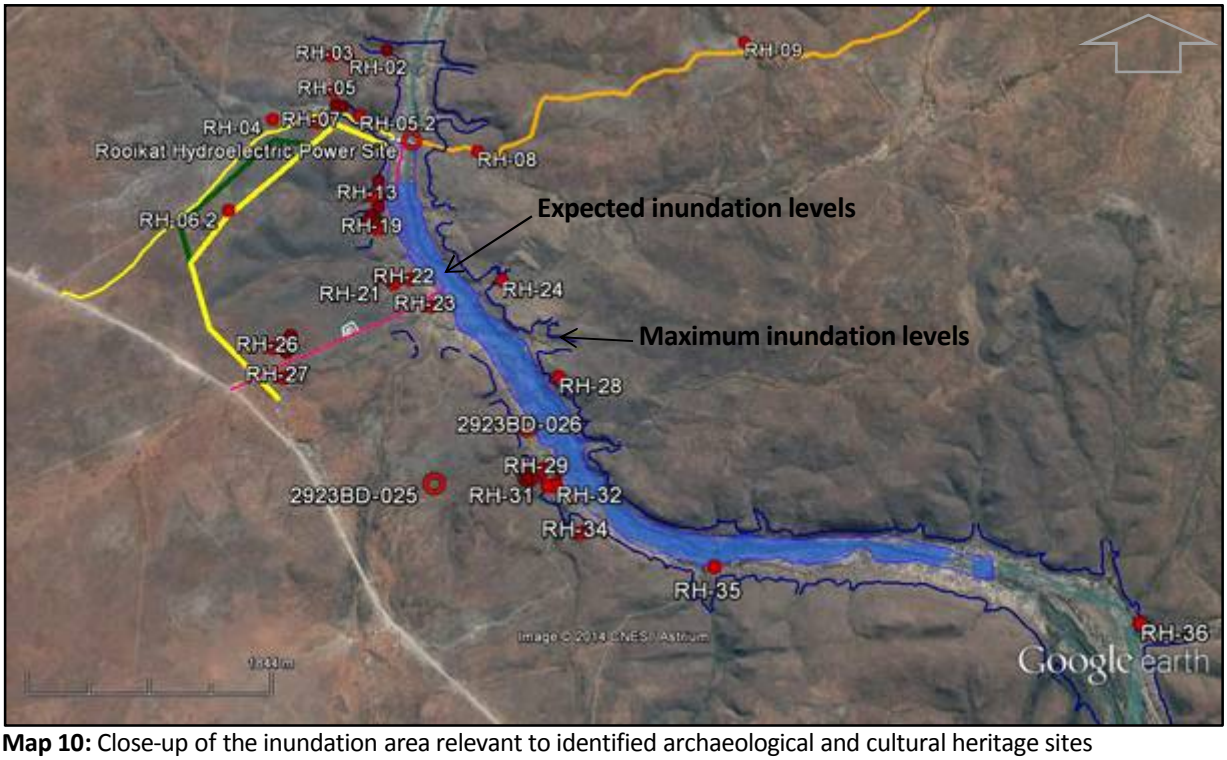
Plate 129: View of the quarry / spoil site

Plate 131: The Alternative Construction Road route through the flood plain

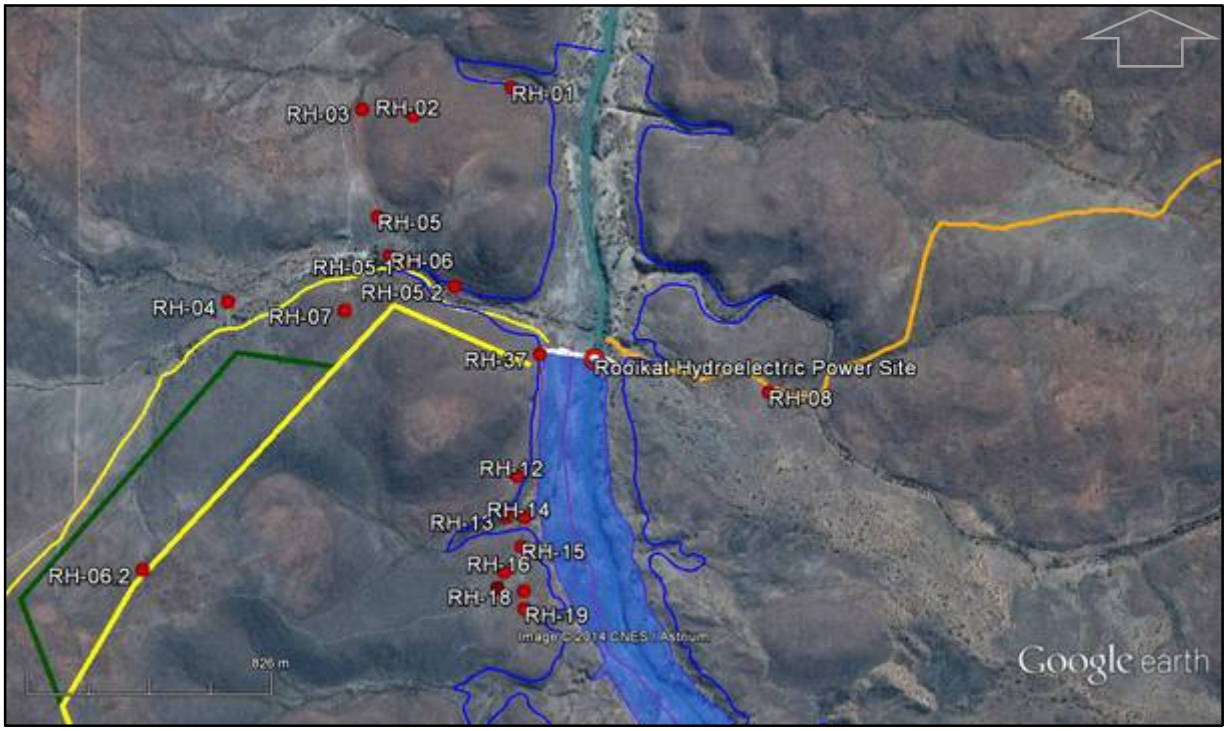
❖ The Inundation Area



Map 9: General view of the inundation area



Map 10: Close-up of the inundation area relevant to identified archaeological and cultural heritage sites



Map 11: Close-up of the inundation area [1]

Map 12: Close-up of the inundation area [2]

Map 13: Close-up of the inundation area [3]

Directly applicable to maximum inundation impact would be recommendations for Sites RH-01, RH-05, RH-06, RH-12, RH-13, RH-14, RH-15, RH-16, RH-17, RH-18, RH-19, RH-20, RH-21, RH-22, RH-23, RH-24, RH-28, RH-29, RH-30, RH-31, RH-32, RH-33, RH-34, RH-35, RH-36 and RH-37.

Plate 132: General view of the Inundation Area – South Bank [1]

Plate 134: General view of the Inundation Area – South Bank [3]

Plate 133: General view of the Inundation Area – South Bank [2]

Plate 135: General view of the Inundation Area – South Bank [4]

Plate 136: General view of the Inundation Area – South Bank [5]

Plate 138: General view of the Inundation Area – South Bank [7]

Plate 137: General view of the Inundation Area – South Bank [6]

Plate 139: General view of the Inundation Area – South Bank [8]

Plate 140: General view of the Inundation Area – North Bank [1]

Plate 142: General view of the Inundation Area – North Bank [3]

Plate 141: General view of the Inundation Area – North Bank [2]

Plate 143: General view of the Inundation Area – North Bank [4]

2.2.3) ENVIRONMENTAL IMPACT ASSESSMENT RATINGS

For each of the identified archaeological and cultural heritage sites an environmental rating is ascribed, based on the extent or spatial scale of the impact [E] (0 = None, 1 = Site specific, 2 = Local, 3 = Regional, 4 = National and 5 = International), the magnitude of the impact, both positive and negative [M] (0 = Zero, 2 = Very low, 4 = Low, 8 = High and 10 = Very high), the duration of the impact [D] (1 = Immediate, 2 = Short term, 3 = Medium term, 4 = Long term and 5 = Permanent), the probability of the occurrence [P] (1 = Improbable, 2 = Low probability, 3 = Medium probability, 4 = High probability and 5 = Definite), the irreplaceable loss of resources [I] (0 = None; 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Definite), the reversibility of potential impacts [R] (0 = No impact, 1 = Impact will be reversible; 2 = High potential for reversibility; 3 = Moderate potential for reversibility; 4 = Low potential for reversibility; 5 = Impact cannot be reversed) and cumulative impact (None, Low, Medium and High). A site significance point is assigned as follows SP (significance point) = (M + D + E + I + R) x P.

A maximum of 150 SP can be assigned to an impact. Environmental Significance [S] is assigned based on the SP as follows: <40 = Low [L]; 40-74 = Medium [M]; 75-99 = Medium-High [MH]; 100-124 = High [H] and 125-150 + Very High [H]. The significance can be either positive [+] or negative [-]. An impact of low [L] is likely to contribute to either + or – decisions about whether or not to proceed with the development, with little real effect and is unlikely to have an influence on project design or alternative motivation. An impact of M implies that if unmanaged could influence a decision on whether or not to proceed with development. An impact of MH is similar to M, with caution to mitigation options and alternative mitigation options should be investigated where possible. An impact of H could influence a decision about whether or not to proceed with development, regardless of available mitigation options and an impact of VH implies that a project cannot proceed and that impacts are irreversible, regardless of available mitigation options.

