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The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project

Conservation Management Plan

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ACRONYMS

AGA Act	Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007)
BID	Background Information Document
Bya	Billion years ago
CE	Common Era
CFP	Chance Find Protocol
CMP	Conservation Management Plan
CS	Cultural Significance
DAC	Department of Arts and Culture
DST	Department of Science and Technology
EMI	Electromagnetic Interference
ESA	Earlier Stone Age
ha	Hectare
HE	Heritage Education
HIA	Heritage Impact Assessment
HLM	Hantam Local Municipality
HRAs	Heritage Resource Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan
I&APs	Interested and Affected Parties
IAP2	International Association of Public Participation
IEMP	Integrated Environmental Management Plan

KC-AAA	Karoo Central Astronomy Advantage Areas
KHLM	Karoo Hoogland Local Municipality
KLM	Kareeberg Local Municipality
Kya	Thousand years ago
LAG	Landbou Aksie Groep
LSA	Later Stone Age
MSA	Middle Stone Age
Mya	Million years ago
NC-DEDT	Northern Cape Department of Economic Development and Tourism
NC-PHRA	Northern Cape Provincial Heritage Resources Authority
NDM	Namakwa District Municipality
NEM: PAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NKBK	Ngwao Boswa jwa Kapa Bokone
NRF	National Research Foundation
OUV	Outstanding Universal Value
PDM	Pixley ka Seme District Municipality
PMP	Park Management Plan
PPP	Public Participation Process
RFI	Radio Frequency Interference
SAHRA	South African Heritage Resources Agency

SAHRIS	South African Heritage Resources Information System
SANParks	South African National Parks
SARAO	South African Radio Astronomy Observatory
SEP	Stakeholder Engagement Process
SKA	Square Kilometre Array
SKAO	International Square Kilometre Array Organisation
SLM	Slyathemba Local Municipality
SWOT	Strengths, Weaknesses, Opportunities, and Threats
ULM	Ubuntu Local Municipality

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1 Introduction

The international Square Kilometre Array Organisation (SKAO) proposes to establish an additional 133 antennas to the 64-dish MeerKAT radio telescope, including supporting infrastructure, for the first phase of the SKA – “SKA1_MID” in South Africa - Square Kilometre Array (SKA) Project (“the Project”). The Project comprises two primary components, namely the ‘core’ (36 land parcels) and three ‘spiral arms’ (73 land parcels) covering an approximate areal extent of 211 000 hectare (ha).

Current planning estimates that construction activities associated with SKA Phase 1 will commence in the latter part 2019, continuing to 2027. The lifespan of SKA Phase 1 is expected to be 50 years from the completion of construction. To this effect, the NRF (of which SARAO is a National Facility) is required to undertake the necessary studies to comply with the requirements stipulated by the South African Heritage Resources Agency (SAHRA) and the South African national legislative framework.

1.1 Document Objective

The primary objective of this document is to define the management requirements for the retention and enhancement of the Cultural Significance (CS) of the landscape within which the site-specific study area is located, that aligns with the South African National Parks (SANParks) hierarchy of objectives (Refer to Figure 5-2).

The identified management and mitigation measures must aim to achieve international best practice standards and thereby avoid/remove/reduce risk to cultural heritage resources, SKAO, the National Research Foundation (NRF), SARAO, other affiliated facilities or entities, and service providers.

1.2 Purpose

The purpose of the Conservation Management Plan (CMP) is to:

- Recognise the rich cultural heritage of the site-specific study area;
- Collate all information into a single management document that details:
 - The determined CS of the landscape;
 - The associated sensitivities of known heritage resource types;
 - Proactive identification of potential risks to heritage resources from Project related activities;
 - Management and mitigation measures of risks or manifested impacts;
- Provide the tools for implementation of the CMP and ultimately retention or enhancement of CS, integrity and authenticity.

1.3 Scope

To define practical management and mitigation measures, informed by the South African regulatory framework and international best practice standards, that retain, complement and enhance CS of the cultural landscape throughout the life of the Project.

The scope applies to all employees of SKAO, NRF, SARAO, other affiliated facilities or entities, service providers and business partners to the Project.

1.4 Principles

The principles of this document are informed by the regulatory framework as presented in the Heritage Impact Assessment (HIA), and specifically SAHRA Site Management Plans: Guidelines for the Development of Plans for the Management of Heritage Sites or Places (2006) and draft Development Heritage Management Plan Guidelines for Archaeological, Palaeontological and Meteorites Heritage Resources (2017). General principles include *inter alia*:

- The general principles for heritage resource management as encapsulated within Section 5¹ of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) must be considered during the compilation of the CMP;
- Proposed management measures must be realistic and commensurate to the nature of the Project, and community;
- The CMP must be clear, written in simple language and not unduly complex;
- The CMP must promote co-operative governance and stakeholder engagement;
- The relevant Heritage Resource Authorities (HRAs), in this instance SAHRA and the Northern Cape Provincial Heritage Resources Authority² (NC-PHRA) must guide the development and endorse the CMP.

¹ (1)(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;

(1)(b) Every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans;

(1)(c) Heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and

(1)(d) Heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

² Previously *Ngwao Boswa jwa Kapa Bokone* (NKBK)

2 Stakeholders

Guidance Note

Stakeholders inform the development of conservation management plans. Management plans must detail who was involved in its development, and the reasoning behind the inclusion of these individuals or entities. It should further describe the manner in which the stakeholder participation was undertaken.

Heritage resources do not occur in isolation from heritage producers or consumers. To this effect, a pivotal component of the HRM process is an effective, integrated engagement process to:

- Identify, acknowledge, and analyse the needs, wants and expectations of stakeholders;
- Facilitate two-way communication streams between all stakeholders that promotes inclusive, participatory decision-making processes; and
- Manage risks and conflicts that may manifest.

To this effect, two processes were undertaken in support of the HRM Process. These comprised a Public Participation Process (PPP) in support of the HIA, and a Stakeholder Engagement Process (SEP) in support of the CMP development. These two separate processes are briefly summarised in the subsequent sections.

2.1 Public Participation Process

The PPP adhered to legislative requirements, as well as the principles embodied by the International Association of Public Participation (IAP2) to achieve the objectives, goals and priorities as outlined in the following table.

Table 2-1: Summary of PPP Objectives

Public Participation Process				
Notify	Engage	Include	Co-operate	Empower
Create awareness of the HRM process in relation to the SKA Project, how it will impact the public, and indicate proposed mutually beneficial solutions	Engage with key stakeholders and Interested and Affected Parties (I&APs) through implementation of a functional and effective communication plan	Create a platform for all stakeholders to provide suggestions, concerns, aspirations and solutions	Forge partnerships with the stakeholders to ensure alignment of interest for achieving common goals and objectives	Ensure meaningful participation and inclusive decision-making which empowers stakeholders

The use of a stakeholder matrix is an important tool to provide a clear understanding of each stakeholder's influence on the HRM process, as well as provide an indication on the best engagement approach.

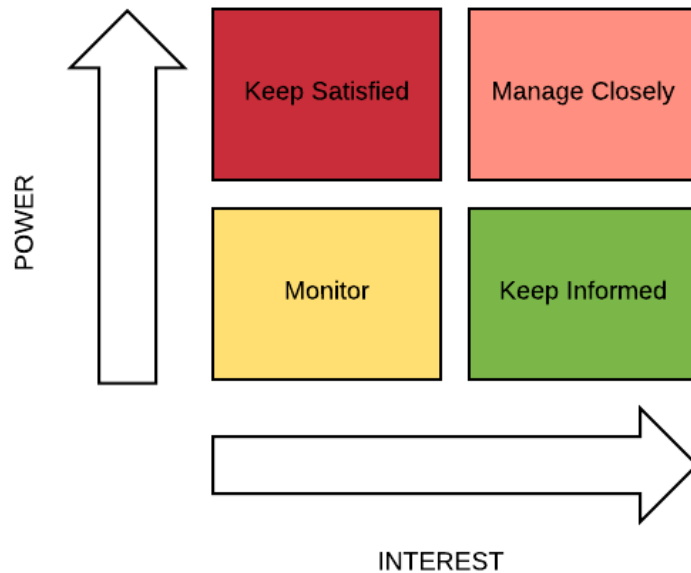


Figure 2-1: Stakeholder Prioritisation adapted from Mitchell et al, 1997

Table 2-2: Stakeholder Prioritisation Definitions

Manage Closely	Keep Satisfied	Monitor	Keep Informed
These stakeholders have high importance to the success of the project, but with limited legal authority. This implies that they will require special initiatives if their interests are to be protected.	These are stakeholders with high degree of influence on the project, its importance and success. This implies that there is a need to construct good working relationships with these stakeholders, to ensure an effective coalition of support for the project.	These are stakeholders with high influence, who can therefore affect the project outcomes, but whose interests are not necessarily aligned with the overall goals of the project.	These are stakeholders with low influence on, or importance to the project objectives, they may require limited monitoring or evaluation, but are of low priority.