Environmental impact assessment ratings are grouped per sites with the same basic recommendation per site type or type of impact, with cognizance to the fact that impacts on heritage sites are as a norm irreversible and with cognizance to the SAHRA (2007) prescribed mitigation options per site significance rating weighed against possible natural impact.

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Site Conservation	**Sites: RH-02; RH-03; RH-04; RH-07; RH-08; RH-09; RH-10; RH-16; RH-17; RH-18; RH-24; RH-25; RH-26; RH-28; RH-34**	0	1	1	0	0	1	2	L	L -	0	1	1	0	0	1	2	L	L +
	Comment: Identified archaeological and cultural heritage sites [Stone Age & Colonial Period sites] that will be conserved by development. Conservation of the sites will provide for a low positive cumulative impact by development, based on basic site location and description adding value to the heritage database.																		
	Summary of mitigation points: **RH-02; RH-03; RH-16; RH-17; RH-18; RH-24; RH-28:** Conservation without additional heritage conservation requirements on behalf of the developer **RH-04:** Formal conservation & permanent sign posting **RH-07; RH-09; RH-25; RH-26:** Temporary conservation **RH-08:** Temporary conservation & permanent sign posting **RH-10:** Temporary conservation & slight realignment **RH-34:** Permanent sign posting																		

Table 5: Environmental significance assessment of sites that will be conserved by development

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Site Conservation	**Sites: RH-19; RH-33**	8 -	4	1	2	4	2	38	L	L -	8 +	4	4	4	4	3	72	MH	MH +
	Comment: Identified archaeological and cultural heritage sites [Rock Art and Stone Age deposits] that will be conserved by development. By virtue of recommended additional mitigation, conservation of these sites within a development framework will provide for a high positive contribution. Sites are deemed as with research value for future generations, with baseline recommended additional mitigation as basic recording platform for future research and conservation monitoring.																		
	Summary of mitigation points: **RH-19:** Phase 2 mitigation (Rock Art recording & Stone Age mitigation). Annual site monitoring & permanent sign posting **RH-33:** Phase 2 mitigation (Rock Art recording). Annual monitoring & permanent sign posting																		

Table 6: Environmental significance assessment of Rock Art sites that will be conserved by development with a Medium-High positive contribution

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Stone Age site Phase 2 mitigation	**Sites: RH-01; RH-06; RH-14; RH-15; RH-23; RH-27; RH-32; RH-36**	4 -	2	1	4	4	3	48	M	M -	6 +	2	3	4	3	3	54	M	M +
	Comment: Stone Age sites that will require Phase 2 mitigation, with the majority of sites threatened by natural weathering (post-depositional water impact, with the potential to destroy sites situated within the river flood plain in totality). Recommended Phase 2 mitigation will provide for a Medium positive contribution by development in allowing a more in depth investigation of a variety of Stone Age aspects with the potential to investigate selected aspects of the complexity of specifically LSA culture.																		
	Summary of mitigation points: **RH-01; RH-37:** Rock Art recording and removal **RH-06; RH-14; RH-23; RH-27; RH-32; RH-36:** Phase 2 mitigation of Stone Age deposits **RH-15:** Rock Art recording and removal and Phase 2 mitigation of Stone Age deposits																		

Table 7: Environmental significance assessment of Stone Age sites that will be impacted with recommended Phase 2 mitigation

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Colonial Period site Phase 2 mitigation	**Sites: RH-05; RH-11; RH-12; RH-21; RH-30**	4 -	2	1	4	4	3	48	M	M -	6 +	2	3	4	3	3	54	M	M +
	Comment: Colonial Period sites that will require Phase 2 mitigation, with many sites threatened by natural weathering (post-depositional water impact, with the potential to negatively continue to impact on sites situated within the river flood plain). Recommended Phase 2 mitigation will provide for a Medium positive contribution by development in allowing a more in depth investigation of a variety of Colonial Period cultural aspects, relating to early farming and prospecting / mining in the area.																		
	Summary of mitigation points: **RH-05:** Phase 2 mitigation, including site specific recording and test pitting. A portion of the site will be conserved, with recommendations for permanent sign posting **RH-11; RH-21:** Phase 2 mitigation as surety of possible impact **RH-12, RH-30:** Phase 2 mitigation																		

Table 8: Environmental significance assessment of Colonial Period sites that will be impacted with recommended Phase 2 mitigation

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Identified grave / cemetery sites that will be mitigated	**Sites: RH-13; RH-29**	8	3	3	4	4	3	66	M	M -	8	2	3	4	3	4	80	M	M +
	Comment: Grave / cemetery sites that will be impacted on by inundation levels, with site contexts at present threatened by natural weathering. Mitigation of sites will provide for a High positive contribution, ensuring rescue excavation of the LSA grave (RH-13) currently busy eroding out of context and exhumation and relocation of the Site RH-29 graves, with possibility of re-internment at the Doornbult heritage site.																		
	Summary of mitigation points: **RH-13:** To be done under SAHRA excavation permit, directly associated with Site RH-14 archaeological deposits **RH-29:** Phase 2 mitigation according to SAHRA Grave Relocation process																		

Table 9: Environmental significance assessment of identified grave / cemetery sites with recommended Phase 2 mitigation

Environmental Impact	Site Number	Environmental Significance																	
		Before Mitigation									After mitigation								
		M	D	E	I	R	P	SP	S	C	M	D	E	I	R	P	SP	S	C
Site Destruction under SAHRA permit	**Sites: RH-20; RH-22; RH-35**	0	1	1	0	0	1	2	L	L -	0	1	1	0	0	1	2	L	L +
	Comment: Destruction of sites under SAHRA Site Destruction Permits of sites that have little to no mitigation value and of which similar type sites have been recommended for Phase 2 mitigation will have no cumulative impact.																		
	Summary of mitigation points: **RH-20; RH-22:** Destruction under SAHRA permit as surety of possible impact **RH-35:** Destruction under SAHRA permit																		

Table 10: Environmental significance assessment of sites proposed for destruction under SAHRA Site Destruction Permits

2.3) CULTURAL LANDSCAPES AND VIEWSCAPES

A 'cultural landscape' refers to a particular geographic area that represents the unique combined work of man and nature (James & Martin 1981). The term has its origins in 16th Century Germany where 'cultural landscape' (*kultur landshaft*) implies 'shaped lands' to differentiate it from the 'original landscape' (urlandschaft), or the 'unaltered' landscape, prior to human impact (Sauer 1925). Sauer (1925) stresses the agency of culture as a force in shaping the visible features of the earth's surface in delimited areas where the physical environment retains a central significance, as the medium with and through which human cultures act. According to Sauer (1925) '*The cultural landscape is fashioned from a natural landscape by a cultural group. Culture is the agent, the natural the medium, the cultural landscape is the result.*'

In order to better understand the concept of 'cultural landscape' it is necessary to separate the term 'culture' to further our understanding of its many definitions. Within the anthropological arena culture is generally understood as a '*complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society*'. Culture is 'human culture' and is acquired through a learning process. Through culture people can adapt to their environment in non-genetic ways, so people living in different environments will often have different cultures, or will develop different cultures (Van Willigen 1986). An integral part of culture is change; be it the result of a changing natural environment to which the culture have to adapt or contact with another culture, the primary force of cultural change, and often the result of socio-political pressure. Els (1992) explains that cultural contact change usually occurs according to either the process of acculturation (dominating 'donor' culture) or the process of enculturation (dominating 'receiver' culture). Both cultural processes can be spontaneous, forced or guided; but cultural process is never a one-way street – any given cultural system is at once a 'donor' and a 'receiver'. The essence of cultural change lies in the restructuring of the parts so that a new cultural pattern results. Bourguignon (1979) highlights the fact that this 'restructuring' should center on the question of '*What changes are (were) necessary to make culture, as we know it, possible?*' Culture is thus a process of constant change and adaptation; psychologically, behaviorally, technologically, politically, economically and spiritually (religiously), collectively referred to as 'cultural evolution'. [Certain forms of society and culture could simply not have arisen before others; for example, industrial farming could not have been invented before simple farming, and metallurgy could not have developed without previous non-smelting processes involving metals (van Willigen 1986)].

When considering the concept of 'cultural landscape', taking cognizance of the vital force of change as an agent of culture, it is only logical that cultural change will be reflected in a changing cultural landscape.

The concept of 'cultural landscape' has also been adapted and developed within international heritage arenas (UNESCO 2005) as part of an international effort to reconcile one of the most encompassing dualisms in Western thought; those of 'nature'; and 'culture'. In so doing the World Heritage Committee has adopted 3 categories of 'cultural landscape', ranging from (a) those landscapes most deliberately 'shaped' by people, through (b) the full range of 'combined' works, to (c) those least evidently 'shaped' by people (yet highly valued). The 3 categories extracted from the UNESCO Committee's Operational Guidelines are as follows (Punnell 2006):

1. A landscape designed and created intentionally by man;
2. An 'organically evolved landscape' which may be a 'relict (or fossil) landscape' or a 'continuing landscape'; and
3. An 'associative cultural landscape' which may be valued because of the religious, artistic or cultural associations of the natural environment.