2.1.1 Objectives

The objectives of the PPP were founded on the principles encapsulated within the aforementioned regulatory framework. In the context of this Project, the primary objectives of the PPP were to:

- Ensure that the HRM Process in relation to the Project was distributed as widely as possible to afford all Interested and Affected Parties (I&APs) an opportunity to participate;
- Record all comments received from I&APs;
- As far as possible, utilise local knowledge of the cultural landscape to identify tangible and intangible heritage resources that may be impacted upon by the Project;
- Provide I&APs with the opportunity to verify their specific inputs have been accurately recorded, addressed and where applicable, considered in the determination of Cultural Significance and identified potential impacts; and
- Comply with the South African regulatory requirements.

2.1.2 Summary of the PPP

Table 2-3: Summary of PPP Activities during the HRM Process

Activity	Details
Stakeholder database	A stakeholder database was developed in conjunction with SARAO which included I&APs from various sectors of society – this includes <i>inter alia</i> directly affected and adjacent landowners, government officials and various groups, such as the San Council and McGregor Museum.
Introductory Meeting	An introductory meeting was held with the Landbou Aksie Groep (LAG) in Carnarvon, Northern Cape on 23 January 2018. The meeting was attended by Justin du Piesanie and Jaco van der Walt as the representatives of the HRM Process.
Pre- consultation	Invitation letters to participate in the HRM process were distributed to I&APs previously registered for the SEA process on 2 March 2018 via email. This included a Background Information Document (BID).
Newspaper advertisement	Project notifications were placed in the Noordwester and The Citizen newspapers, published on 02 March 2018.

Activity	Details
Site notices	Site notices were placed at six strategic locations within the regional study area during the week of 23 February to 2 March 2018. These locations were as follows: <ul style="list-style-type: none"> ▪ Brandvlei Post Office; ▪ Vanwyksvlei Post Office; ▪ SKA site northern access; ▪ Carnarvon Spar Notice Board; ▪ SKA site southern access; and ▪ Williston Post Office.
Websites	Placement of all relevant SEP material on the Digby Wells, SARAO and Heritage Portal on 5 March 2018. The applicable links are as follows: Digby Wells: http://www.digbywellsdocs.com/PublicDocuments/?downloads=nrf4874-the-south-african-radio-astronomy-observatory-bid SARAO: http://www.ska.ac.za/northern-cape-communities/heritage-resources-management-process/ Heritage Portal: http://www.theheritageportal.co.za/notice/heritage-resources-management-process-south-african-radio-astronomy-observatory-square

2.2 Stakeholder Engagement Process

Stakeholders in the development of the CMP comprise of both internal and external parties, selected for their ability to inform the decision-making process. In this instance, SARAO in conjunction with SANParks as the land managing authority³, are not only internal but also the primary stakeholders accountable for all decisions and activities within the site-specific study area⁴. Other applicable stakeholder categories include:

- Core Stakeholders;
- Authorities; and
- Interested and Affected Parties.

Identified key stakeholders considered in the SEP are presented in Table 2-4

³ Refer to Chapter 4 for relevant management structures

⁴ Refer to Chapter 3 for detailed site definition and delimitations

Table 2-4: Identified Key Stakeholders

Stakeholder Group		Stakeholder	Description
Internal	Primary	SKAO	Overall accountability for the SKA Project and components thereof. Final approval on decisions made through consultative process.
		SARAO	
		SANParks	Accountable for all aspects of the implementation of the final, approved CMP.
	Core	Digby Wells	Overall responsibility for the HRM process including the development of the CMP and the associated HRM specific consultation with stakeholders.
External	Core	San Council	Traditional authority with vested interest in the cultural landscape. Must be informed and consulted in matters direct affecting their tangible and intangible heritage.
	Authority	Kareeberg Local Municipality (KLM)	Local authority, must be consulted on matters under their jurisdiction.
		Hantam Local Municipality (HLM)	
		Karoo Hoogland Local Municipality (KHLM)	
		Pixley ka Seme District Municipality (PDM)	Provincial authority, must be consulted on matters under their jurisdiction.
		NC-PHRA	Provincial authority responsible for the management of the historical built environment as contemplated under Section 2 (xiv) and 34 of the NHRA.
		SAHRA	National authority responsible for the management of heritage resources forming part of the national estate. Must be consulted on matters under their jurisdiction.
		Department of Arts and Culture (DAC)	National authority responsible for the management of heritage resources forming part of the national estate. Must be consulted on matters under their jurisdiction.

Stakeholder Group		Stakeholder	Description
	I&APs	Landbou Aksie Groep ⁵	Stakeholders with a vested interest in the Project and/or components thereof
		McGregor Museum	
		Sol Plaatjie University	

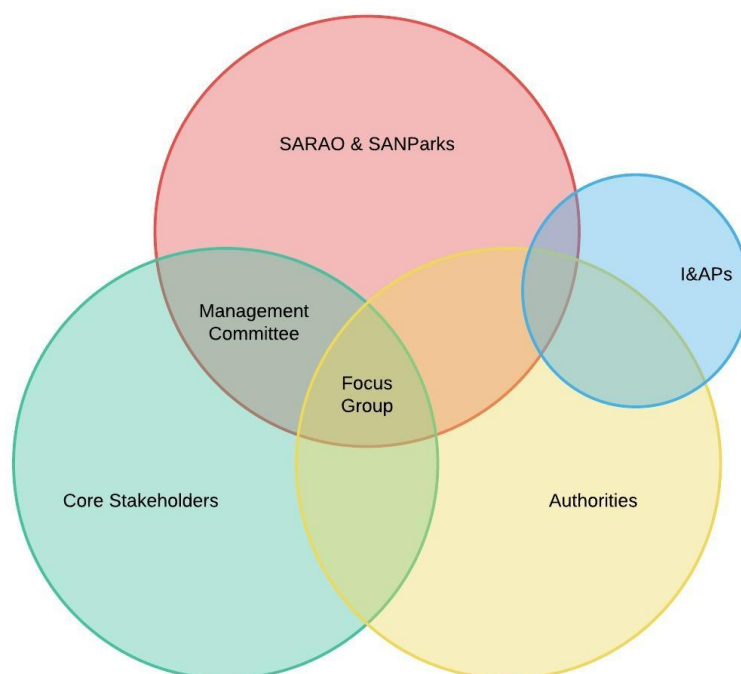


Figure 2-2: Stakeholder Interaction

2.2.1 Objectives

The objectives of the SEP were founded on the principles encapsulated within the aforementioned regulatory framework. In the context of this Project, the primary objectives of the SEP were to:

- Present and discuss with stakeholders all gathered data;
- Reach consensus on the determined CS of the cultural landscape;
- Identify key issues that must be considered in the development of the CMP;

⁵ A representative group affiliated with the local farmers union with specific vested interest in the SKA Project in terms of landowners and the potential impacts that may manifest, such as communication issues due to RFI restrictions.

- Conduct a situational analysis by way of ‘SWOT’;
- Define the guiding principles for planning and action; and
- Comply with the South African regulatory requirements.

2.2.2 Summary of the SEP

Table 2-5: Summary of SEP Activities during the HRM Process

Activity	Details
Invitations	Digby Wells distributed invitations to identified representatives from stakeholder groups as presented in Table 2-4 on 23 April 2018 to participate in the SKA Project CMP development. This included a formal request for their participation in a Focus Group Meeting at the SASSA Hall in Carnarvon, Northern Cape.
Focus Group Meeting	<p>Focus Group Meetings were scheduled for:</p> <ul style="list-style-type: none"> ■ 19 June 2018; and ■ 23 July 2018. <p>Due to availability of invited delegates, individual telephonic interviews were undertaken in lieu of the proposed Focus Group Meeting scheduled for 23 July 2018.</p>
Information Distribution	Information considered during the Focus Group Meeting, including the SWOT Analysis and presentation document was submitted to stakeholder representatives on 21 June 2018 for review and comment. The draft CMP document was distributed to stakeholder representatives on 20 July 2018 for review and comment.
Stakeholder Review	Input and comments received from stakeholder representatives were incorporated into the draft CMP for submission to the relevant heritage resource authorities.