❖ The MSA and LSA Stone Age Cultural Landscape

The MSA and very specifically the LSA Stone Age cultural landscape of the *Rooikat Hydroelectric Power Site* can be described as an organically evolved fossil landscape least evidently shaped by humans, with little to no visual or physical impact altering the landscape itself. It is evident that natural resources across the landscape were exploited and utilized, with the Orange River having been a major draw card to the area. The variety of Stone Age sites and more precisely variety within the LSA type of deposits, ranging from knapping deposits further inland to the silt banks of the Orange, the numerous settlement sites, Rock Art panels and specifically the identified LSA grave, with the potential to closer attempt a reconstruction of the complexity of culture, raises the cultural heritage significance of the area considerably. However, considering the size of the study site, with effectively 17 Stone Age sites or occurrences identified (with cognizance to wide spread low density deposits across many a dolerite outcrop and selected plains areas), Stone Age impact on the landscape seems to have been low by comparison; a direct result of local geography and geology, with steep gradients along the banks of the Orange, associated with numerous 'flash' floods, the major deterring environmental factor for pre-historic occupation.

❖ The Colonial Period Cultural Landscape

The Colonial Period cultural landscape of the *Rooikat Hydroelectric Power Site* can be described as an organically evolved continuing landscape least evidently shaped by humans. Sparsely scattered Colonial Period farming and prospecting remains, dating from the rough 1850's onwards and more intensively after the discovery of diamonds in 1865, have had little impact on the landscape, with reference to visual or physical impact. A total of 20 Colonial Period resources were identified during the field assessment, with geo-referenced localities evident evidence of widespread use of the landscape, albeit with a focus on the banks of the Orange River and with of the more significant sites all situated within the maximum inundation area; directly associated with past floods having already impacted on these sites and with cognizance to the fact that natural floods will continue to do so. The Colonial Period cultural landscape thus largely in itself self-destructive, by virtue of the most prominent part of the landscape, the Orange River flood plain, having been the preferred Colonial Period landscape. Considering the vast expanse of the study site, recorded Colonial Period resources are, as with the case of the Stone Age resources, less than originally expected, with sites clustered along the downstream south bank, inferred again to be the result of local geography and geology, but at least in Colonial Period times closely associated with year round access to Hopetown for commodities, implying a close socio-economic cultural preference.

* * *

The proposed *Rooikat Hydroelectric Power Site* development will permanently alter the cultural landscape, both visually and physically. However, considering the low number of recorded resources in comparison with the vast size of the study site, the direct association between qualitative heritage resources recorded associated with what Sampson (1972) described as an '*altogether menacing (environment) to human survival*' and the fact that the majority of the more significant identified heritage resources are all situated within the Orange River flood plain, subjected to intermittent '*flash*' flood impact, with evidence of at least 1 pre-recorded site having been destroyed in totality, radically diminishes visual and physical impact of development on the cultural landscape. It is important to take cognizance of the fact that both the Pre-historical and Colonial Period cultural landscapes are in themselves

self-destructive by virtue of geographic possibility and choice of landscape use, with a pre-selection for the flood plain of the river and tributary mouths, subject to significant post-depositional water impact. The 'no development' option to ensure the status quo of sites and their context within the cultural landscape is not applicable in the context of the proposed *Rooikat Hydroelectric Power Site* development: The majority of the more significant heritage resources identified will inevitably, in time, be destroyed by natural floods. The Stone Age and Colonial Period cultural landscape of the *Rooikat Hydroelectric Power Site* is thus, as is, in a state of progressive regression. Development in this case may serve to timeously mitigate resources, replacing the current emphasis on 'site conservation' with mitigated 'site information' in the face of inevitable impact, by controlled mitigation associated with development rather than by the 'no development' option of natural weathering and flood destruction.

2.4) CUMULATIVE IMPACT

Cumulative effects can be defined as impacts which combine from different projects, resulting in significant change, which is larger than the sum of the individual impacts. Cumulative Effects Assessment (CEA) is, in South Africa, an emerging process in the field of Integrated Environmental Management (IEM). It aims to provide direction in the decision making process from a holistic point of view – through the understanding of impacts on past, present and future generations by broadening the spatial and temporal focus of Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA). It focusses on the consideration of long term changes, not only as the result of a single action or development, but the combined effects of many actions over time, and on the environment in order to guide the decision making process through an understanding of local, regional and global linkages (DEAT 2004). The concept of a tiered context analysis to guide the planning and decision making process is not new. Possibly in its simplest form, albeit from the field of architecture, Aliel Saarinen (1873 – 1950) explained: '*Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan.*'

CEA can be done as a stand-alone assessment or can be incorporated in the SEA through inclusion in the EIA, with the latter approach being preferred as a result of the more applied methodology inherent therein (DEAT 2004). When CEA principles are included in the EIA level, individual aspects thereof can already be addressed on specialist assessment level. DEAT (2004) prescribes a 2 tiered context for basic analysis, namely:

- Project based; and
- Regional based.

The principles of CEA are not lost on the South African heritage compliance arena, albeit in large limited to the project based level. The SAHRA (2007) guidelines state that: '*The legislation (NHRA 1999) require that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance be protected. Thus any assessment should make provision for the protection of ALL these heritage components, including archaeology, shipwrecks, battlefields, graves and structures over 60 years, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites and palaeontological sites and objects.*' It continues: '*Where possible archaeological and palaeontological sites should be saved, but where this is not possible, the loss of information about our heritage resources can be mitigated against or minimized through a process of excavation (or sampling) and dating of a representative sample of the evidence from the site. This allows us to record at least part of the history of the place*.' And '*When a Phase 1 is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. If however the Phase 1 forms a major component of an HIA it will be necessary to ensure that the study addresses such issues and complies with Section 38 of the National Heritage Resources Act.*'

The above describes the basic process of the SAHRA Heritage Impact Assessment (HIA), including the archaeological (AIA) and palaeontological (PIA) components thereof: Firstly as the type of sites that are protected and needs to be recorded during Phase 1 assessment, their documentation and associated relevant recommendations, either conservation or (Phase 2) mitigation and if the assessment formed a major part of the HIA for inclusion in an EIA, the need to assess the findings in a wider project based context. In practice this is often done by the cumulative description of identified impacts on the immediate receiving cultural environment: An archaeological and cultural heritage description of the impact of development on the cultural landscape and viewscape is a first tier cumulative context description, an interpretation of impact on a project based level.

Specialist input on a regional based level was requested with specific reference to hydroelectric developments in the Thembilihle and surrounding local municipal areas, and including specifically the proposed Kakamas, Riemvasmaak, Onseeprus and Meerkat hydro-electric facilities (Pers. Comm.: Mark Day, Enviroworks). Archaeological and cultural heritage information is available on SAHRIS for 2 of these projects, being the Kakamas (Morris 2010) and Riemvasmaak (Orton & Webley 2012) developments, thus limiting this discussion to only their inclusion.

At the Kakamas study site Morris (2010) identified a basic Stone Age – Colonial Period cultural sequence. Noteworthy in his assessment results is the number of LSA settlement sites found on the north bank of the Orange River, specifically in comparison with results of the Rooikat development, where land-use and settlement during the LSA was focused on the south bank of the river. Morris provides no specific interpretation for this settlement pattern, but it remains important to note that through systematic survey of defined geographic areas, such as required in CRM reconnaissance, it is possible to collect significant data relating to landscape archaeology, in cases with the potential to in itself be contributory to further research. Colonial Period resources identified include the '*Noordvoor*', or north canal, dated to 1908, together with a number of other structures, often associated with surface artefacts. In close proximity to the study site, situated at the upper end of Neus Island, is the Kakamas agricultural settlement, started in 1898. The settlement is known for its pioneering developments in hydro-electric power, with a generator brought into operation as early as 1924. The building which housed the generator is today a museum. This brings an interesting aspect to the proposed study site and following the general premise of 'cultural evolution', greatly adding to the technological heritage value of the immediate terrain.

At the Riemvasmaak study site Orton & Webley (2012) again identified a basic Stone Age – Colonial Period cultural sequence. They found widely scattered MSA and LSA occurrences coined with a number of Colonial Period structures, often associated with artefacts. Most prominently their survey yielded a vast array of graves and grave-like features. Identified Colonial Period heritage sites comprise a relatively recent, 20th Century cultural landscape. Orton & Webley (2012) alert the reader to possible concerns when they state that: '… *it should be noted that the community who created that landscape have given permission for development to proceed. This serves to temper the significance of the cultural landscape and the individual features of which it is comprised*.' Their statement focusses attention on the debate in Social Impact Assessment (SIA), in South Africa at present centering on socio-economic assessment, often at the cost of socio-cultural evaluation. Permission by a people to continue with development across their own cultural landscape may be strongly economically motivated, specifically considering the past political environment of South Africa and the associated economic marginalization of many cultural and minority groups. But the responsibility to uplift and development within a strong cultural environment is nothing new; the very subject matter of '*applied anthropology*', often simply called developmental anthropology (Van Willigen 1986). The issue here is thus not the concern identified, but the solution posed: The strategy that will be implemented to allow or further consider development, whilst uplifting a previously economically marginalized people, whereas ensuring that this will be culturally advantageous to the community, in generations to come.