3 Site Definition

3.1 Description and Significance

Guidance Note

Site descriptions and the ensuing discussions of CS drive the management of the heritage sites. Management plans must include clear descriptions to the character and extent of the site and define the CS built upon by verifiable sources, robust criteria and motivations.

3.1.1 Descriptions

The study area⁶ is known to comprise tangible and intangible heritage resources ranging from palaeontological through to the historical period. These resources do not occur in isolation from one another, but are rather as temporal palimpsests⁷ that reinforce a specific sense-of-place. In the context of this CMP, the Project is located within a cultural landscape comprising several layers that contribute to the spirit of place. These include:

- The natural landscape comprising flat plains and mountainous features;
- The palaeontological record associated with various fossil remains;
- The archaeological record associated with Earlier (ESA) and Middle Stone Age (MSA) lithic artefacts;
- The archaeological record associated with Later Stone Age (LSA) artefacts attributed to the /Xam group;
- The archaeological record associated with Rock Art engravings attributed to various San groups, and the /Xam in particular;
- The archaeological record associated with LSA artefacts and pottery attributed to Khoekhoe groups;
- The archaeological record associated with Rock Art paintings attributed to Khoekhoe groups;
- 18th and 19th century settlement of Xhosa groups in the Northern Cape, and their interactions with the /Xam, Korana and Griqua;
- Migrations of the frontier farmers from the Cape Colony into the region;
- The present-day farming and rural landscape; and
- A limited 21st century scientific environment with the introduction of the MeerKAT and KAT-7 radio-telescopes (colloquially referenced as the 'techno-eco' environment).

⁶ Refer to Section 3.2 for the precise delimitation of the study area.

⁷ An assemblage of material and objects that form part of the same deposit but are of different ages and 'life' span (Bailey, 2007)

3.1.2 Evaluation of Cultural Significance

CS⁸ was determined based on identified resources' importance or contribution to four broad value categories: aesthetic, historical, scientific and social values. These categories summarised the CS and other values described in Section 3(3) of the NHRA. The resources' importance or contributions to these values were considered in terms of associative (qualitative) and / or rarity (quantitative) attributes, based on data collected through the HRM process. The integrity or condition of resources further influenced the CS. Integrity is largely determined based on resources' current, observed state of conservation, as well as notable changes made to it over the years.

Field ratings assist the responsible heritage resources authority to grade heritage resources into national (Grade I), provincial (Grade II) or local (Grade III) categories, and are required under Chapter II Section 7(J) of the SAHRA Minimum Standards.

Field ratings considered the assigned CS and the level of official management required or the local competency of heritage authorities⁹.

Table 3-1: Broad value categories to inform CS

Value Category	Attributes		NHRA Reference
Aesthetic	1.	Importance in aesthetic characteristics	S. 3(3)(e)
	2.	Degree of technical / creative skill at a particular period	S. 3(3)(f)
Historical	3.	Importance to community or pattern in country's history	S. 3(3)(a)
	4.	Site of significance relating to history of slavery	S. 3(3)(i)
	5.	Association with life or work of a person, group or organisation of importance in the history of the country	S. 3(3)(h)
Scientific	6.	Possession of uncommon, rare or endangered natural or cultural aspects	S. 3(3)(b)
	7.	Information potential	S. 3(3)(c)
	8.	Importance in demonstrating principle characteristics	S. 3(3)(d)
Social	9.	Association to community or cultural group for social, cultural or spiritual reasons	S. 3(3)(g)

⁸ Cultural Significance is defined in the NHRA as the intrinsic "aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance" of a heritage resource. These attributes are combined and reduced to four themes used in the Digby Wells significance matrix: aesthetic, historical, scientific and social.

⁹ Currently the NC-PHRA is only competent to manage and issue permits on NHRA Section 34 heritage resources, and no local (i.e. local government) competency exists within the province. All decisions relating to archaeology, palaeontology and burial grounds and graves therefore fall under the ambit of SAHRA.