Available archaeological and cultural heritage information from the Rooikat, the Kakamas and the Riemvasmaak projects establish a basic Stone Age – Colonial Period sequence: Since pre-historic times mankind has explored and exploited the Orange River as a significant, if not the most prominent natural feature on the landscape, resulting in the myriad cultures that established themselves around the river banks and further inland. With cognizance to the concept of 'cultural evolution' the question is not '*if*' the Orange will continue to be used, but rather '*how*' this will be done, that will shape the cultural landscape of the future. From the architectural industry Box (2007) offers a list of guidelines useful in the number of design and building decisions. First and foremost he states: '*Decide first where not to build*.' According to Box this as the key to intelligent site planning; once the decision has been made

where not to build, the choices of places to build or develop will reveal themselves. The best part of a site should be respected by not building on it; instead it is better to develop on the worst part, to '*cover it up*'. He explains this on other scales stating that: '*in a room decide where not to place furniture, and in a garden decide where not to place plants – these places are the best spaces for people.*' In the planning and design of development it is imperative to consider the design of space, not necessarily place: Supported by the principles of IEM, the design of natural 'space', cultural 'space' and the socio-economic 'space' between these 2 agents that will ensure a coherent and intelligible survival of the 'spaces' for generations to come.

* * *

Returning to the archaeological and cultural heritage component of the Rooikat development, it is important to weigh the choice of study site against Box's (2007) statement: '*Decide first where not to build*':

- To not build in Stone Age significant terraces of the Orange / Vaal basin.
  To build on a portion of the Orange where the river banks are characterized by steep slopes of little anthropogenic significance.
- To not build in areas where high densities of archaeological and cultural heritage sites are present.
  To build in an area characterized by sparse site distribution.
- To not build in an area where significant archaeological sites will be negatively impacted by development.
  To build in an area where the majority of sites that will be affected by development are threatened by natural weathering – with evidence of natural impact having already resulted in total site destruction.
- To not build in an area where intangible or ambient cultural heritage concerns may negatively impact on future generations.

3) RECOMMENDATIONS

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Rooikat Hydroelectric Power Site*, Orange River (near Hopetown), Thembilihle Local Municipality, Northern Cape, proceed as applied for provided the developer comply with the below listed heritage compliance requirements per development aspect:

THE ROOIKAT HYDROELECTRIC POWER SITE				
Site Code	Alternative Site Name	Site Description	Co-ordinates	Recommendations
RH-01	-	Rock Art, LSA	S29°26'33.1"; E23°54'47.8"	Phase 2 mitigation
RH-02	-	Stone wall, Colonial Period	S29°26'36.3"; E23°54'35.2"	Conservation – no additional requirements
RH-03	-	Knapping site, MSA & LSA	S29°26'35.6";E23°54'28.6"	Conservation – no additional requirements
RH-04	-	Cemetery, Colonial Period	S29°26'57.1"; E23°54'11.3"	Formal conservation & permanent sign posting
RH-05	SH-S2 (VR 2013a)	Farmstead, Colonial Period	S29°26'47.6"; E23°54'30.6"	Phase 2 mitigation & permanent sign posting
RH-06	SH-A2.3 (VR 2013a)	Stone Age occurrence, MSA & LSA	S29°26'52.0"; E23°54'32.1"	Phase 2 mitigation
RH-07	-	Rock Art, LSA	S29°26'58.1"; E23°54'26.3"	Temporary conservation
RH-08	-	Cemetery, Colonial Period	S29°27'07.3"; E23°55'20.8"	Temporary conservation & permanent sign posting
RH-09	-	Livestock enclosure, Colonial Period	S29°26'31.4"; E23°56'50.9"	Temporary conservation
RH-10	-	Livestock enclosures, Colonial Period	S29°26'11.4"; E23°57'57.9"	Temporary conservation & slight realignment
RH-11	-	Settlement, Colonial Period	S29°25'57.4"; E23°59'15.3"	Phase 2 mitigation OR Temporary conservation and realignment (including Phase 1 AIA of realigned road)
RH-12	-	Settlement / lookout point, Colonial Period	S29°27'16.7"; E23°54'48.4"	Phase 2 mitigation
RH-13	-	Grave, LSA	S29°27'21.3"; E23°54'46.9"	Phase 2 mitigation
RH-14	-	Settlement, LSA	S29°27'21.4"; E23°54'49.3	Phase 2 mitigation
RH-15	-	Rock Art panels & lithic artefacts, (MSA &) LSA	S29°27'24.7"; E23°54'48.9"	Phase 2 mitigation
RH-16	-	Stone wall, Colonial Period	S29°27'27.5"; E23°54'46.7"	Conservation – no additional requirements
RH-17	SH-S3 (VR 2013a)	Livestock enclosure, Colonial Period	S29°27'29.3"; E23°54'45.8"	Conservation – no additional requirements
RH-18	-	Stone wall, Colonial Period	S29°27'31.7"; E23°54'49.2"	Conservation – no additional requirements
RH-19	-	Rock Art panels & lithic artefacts, LSA	S29°27'31.7"; E23°54'49.3"	Phase 2 mitigation. Annual site monitoring & permanent sign posting
RH-20	-	Livestock enclosure, Colonial Period	S29°27'46.2"; E23°54'50.9"	In situ conservation OR Destruction under SAHRA permit
RH-21	-	Livestock enclosure, Colonial Period	S29°27'48.5"; E23°54'55.8"	In situ conservation OR Phase 2 mitigation
RH-22	-	Artefact occurrence, MSA & LSA	S29°27'47.1"; E23°55'00.9"	In situ conservation OR Destruction under SAHRA permit
RH-23	-	Settlement, (MSA &) LSA	S29°27'55.1"; E23°55'08.3"	Phase 2 mitigation
RH-24	-	Livestock enclosures, Colonial Period	S29°27'47.6"; E23°55'30.7"	Conservation – no additional requirements

RH-25	SH-S4 (VR 2013a)	Livestock enclosure, Colonial Period	S29°28'08.9"; E23°54'24.2"	Temporary conservation
RH-26	-	Livestock enclosure, Colonial Period	S29°28'07.9"; E23°54'20.0"	Temporary conservation
RH-27	-	Stone Age occurrence, MSA & LSA	S29°28'16.3"; E23°54'24.1"	Phase 2 mitigation
RH-28	-	Stone Age occurrence, MSA & LSA	S29°28'15.5"; E23°55'49.5"	Conservation – no additional requirements
RH-29	-	Cemetery, Colonial Period	S29°28'40.9"; E23°55'45.1"	Phase 2 grave relocation
RH-30	-	Settlement, Colonial Period	S29°28'44.9"; E23°55'48.7"	Phase 2 mitigation
RH-31	-	Stone wall, Colonial Period	S29°28'45.3"; E23°55'46.8"	Destruction under SAHRA permit
RH-32	MMK 2923BD-024	Stone Age occurrence, LSA	S29°28'45.3"; E23°55'49.4"	Phase 2 mitigation
RH-33	MMK 2923BD-023 Historical Site 1	Rock Art panels & lithic artefacts, MSA & LSA	S29°28'43.3"; E23°55'40.8"	Phase 2 Rock Art recording & monitoring and permanent sign posting
RH-34	Historical Site 2	Settlement, Colonial Period and Stone Age occurrence, MSA & LSA	S29°28'57.7"; E23°55'52.8"	Permanent sign posting
RH-35	-	Stone Age occurrence, LSA	S29°29'06.1"; E23°56'36.5"	Destruction under SAHRA permit
RH-36	-	Stone Age occurrence, MSA & LSA	S29°29'19.8"; E23°58'39.8"	Phase 2 mitigation
RH-37	-	Rock Art panels & lithic artefacts, LSA	S29°27'03.0"; E23°54'51.3"	Phase 2 mitigation

Rooikat Hydroelectric Power Site: RH-05, RH-06 & RH-37

Power Lines:

1. New Alternative 1 & New Alternative 2: RH-07; RH-25; RH-26, RH-27 & RH-37
2. Substation / switching site: RH-27

Access Roads:

4. South Access Road: RH-04; RH-05; RH-06 & RH-07
5. North Access Road: RH-08; RH-09; RH-10; RH-11
6. Alternative Construction Road & spoil site: RH-12; RH-13; RH-14; RH-15; RH-16; RH-17; RH-19; RH-20; RH-21; RH-22; RH-23; RH-26 & RH-27

Inundation Area: RH-01; RH-05; RH-06; RH-12; RH-13; RH-14; RH-15; RH-16; RH-17; RH-18; RH-19; RH-20; RH-21; RH-22; RH-23; RH-24; RH-28; RH-29; RH-30; RH-31; RH-32; RH-33; RH-34; RH-35, RH-36 & RH-37

Table 11: Summary of the Phase 1 AIA findings and associated recommendations

NOTES:

- Should any 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 course of development the developer should immediately cease operation in the vicinity of the find and report the site to SAHRA / an ASAPA accredited CRM archaeologist. Human remains confirmed younger than 60 years are to be reported directly to the nearest police station.