Table 3-2: Determined CS of Known Heritage Resource Types Within the Study Area¹⁰

Resource ID	Resource Period	Description	Designation
Abrahamskraal Formation	Precambrian (1,2 billion years ago [bya]) to late Pleistocene (20 kya)	Sandstone, mudstone lithology with diverse terrestrial and freshwater tetrapods of Tapinocephalus to Lystrosaurus Biozones, palaeoniscoid fish, freshwater bivalves, trace fossils and sparse vascular plants	Very High
White Hill Formation	Precambrian (1,2 bya) to late Pleistocene (20 kya)	Mesosaurid reptiles, rare cephalochordates, variety of palaeoniscoid fish, small eocarid crustaceans, insects, low diversity of trace fossils	Very High
ESA Occurrences	Earlier Stone Age (3 mya to 300 kya) (ESA)	Long blades, cores and low incidences of formal tools moderate to heavily weathered	Low
MSA	Middle Stone Age (c. 300 kya to 30 kya) (MSA)	High proportion of minimally modified blades and points produced from good quality raw material, including hornfels (which is highly patinated) and quartz. Occur widely over the landscape mostly through geological action rather than human.	Negligible
LSA Occurrences	Later Stone Age (c. 30 kya to 2 000 years ago [ya]) (LSA)	Assemblage characterised by un-patinated hornfels.	Low
LSA		Microlithic scrapers and segments. Assemblages characterised by many blades and backed blades on CCS characteristic of Swartkop assemblages).	High

¹⁰ Refer to Chapter 7 of the HIA (Appendix A) for detailed reasoning on determined designations.



Resource ID	Resource Period	Description	Designation
Rock Engravings	Later Stone Age (c. 30 kya to 2 000 ya) (LSA)	Images produced by incising, chipping, or pecking to depict imagery of realistic and proportionally correct animals, human figures and shamanistic concepts	Very High
LSA	LSA Herder period (after 2 000 ya to c. 1000 CE)	Lithics dominated by coarse irregular flakes commonly on quartz, with small or absent retouched component. Associated with thin walled ceramics	Medium
Rock Paintings	LSA Herder period (after 2 000 ya to c. 1000 CE)	Limited and distinctive set of geometric forms, such as circular outlines, crosses, lines, concentric circles, oblong forms and finger-applied dots	High
Burial grounds and graves	Later Stone Age (c. 30 kya to 2 000 ya) (LSA)	Unidentified burials associated with the /Xam	Very High
Burial grounds and graves	British Colony and First Boer Republics (1814 CE to 1880 CE)	Burial grounds and graves affiliated with historic farmsteads and associated labourer homesteads - i.e. Xhosa, Korana and Griqua	Very High
Burial grounds and graves	Union of South Africa (1910 CE to 1961 CE)	Burial grounds and graves affiliated with historic farmsteads and associated labourer homesteads	Very High
Burial grounds and graves	Apartheid Republic of South Africa (1961 to 1994)	Burial grounds and graves affiliated with historic farmsteads and associated labourer homesteads	Very High
Historic Built Environment	British Colony and First Boer Republics (1814 CE to 1880 CE)	Corbelled houses - vernacular architecture in the context of setting	High

Resource ID	Resource Period	Description	Designation
Historic Built Environment	Union of South Africa (1910 CE to 1961 CE)	Farmstead ruins and complexes as tangible markers of a historically layered cultural landscape	Low
Visual	N/A	Visual, aesthetic and scenic character	Medium

The CS of the various heritage resource types known to occur within the site-specific and local study area demonstrates the cultural heritage landscape to have a high CS rating.

Further to the aforementioned CS considering the criteria encapsulated in Section 3(3) of the NHRA, the site-specific study area is situated within the /Xam Cultural Landscape. This, along with the #Khomani Cultural Landscape¹¹ was considered in the UNESCO Tentative World Heritage Site List. The UNESCO Outstanding Universal Value (OUV) criteria under which the inscription was proposed are summarised in Table 3-3.