- 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 Impact Assessment (EIA).

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APPENDIX – A –

INTRODUCTION TO THE ARCHAEOLOGY OF SOUTH AFRICA

Archaeologically the southern African cultural environment is roughly divided into the Stone Age, the Iron Age and the Colonial Period, including its subsequent Industrial component. This cultural division has a rough temporal association beginning with the Stone Age, followed by the Iron Age and the Colonial Period. The division is based on the identified primary technology used. The hunter-gatherer lifestyle of the Stone Age is identified in the archaeological record through stone being the primary raw material used to produce tools. Iron Age people, known for their skill to work iron and other metal, also practiced agriculture and animal husbandry. Kingships and civilizations associated with the Iron Age are indicative of a complex social hierarchy. The Colonial Period is marked by the advent of writing, in southern Africa primarily associated with the first European travelers (Mitchell 2002).

During the latter part of the Later Stone Age (LSA) hunter-gatherers shared their cultural landscape with both pastoralists and Iron Age people, while the advent of the Colonial Period in South Africa is marked by a complex cultural mosaic of people; including LSA hunter-gatherers, pastoralists, Later Iron Age farming communities and Colonial occupation.

1) EARLY HOMININ EVOLUTION

DNA studies indicates that humans and chimpanzees shared a common ancestor between 6-8Mya (Sibley & Ahlquist 1984). By 4Mya, based on fossil evidence from Ethiopia and Kenya, hominins (humans and their immediate fossil ancestors and relatives) had already evolved. The earliest fossils are ascribed to *Ardipithecus ramidus* (4.4Mya), succeeded by *Australopithecus anamensis* (4.2-3.9Mya). These fossils are inferred to lie at the base from which all other hominins evolved (Leakey *et al*. 1995; White *et al*. 1994).

In South Africa the later hominins are classed into 3 groups or distinct genera; *Australopithecus* (gracile australopithecines), *Paranthropus* (robust australopithecines) and *Homo.* South Africa has 3 major hominin sites: Taung in the North-West Province, where Raymond Dart identified the first *Australopithecus* fossil in 1924 (Dart 1925); The Cradle of Humankind (Sterkfontein Valley) sites in Gauteng, the most prolific hominin locality in the world for the period dating 3.5-1.5Mya which have yielded numerous *Australopithecus, Paranthropus* and limited *Homo* fossils (Keyser *et al*. 2000; Tobias 2000); and Makapansgat in the Limpopo Province, where several more specimens believed to be older than most of the Cradle specimens were discovered (Klein 1999).

A. africanus, represented at all 3 sites are believed to have been present on the South African landscape from about 3Mya. From approximately 2.8Mya they shared, at least in the Cradle area, the landscape with *P. robustus* and from roughly 2.3Mya with early forms of *Homo* (Clarke 1999). Global climatic cooling around 2.5Mya may have stimulated a burst of species turnover amongst hominins (Vrba 1992); the approximate contemporary appearance of the first stone tools suggests that this was a critical stage in human evolution. But exactly which early hominin population is to be accredited as the ancestor of *Homo* remains elusive.

H. ergaster is present in the African palaeo-anthropological record from around 1.8Mya and shortly thereafter the first exodus from Africa is evidenced by *H. erectus* specimens from China, Indonesia and even Europe (Klein 1999).

2) THE STONE AGE

2.1) The Earlier Stone Age

In South Africa the only Earlier Stone Age (ESA) Oldowan lithic assemblage comes from Sterkfontein Cave. The predominant quartz assemblage is technologically very simple, highly informal and inferred to comprise exclusively of multi-purpose tools (Kuman *et al*. 1997). The latter part of the ESA is characterized by the Acheulean Industrial Complex, present in the archaeological record from at least 1.5Mya. Both *H. ergaster* and *P. robustus* may be accredited with the production of these tools. The association between stone tools and increased access to meat and marrow supporting the greater dietary breath of *Homo* may have been vital to *Homo's* evolutionary success; and the eventual extinction of the robust australopithecines (Klein 1999).

Probably the longest lasting artefact tradition ever created by hominins, the Acheulean is found from Cape Town to north-western Europe and India, occurring widely in South Africa. Despite the many sites it is still considered a '*prehistoric dark age*' by many archaeologists, encompassing one of the most critical periods in human evolution; the transition from *H. ergaster* to archaic forms of *H. Sapiens* (Klein 1999).

The Acheulean industry is characterized by handaxes and cleavers as *fosilles directeurs* (signatory artefact types), in association with cores and flakes. Handaxes and cleavers were multi-purpose tools used to work both meat and plant matter (Binneman & Beaumont 1992). Later Acheulean flaking techniques involved a degree of core preparation that allowed a single large flake of predetermined shape and size to be produced. This

Victoria West technique indicates an origin within the Acheulean for the *Levallois technique* of the Middle Stone Age (Noble & Davidson 1966). The lithic artefact component was supplemented by wood and other organic material (Deacon 1970).

2.2) The Middle Stone Age

The Middle Stone Age (MSA), dating from approximately 500kya to 40-27/23kya is interpreted as an intermediate technology between the Acheulean and the Later Stone Age (LSA) (Goodwin & van Riet Lowe 1929). The MSA is typologically characterized by the absence of handaxes and cleavers, the use of prepared core techniques and the production of blades, triangular and convergent flakes, with convergent dorsal scars and faceted striking platforms, often produced by means of the *Levallois technique* (Volman 1984). The widespread occurrence of MSA technology across Africa and its spread into much of Eurasia in Oxygen Isotope Stage (OIS) 7 is viewed as part of a process of population dispersal associated with both the ancestors of the later Neanderthals in Europe and anatomically modern humans in Africa (Foley & Lahr 1997).

After the riches offered by the Cradle sites and Makapansgat, southern Africa's Middle Pleistocene fossil record is comparatively poor. Early Middle Pleistocene fossil evidence suggests an archaic appearance and fossils are often assigned to *H. heidelbergensis* and *H. sapiens rhodesiensis* (Rightmire 1976). Modern looking remains, primarily from Border Cave (KwaZulu-Natal) and Klasies River Mouth (Eastern Cape) raised the possibility that anatomically modern humans had, by 120kya, originated south of the Sahara before spreading to other parts of the world (Brauer 1982; Stringer 1985). Subsequent studies of modern DNA indicated that African populations are genetically more diverse and probably older than those elsewhere (Cann *et al*. 1994). Combined, the fossil and genetic evidence underpins the so-called *Out of Africa 2* model (arguing that gene flow and natural selection led regional hominin populations along distinct evolutionary trajectories after *Homo's* expansion from Africa in the Lower Pleistocene *Out of Africa 1* model) of modern human origins and the continuing debate as to whether it should be preferred to its *Multiregional* alternative (arguing that modern humans evolved more or less simultaneously right across the Old World) (Mellars & Stringer 1989; Aitken *et al*. 1993; Nitecki & Nitecki 1994).

Persuasive evidence of ritual activity or bodily decoration is evidenced by the widespread presence of red ochre at particularly MSA 2 sites (after Volman's 1984 MSA 1-4 model; Hensilwood & Sealy 1997), while evidence from Lion Cave, Swaziland, indicates that specularite may have been mined as early as 100kya (Beaumont 1973). Evidence for symbolic behavioral activity is largely absent; no evidence for rock art or formal burial practices exists.

2.3) The Later Stone Age

Artefacts characteristic of the Later Stone Age (LSA) appear in the archaeological record from 40/27-23kya and incorporates micolithic as well as macrolithic assemblages. Artefacts were produced by modern *H. sapien* or *H. sapien sapien,* who subsisted on a hunter-gatherer way of life (Deacon 1984; Mitchell 2002).

According to Deacon (1984) the LSA can temporally be divided into 4 broad units directly associated with climatic, technological and subsistence changes:

1. Late Pleistocene microlithic assemblages (40-12kya);
2. Terminal Pleistocene / early Holocene non-microlithic assemblages (12-8kya);
3. Holocene microlithic assemblages (8kya to the Historic Period); and
4. Holocene assemblages with pottery (2kya to the Historic Period) closely associated with the influx of pastoralist communities into South Africa (Mitchell 2002).

Elements of material culture characteristic of the LSA reflect modern behavior. Deacon (1984) summarizes these as:

1. Symbolic and representational art (paintings and engravings);
2. Items of personal adornment such as decorated ostrich eggshell, decorated bone tools and beads, pendants and amulets of ostrich eggshell, marine and freshwater shells;
3. Specialized hunting and fishing equipment in the form of bows and arrows, fish hooks and sinkers;
4. A greater variety of specialized tools including bone needles and awls and bone skin-working tools;
5. Specialized food gathering tools and containers such as bored stone digging stick weights, carrying bags of leather and netting, ostrich eggshell water containers, tortoiseshell bowls and scoops and later pottery and stone bowls;
6. Formal burial of the dead in graves (sometimes covered with painted stones or grindstones and accompanied by grave goods);
7. The miniaturization of selected stone tools linked to the practice of hafting for composite tools production; and
8. A characteristic range of specialized tools designed for making some of the items listed above.

- Rock Art

Rock Art is one of the most visible and informative components of South Africa's archaeological record. Research into LSA ethnography (as KhoiSan history) has revolutionized our understanding of both painted and engraved (petroglyph) images, resulting in a paradigm shift in Stone Age archaeology (Deacon & Dowson 2001). Paintings are concentrated in the Drakensberg / Maluti mountains, the eastern Free State, the Cape Fold Mountains, the Waterberg Plateau and the Soutpansberg mountains. Engravings on the other hand are found throughout the Karoo, the western Free State and North-West Province (Mitchell 2002). Both forms of LSA art drew upon a common stock of motifs, derived from widely shared beliefs and include a restricted range of naturalistically depicted animals, geometric imagery, human body postures and non-realistic combinations of human and animal figures (anthropomorphic figurines). LSA Rock Art is closely associated with spiritual or magical significance (Lewis-Williams & Dowson 1999).

Aside from LSA or KhoiSan Rock Art, thus art produced by both hunter-gatherer and pastoralist and agro-pastoralist groups, Rock Art produced by Iron Age populations are known the be present towards the north of the country.

- Shell Middens ('Strandloper' Cultures)

South Africa's nearly 3,000km coastline is dotted by thousands of shell middens, situated between the high water mark and approximately 5km inland, bearing witness to long-term exploitation of shellfish mainly over the past 12,000 years. These LSA shell middens are easily distinguishable from natural accumulations of shells and deposits can include bones of animals eaten such as shellfish, turtles and seabirds, crustaceans like crabs and crayfish and marine mammal remains of seals, dolphins and occasionally whales. Artefacts and hearth and cooking remains are often found in shell midden deposits. Evidence exist that fish were speared, collected by hand, reed baskets and by means of stone fish traps in tidal pools (Mitchell 2002).

Shell midden remains were in the past erroneously assigned to 'Strandloper cultures'. Deacon & Deacon (1999) explain that '*no biological or cultural group had exclusive rights to coastal resources.*' Some LSA groups visited the coast periodically while others stayed year round and it is misleading to call them all by the same name. Two primary sources of archaeological enquiry serves to shed more light on the lifestyles of people who accumulated shell middens, one being the analysis of food remains in the middens itself and the other being the analysis of LSA human skeletal remains of people buried either in shell middens or within reasonable proximity to the coast.

Shell middens vary in character ranging from large sites tens of meters in extent and with considerable depositional depth to fairly small ephemeral collections, easily exposed and destroyed by shifting dune action. Shell middens are also found inland, along rivers where fresh water mussels occur. These middens are often fairly small and less common; in the Eastern Cape often dated to within the past 3,000 years (Deacon & Deacon 1999).

In addition shell middens are not exclusively assigned to LSA cultures; shellfish were exploited during the Last Interglacial, indicating that the practice was most probably continuous for the past 120,000 years (MSA shell middens). Along the coast of KwaZulu-Natal evidence exist for the exploitation of marine food resources by Iron Age communities. These shell middens are easily distinguished from Stone Age middens by particularly rich, often decorated ceramic artefact content. Colonial Period shell middens are quite rare and extremely ephemeral in character; primarily the result of European shipwreck survivors and reported on along the coast of KwaZulu-Natal and the Transkei, Eastern Cape.

3) THE IRON AGE

For close to 2 millennia people combining cereal agriculture with stock keeping have occupied most of southern Africa's summer rainfall zone. The rapid spread of farming, distinctive ceramics and metallurgy is understood as the expansion of a Bantu-speaking population, in archaeological terms referred to as the Iron Age.

3.1) The Early Iron Age

Ceramic typology is central to current discussions of the expansion of iron using farming communities. The most widely used approach is that of Huffman (1980), who employs a multidimensional analysis (vessel profile, decoration layout and motif) to reconstruct different ceramic types. Huffman (1998) argues that ceramics can be used to trace the movements of people, though not necessarily of specific social or political groupings. Huffman's Urewe Tradition coincides largely with Phillipson's (1977) Eastern Stream. A combined Urewe Tradition / Eastern Stream model for the Early Iron Age can be summarized as:

1. The Kwale branch (extending along the coast from Kenya to KwaZulu-Natal);
2. The Nkope branch (located inland and reaching from southern Tanzania through Malawi and eastern Zambia into Zimbabwe); and
3. The Kalundu branch (strething from Angola through western Zambia, Botswana and Zimbabwe into South Africa).

In southern Africa, recent work distinguishes two phases of the Kwale branch: The earlier Silver Leaves facies (250-430AD) occurring as far south as the Northern Province. The later expression or Mzonjani facies (420-580AD) occurs in the Northern Province a well as along the KwaZulu-Natal coastal belt (Huffman 1998). Since the Silver Leaves facies is only slightly younger than the Kwale type site in Kenya, very rapid

movement along the coast, perhaps partly by boat, is inferred (Klapwijk 1974). Subsequently (550-650AD) people making Mzonjani derived ceramics settled more widely in the interior of South Africa.

Assemblages attributable to the Nkope branch appear south of the Zambezi but north of South Africa from the 5th Century. Ziwa represents an early facies, with Gokomere deriving jointly from Ziwa and Bambata. A subsequent phase is represented by the Zhizo facies of the Shashe-Limpopo basin, and by Taukome (Huffman 1994). Related sites occur in the Kruger National Park (Meyer 1988). Zhizo (7th – 10th Century) is ancestral to the Toutswe tradition which persisted in eastern Botswana into the 13th Century.

Kalundu origins need further investigation; its subsequent development is however better understood. A post Bambata phase is represented by the 5th – 7th Century sites of Happy Rest, Klein Africa and Maunatlana in the Northern Province and Mpumalanga (Prinsloo 1974, 1989). Later phases are present at the Lydenburg Heads site (Whitelaw & Moon 1996) and by the succession of Mzuluzi, Ndondonwane and Ntshekane in KwaZulu-Natal (7th – 10th Centuries) (Prins & Grainger 1993). Later Kalundu facies include Klingbeil and Eiland in the northern part of the country (Evers 1980) with Kgopolwe being a lowveld variant in Mpumalanga (10th – 12th Century). Broadhurst and other sites indicate a still later survival in Botswana (Campbell 1991).

Despite the importance accorded to iron agricultural implements in expanding the spread of farming and frequent finds of production debris, metal objects are rare. Metal techniques were simple, with no particular sign of casting, wire drawing or hot working. Jewelry (bangles, beads, pendants etc.) constitute by far the largest number of finds but arrows, adzes, chisels, points and spatulae are known (Miller 1996).

Early Iron Age people were limited to the Miombo and Savannah biomes; excluded from much of the continents western half by aridity and confined in the south during the 1st millennium to bushveld areas of the old Transvaal. Declining summer rainfall restricted occupation to a diminishing belt close to the East Coast and north of S33° (Maggs 1994); sites such as Canasta Place (800AD), Eastern Cape, mark the southern-most limit of Early Iron Age settlement (Nogwaza 1994).

- The Central Cattle Pattern

The Central Cattle Pattern (CCP) was the main cognitive pattern since the Early Iron Age (Huffman 1986). The system can be summarized as opposition between male pastoralism and female agriculture; ancestors and descendants; rulers and subjects; and men and women. Cattle served as the primary means of transaction; they represented symbols exchanged for the fertility of wives, legitimacy of children and appeasement of ancestors. Cattle were also used as tribute to rulers confirming sub-ordination and redistribution as loan cattle by the ruler to gain political support. Cattle represented healing and fertilizing qualities (Huffman 1998; Kuper 1980).

This cognitive and conceptual structure underlies all cultural behavior, including the placement of features in a settlement. The oppositions of male and female, pastoralism and agriculture, ancestors and descendants, rulers and subjects, cool and hot are represented in spatial oppositions, either concentric or diametric (Huffman 1986).

A typical CCP village comprise of a central cattle enclosure (byre) where men are buried. The *Kgotla* (men's meeting place / court) is situated adjacent to the cattle enclosure. Surrounding the enclosure is an arc of houses, occupied according to seniority. Around the outer perimeter of the houses is an arc of granaries where women keep their pots and grinding stones (Huffman 1986). The model varies per ethnic group which helps to distinguish ethnicity throughout the Iron Age, but more studies are required to recognize the patterns.

3.2) The Middle Iron Age

The hiatus of South African Middle Iron Age activity was centered in the Shashe-Limpopo Valley and characterized by the 5-tier hierarchical Mapungubwe State spanning some 30,000km². By the 1st millennium ivory and skins were already exported overseas, with sites like Sofala and Chibuene, Mosambique, interfacing between interior and transoceanic traders. Exotic glass beads, cloth and Middle Eastern ceramics present at southern African sites mark the beginning of the regions incorporation into the expanding economic system that, partly tied together with maritime trading links across the Indian Ocean, increasingly united Africa, Asia and Europe long before Da Gama or Columbus (Eloff & Meyer 1981; Meyer 1998).

Occupation was initially focused at Bambandanyalo and K2. The Bambananyalo main midden (1030-1220AD) stands out above the surrounding area, reaching more than 6m in places and covering more than 8ha the site may have housed as many as 2,000 people (Meyer 1998). The CCP was not strictly followed; whether this is ideologically significant or merely a reflection of local typography remains unclear. The midden, the size of which may reflect the status of the settlement's ruler, engulfed the byre around 1060-1080AD, necessitating relocation of the cattle previously kept there. The re-organization of space and worldview implied suggests profound social changes even before the sites' abandonment in the early 13th century, when the focus of occupation moved to Mapungubwe Hill, 1 km away (Huffman 1998).

Excavations at Mapungubwe Hill, though only occupied for a few decades (1220-1290AD), yielded a deep succession of gravel floors and house debris (Eloff & Meyer 1981). Huffman (1998) suggests that the suddenness with which Mapungubwe was occupied may imply a deliberate decision to give spatial expression to a new social order in which leaders physically removed themselves from ordinary people by moving onto more inaccessible, higher elevations behind the stone walls demarcating elite residential areas. Social and settlement changes speak of considerable centralization of power and perhaps the elaboration of new ways of linking leaders and subjects.

At Bambandanyalo and Mapungubwe elite burial grave goods include copper, bone, ivory and golden ornaments and beads. Social significance of cattle is reinforced by their importance among the many human and animal ceramic figurines and at least 6 'beast burials' (Meyer 1998).

Today the drought prone Shashe-Limpopo Valley receives less than 350mm of rainfall per annum, making cereal cultivation virtually impossible. The shift to drier conditions in the late 1200's across the Shashe-Limpopo basin and the eastern Kalahari may have been pivotal in the break-up of the Mapungubwe polity, the collapse of Botswana's Toutswe tradition and the emergence of Great Zimbabwe (1220-1550AD), southern Africa's best known and largest (720ha) archaeological site (Meyer 1998).

South of the Limpopo and north of the Soutpansberg, Mapungubwe derived communities survived into the 14th Century, contemporary with the establishment of Sotho-speaking makers of Maloko pottery.

3.3) The Later Iron Age

South African farming communities of the 2nd millennium experienced increased specialization of production and exchange, the development of more nucleated settlement patterns and growing political centralization, albeit not to the same extent as those participating in the Zimbabwe tradition. However, together they form the background to the cataclysmic events of the late 18th / early 19th Century *Mfecane* (Mitchell 2002).

Archaeological evidence of settlement pattern, social organization and ritual practice often differ from those recorded ethnographically. The Moloko ceramic tradition seems to be ancestral to modern Sotho-Tswana speakers (Evers 1980) and from about 1,100AD a second tradition, the Blackburn tradition, appears along South Africa's eastern coastline. Blackburn produced mostly undecorated pottery (Davies 1971), while Mpambanyoni assemblages, reaching as far south as Transkei, includes examples of rim notching, incised lines and burnished ochre slip (Robey 1980). At present, no contemporary farming sites are known further inland in KwaZulu-Natal or the Eastern Cape.

Huffman (1989) argues that similarities between Blackburn and early Maloko wares imply a related origin, presumably in the Chifumbaze of Zambia or the Ivuna of Tanzania, which contains a range of ceramic attributes important in the Blackburn as well as beehive grass huts similar to those made by the Nguni. This is one of the few suggestions of contact between Sotho-Tswana and Nguni speakers on the one hand and farming communities who, if Huffman is correct, were already long established south of the Limpopo. Both ethnographic and archaeological data demonstrate that Sotho-Tswana and Nguni are patrilineal and organize their settlements according to the CCP (Kuper 1980).

From 1,300AD there is increasing evidence for the beginning of agro-pastoralist expansion considerably beyond the area of previous occupation. It is also to this time that the genealogies of several contemporary Bantu speaking groups can be traced (Wilson & Thompson 1969). Associated with this expansion was the regular employment of stone, rather than wood, as building material, an adaptation that has greatly facilitated the discovery and identification of settlements. Maggs (1976) describes 4 basic settlement types all characterized by the use of semi weathered dolorite to produce hard binding *daga* for house floors and a wall building tradition employing larger more regular stones for the inner and outer faces and smaller rubble for the infill. As with the more dispersed homesteads of KwaZulu-Natal and the Eastern Cape, sites tend to be in locally elevated situations, reflecting a deep seated Sotho and Nguni preference for benign higher places rather than supernaturally dangerous riverside localities; another important contrast to both 1st millennium (Maggs 1976) and later Zulu Kingdom settlement patterns (Hall & Maggs 1979).

The lack of evidence for iron production in the interior and eastern part of South Africa emphasize exchange relationships between various groups and associated more centralized polities. By the 19th Century iron production in KwaZulu-Natal was concentrated in particular clans and lineages and associated with a range of social and religious taboos (Maggs 1992). South of Durban comparatively few smelting sites are known (Whitelaw 1991), a trend even more apparent in Transkei (Feely 1987). However, metal remained the most important and archaeologically evident item traded between later farming communities. (Other recorded trade items include glass and ostrich eggshell beads; Indian Ocean seashells; siltstone pipes; *dagga,* and later on tobacco; pigments including ochre, graphite and specularite; hides and salt.)
Rising polity settlements are particularly evident in the north of the country and dated to the 17th Century, including Molokwane, capital of the Bakwena chiefdom (Pistorius 1994) and Kaditshwene, capital of a major section of the Hurutshe, whose population of 20,000 in 1820 almost equals contemporary Cape Town in size (Boeyens 2000). The agglomeration of Tswana settlements in the north of the country was fuelled by both population growth and conflict over access to elephant herds for ivory and long distance trade with the East Coast. During this period ceramic decoration became blander and more standardized than the earlier elaborate decoration that included red ochre and graphite coloring.

The *Mfecane* refers to the wars and population movements of the early 19th Century which culminated in the establishment of the Zulu Kingdom and came to affect much of the interior, even beyond the Zambezi: The late 18th Century was marked by increasing demands for ivory (and slaves) on the part of European traders at Delagoa Bay; as many as 50 tones of ivory were exported annually from 1750-1790. As elephant populations declined, competition increased both for them and for the post 1790 supply of food to European and American whalers calling at Delagoa Bay (Smith 1970). Cattle raiding, conflict over land and changes in climatic and subsistence strategies characterized much of the cultural landscape of the time.

Competition for access to overseas trade encouraged some leaders to replace locally organized circumcision schools and age-sets with more permanently maintained military regiments. These were now used to gain access through warfare to land, cattle and stored food. By 1810 three groups, the Mthethwa, Ndwandwe and Ngwane dominated northern KwaZulu-Natal (Wright 1995). The Mthethwa paramountcy was undermined by the killing of its leader Dingiswayo in *circa* 1818, which led to a brief period of Ndwandwe dominance. In consequence one of Dingiswayo's former tributaries, Shaka, established often forceful alliances with chiefdoms further south. Shaka's Zulu dominated coalition resisted the Ndwandwe who in return fled to Mozambique. As the Zulu polity expanded it consolidated its control over large areas, incorporating many communities into it. Others sought refuge from political instability by moving south of the Thukela River, precipitating a further *domino effect* as far as the Cape Colony's eastern border (Wright 1995).

4) THE COLONIAL PERIOD

In the 15th Century Admiral Zheng He and his subordinates impressed the power of the Ming Dynasty rulers in a series of voyages as far afield as Java, Sri Lanka, southern Arabia and along the East African coast, collecting exotic animals *en route.* But nothing more came of his expeditions and China never pursued opportunities for trade or colonization (Mote 1991).

Portuguese maritime expansion began around the time of Zheng He's voyages; motivated by a desire to establish a sea route to the riches of the Far East. By 1485 Diogo Cao had reached Cape Cross, 3 years later Bartolomeu Dias rounded the Cape of Good Hope and less than a decade later Vasco da Gama called at several places along South Africa's coast, trading with Khoekhoen (Khoi) at Mossel Bay before reaching Mozambique and crossing the ocean to India. His voyage initiated subsequent Portuguese bases from China to Iraq. In Africa interest was focused on seizing important coastal trading towns such as Sofala and gaining access to the gold of Zimbabwe. Following the 1510 Portuguese-Khoekhoen battle at Table Bay, in which the viceroy of India was killed, Portuguese ships ceased to call along the South African coast (Elphick 1985).

A number of shipwrecks, primarily along the eastern coast attest to Portuguese activity including the Sao Joao, wrecked in 1552 near Port Edward and the Sao Bento, destroyed in 1554 off the Transkei coast. Survivors' accounts provided the 1st detailed information on Africa's inhabitants (Auret & Maggs 1982).

By the late 1500's Portuguese supremacy of the Indian Ocean was threatened. From 1591 numerous Dutch and English ships called at Table Bay and in 1652 the Dutch East Indian Company (VOC) established a permanent base, with the intent to provide fresh food and water to VOC ships. In an attempt to improve the food supply a few settlers (free burghers) were allowed to establish farms. The establishment of an intensive mixed farming economy failed due to shortages of capital and labor, and free burghers turned to wheat cultivation and livestock farming. While the population grew slowly the area of settlement expanded rapidly with new administrative centers established at Stellenbosch (1676), Swellendam (1743) and Graaf-Reinet (1785). By the 1960's the Colony's frontier was too long to be effectively policed by VOC officials (Elphick 1985).

From the 1700's many settlers expanded inland over the Cape Fold Mountain Belt. The high cost of overland transport constrained the ability to sell their produce while settlement of the interior was increasingly made difficult by resident KhoiSan groups, contributing due to a lack of VOC military support to growing Company opposition in the years before British control of the Cape (1795 / 1806) (Davenport & Saunders 2000).

In 1820 a major British settlement was implanted on the eastern frontier of the Cape Colony, resulting in large numbers of the community moving into the interior, initially to KwaZulu-Natal, and then after Britain annexed Natal (1843), further into the interior to beyond the Vaal River. Disruptions of the *Mfecane* eased their takeover of African lands and the *Boers* (farmers) established several Republics. A few years later the 2nd South African War saw both the South African and Orange Free State Republics annexed by Britain, a move largely motivated by British desire to control the goldfields of the Witwatersrand. With adjacent regions of the sub-continent also falling, directly or indirectly, under British rule and German colonization of Namibia, European control of the whole of southern Africa was firmly established before the 1st World War (Davenport & Saunders 2000).

- Xhosa Iron Age Cultures meets Colonists in the Eastern Cape

From the late 1600's conflict between migrants from the Cape (predominantly Boers) and Xhosa people in the region of the Fish River were strife, ultimately resulting in a series of 9 Frontier Wars (1702-1878) (Milton 1983). Both cultures were heavily based and reliant on agriculture

and cattle farming. As more Cape migrants, and later settlers from Britain (1820) and elsewhere arrived, population pressures and competition over land, cattle and good grazing became intense. Cattle raiding became endemic on all sides, with retaliatory raids launched in response. As missionaries arrived with evangelical messages, confrontations with hostile chiefs who saw them as undermining traditional Xhosa ways of life resulted in conflicts which flared into wars.

As pressures between the European settlers and the Xhosa grew, settlers organized themselves into local militia, counteracted by Xhosa warring skills: But both sides were limited by the demands of seasonal farming and the need for labor during harvest. Wars between the Boers and the Xhosa resulted in shifting borders, from the Fish to the Sundays River, but it was only after the British annexed the Cape in 1806 that authorities turned their attention to the Eastern regions and petitions by the settlers about Xhosa raids. British expeditions, in particular under Colonel John Graham in 1811 and later Harry Smith in 1834, were sent not only to secure the frontier against the Xhosa, but also to impose British authority on the settlers, with the aim to establish a permanent British presence. Military forts were built and permanently manned. Over time the British came to dominate the area both militarily and through occupation with the introduction of British settlers. The imposition of British authority led to confrontations not only with the Xhosa but also with disaffected Boers and other settlers, and other native groups such as the Khoikhoi, the Griqua and the Mpondo. The frontier wars continued over a period of about 150 years; from the 1st arrival of the Cape settlers, and with the intervention of the British military ultimately ending in the subjugation of the Xhosa people. Fighting ended on the Eastern Cape frontier in June 1878 with the annexation of the western areas of the Transkei and administration under the authority of the Cape Colony (Milton 1983).

- The Industrial Revolution

The Industrial Revolution refers roughly to the period between the 18th - 19th Centuries, typified by major changes in agriculture, manufacturing, mining, transport, and technology. Changing industry had a profound effect on socio-economic and socio-cultural conditions across the world: The Industrial Revolution marks a major turning point in human history; almost every aspect of daily life was eventually influenced in some way. Average income and population size began to exhibit unprecedented growth; in the two centuries following 1800 the world's population increased over 6-fold, associated with increasing urbanization and demand of resources. Starting in the latter part of the 18th century, the transition from manual labor towards machine-based manufacturing changed the face of economic activity; including the mechanization of the textile industries, the development of iron-making techniques and the increased use of refined coal. Trade expansion was enabled by the introduction of canals, improved roads and railways. The introduction of steam power fuelled primarily by coal and powered machinery was underpinned by dramatic increases in production capacity. The development of all-metal machine tools in the first two decades of the 19th century facilitated the manufacture of more production machines in other industries (More 2000).

Effects of the Industrial Revolution were widespread across the world, with its enormous impact of change on society, a process that continues today as 'industrialization'.

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APPENDIX – B –

EXTRACTS FROM THE NATIONAL HERITAGE RESOURCES ACT, NO 25 OF 1999

DEFINITIONS

Section 2

In this Act, unless the context requires otherwise:

ii. "*Archaeological*" means –
- a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10 m of such representation;
- c) wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic,… 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.

viii. "*Development*" means any physical intervention, excavation or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including –
- a) construction, alteration, demolition, removal or change of use of a place or structure at a place;
- b) carrying out any works on or over or under a place;
- c) subdivision or consolidation of land comprising, a place, including the structures or airspace of a place;
- d) constructing or putting up for display signs or hoardings;
- e) any change to the natural or existing condition or topography of land; and
- f) any removal or destruction of trees, or removal of vegetation or topsoil;

xiii. "*Grave*" means a place of interment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place;

xxi. "*Living heritage*" means the intangible aspects of inherited culture, and may include –
- a) cultural tradition;
- b) oral history;
- c) performance;
- d) ritual;
- e) popular memory;
- f) skills and techniques;
- g) indigenous knowledge systems; and
- h) the holistic approach to nature, society and social relationships.

xxxi. "*Palaeontological*" means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trance;

xli. "*Site*" means any area of land, including land covered by water, and including any structures or objects thereon;

xliv. "*Structure*" means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith;

NATIONAL ESTATE

Section 3

1) For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.

2) Without limiting the generality of subsection 1), the national estate may include –
- a) places, buildings, structures and equipment of cultural significance;
- b) places to which oral traditions are attached or which are associated with living heritage;
- c) historical settlements and townscapes;
- d) landscapes and natural features of cultural significance;
- e) geological sites of scientific or cultural importance
- f) archaeological and palaeontological sites;
- g) graves and burial grounds, including –
  - i. ancestral graves;
  - ii. royal graves and graves of traditional leaders;
  - iii. graves of victims of conflict
  - iv. graves of individuals designated by the Minister by notice in the Gazette;
  - v. historical graves and cemeteries; and
  - vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No 65 of 1983)
- h) sites of significance relating to the history of slavery in South Africa;
- i) movable objects, including –

i. objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
ii. objects to which oral traditions are attached or which are associated with living heritage;
iii. ethnographic art and objects;
iv. military objects;
v. objects of decorative or fine art;
vi. objects of scientific or technological interest; and
vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1 xiv) of the National Archives of South Africa Act, 1996 (Act No 43 of 1996).

STRUCTURES

Section 34

1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

ARCHAEOLOGY, PALAEONTOLOGY AND METEORITES

Section 35

3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
4) No person may, without a permit issued by the responsible heritage resources authority –
    a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
    b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
    c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
    d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.
5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may –
    a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
    b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
    c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph a) to apply for a permit as required in subsection 4); and
    d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.
6) The responsible heritage resources authority may, after consultation with the owner of the land on which an archaeological or palaeontological site or meteorite is situated, serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

BURIAL GROUNDS AND GRAVES

Section 36

3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority –
    a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
    b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
    c) bring onto or use at a burial ground or grave referred to in paragraph a) or b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction of any burial ground or grave referred to in subsection 3a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.
5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection 3b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority –
    a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and
    b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority –
    a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and
    b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-internment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

HERITAGE RESOURCES MANAGEMENT

Section 38

1) Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorised as –
    a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
    b) the construction of a bridge or similar structure exceeding 50 m in length;
    c) any development or other activity which will change the character of a site –
        i. exceeding 5 000 m² 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 10 000 m² in extent; or
    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.

2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection 1) –
    a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or
    b) notify the person concerned that this section does not apply.

3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection 2a) …

4) The report must be considered timeously by the responsible heritage resources authority which must, after consultation with the person proposing the development decide –
    a) whether or not the development may proceed;
    b) any limitations or conditions to be applied to the development;
    c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;
    d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and
    e) whether the appointment of specialists is required as a condition of approval of the proposal.

APPOINTMENT AND POWERS OF HERITAGE INSPECTORS

Section 50

7) Subject to the provision of any other law, a heritage inspector or any other person authorised by a heritage resources authority in writing, may at all reasonable times enter upon any land or premises for the purpose of inspecting any heritage resource protected in terms of the provisions of this Act, or any other property in respect of which the heritage resources authority is exercising its functions and powers in terms of this Act, and may take photographs, make measurements and sketches and use any other means of recording information necessary for the purposes of this Act.

8) A heritage inspector may at any time inspect work being done under a permit issued in terms of this Act and may for that purpose at all reasonable times enter any place protected in terms of this Act.

9) Where a heritage inspector has reasonable grounds to suspect that an offence in terms of this Act has been, is being, or is about to be committed, the heritage inspector may with such assistance as he or she thinks necessary –
    a) enter and search any place, premises, vehicle, vessel or craft, and for that purpose stop and detain any vehicle, vessel or craft, in or on which the heritage inspector believes, on reasonable grounds, there is evidence related to that offence;
    b) confiscate and detain any heritage resource or evidence concerned with the commission of the offence pending any further order from the responsible heritage resources authority; and
    c) take such action as is reasonably necessary to prevent the commission of an offence in terms of this Act.

10) A heritage inspector may, if there is reason to believe that any work is being done or any action is being taken in contravention of this Act or the conditions of a permit issued in terms of this Act, order the immediate cessation of such work or action pending any further order from the responsible heritage resources authority.