Table 3-3: Criteria and Justification under Which Inscription was Proposed

OUV Criteria	Description
(iii) Bear a unique or at least exceptional testimony to a cultural tradition or to a civilisation which is living or which has disappeared	<p>The recorded history preserves tangible evidence of the presence of the San and their ancestors in the form of archaeological deposits that stretch back to primordial human populations. More recently the economic and spiritual bonds of the 19th century /Xam (a San group) with their land, was copiously recorded in the 1870s, something not done elsewhere. Their rock engravings served to permanently enhance the spiritual potency of certain places used for rainmaking, initiation and other rituals.</p> <p>After hundreds of years of progressive subordination, assimilation and finally colonial era genocide, the /Xam are culturally extinct.</p>
(iv) Be an outstanding example of a type of building, architectural or	The cultural landscape exemplifies a hunter-gatherer lifestyle of deep antiquity, designed to survive an extreme environment

¹¹ UNESCO inscribed the #Khomani Cultural Landscape as a World Heritage Site in July 2017 based on its OUV against criteria (v) and (vi)

OUV Criteria	Description
<p>technological ensemble or landscape which illustrates a significant stage in human history</p>	<p>and live respectfully with nature, within the boundaries of nature rather than apart from it. There is ample evidence for artistic and ritual associations between particular places and beliefs about a potent spirit world that could be accessed to heal sickness and create harmony.</p> <p>Archaeological remains demonstrate the linkages between material culture and the environment.</p>
<p>(v) Be an outstanding example of traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change</p>	<p>The cultural landscape is expressive of the way of life that has dominated the long span of human history, i.e. the manner in which scarce resources such as water and plant foods were dealt with in conjunction with natural phenomena such as drought and predators.</p> <p>The hunting and tracking knowledge, skills in sourcing water and plant foods and the many other resources on which they depended, the cultural ways, belief systems that have facilitated life in these environments, are unique.</p> <p>San are widely regarded as the direct descendants of the ancestors of all humankind as confirmed by genetic studies. The San demonstrate the close linkages between genetics, the ecology of waterless landscapes, and the exceptional cultural technologies developed to survive in it.</p>
<p>(vi) Be directly or tangibly associated with event or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance</p>	<p>Records of the San and their history and culture reveal a rich and deep ethnobotanical knowledge and the potent spiritual world that underscores their beliefs. These reveal the deep respect for nature and the dynamic relationship between humans and other living creatures, some of them mythical or having mythical powers, that ensures the optimal use of resources with minimal damage to sustainability.</p> <p>San art is understood as being a deeply spiritual art, one that harnesses and shares with others the power of successive generations of San spiritual experience and enlightenment.</p> <p>The /Xam records as captured in the 1870s, and registered with the “Memory of the Word” project, are recognised as literally works through translation of /Xam poetry and folklore that assist scholars to understand deeper meanings of Rock Art.</p>

3.2 Delimitations

Guidance Note

The precise position and delimitation of a site are important. They define where and to what extent actions and restrictions that are part of the management programme will be applicable and facilitated.

The Project is located in the Karoo region in the Northern Cape Province of South Africa, some 900 km, 650 km and 90 km from Johannesburg, Cape Town and Carnarvon respectively. As previously mentioned, the Project comprises two primary components, namely the 'core' (36 land parcels) and three 'spiral arms' (73 land parcels) covering an approximate areal extent of 211 000 hectare (ha). Table 3-4 presents a summary of the Project location detail (*Affected towns highlighted*).

Table 3-4: Project Location Summary

Province	District Municipality	Local Municipality	Towns
Northern Cape	Namakwa District Municipality (NDM)	KHLM	Williston
			Sutherland
			Fraserburg
		HLM	Calvinia
			Brandvlei
			Loeriesfontein
	PSDM	KLM	Carnarvon
			Vosburg
			Vanwyksvlei
		Slyathemba Local Municipality (SLM)	Prieska
			Marydale
			Copperton
		Ubuntu Local Municipality (ULM)	Victoria West
			Loxton
			Richmond

This CMP was developed for incorporation into the Proposed National Park Management Plan (i.e. core project area delineated by the 36 land parcels). The management and mitigation principles, however, are applicable to any activities being undertaken within the 'spirals', as required. The Proposed National Park delimitation in relation to the Project is presented in Plan 1.

3.3 Ownership Structures

Guidance Note

The ownership structure and organisational form of the operating entity must be explained with respect to proprietors and users.

The NRF are the landowners of the “core” area. SARAO is a national facility of the NRF who is responsible for securing and managing the SKA site (core and 3 spiral arms). The SKAO is an international Treaty Organization which is responsible for the design, construction and operation of the SKA radio telescope in South Africa and Australia. SANParks has been appointed by the NRF as the land management authority responsible for the management and implementation of the proposed National Park which includes the development and approval of the Park Management Plan.

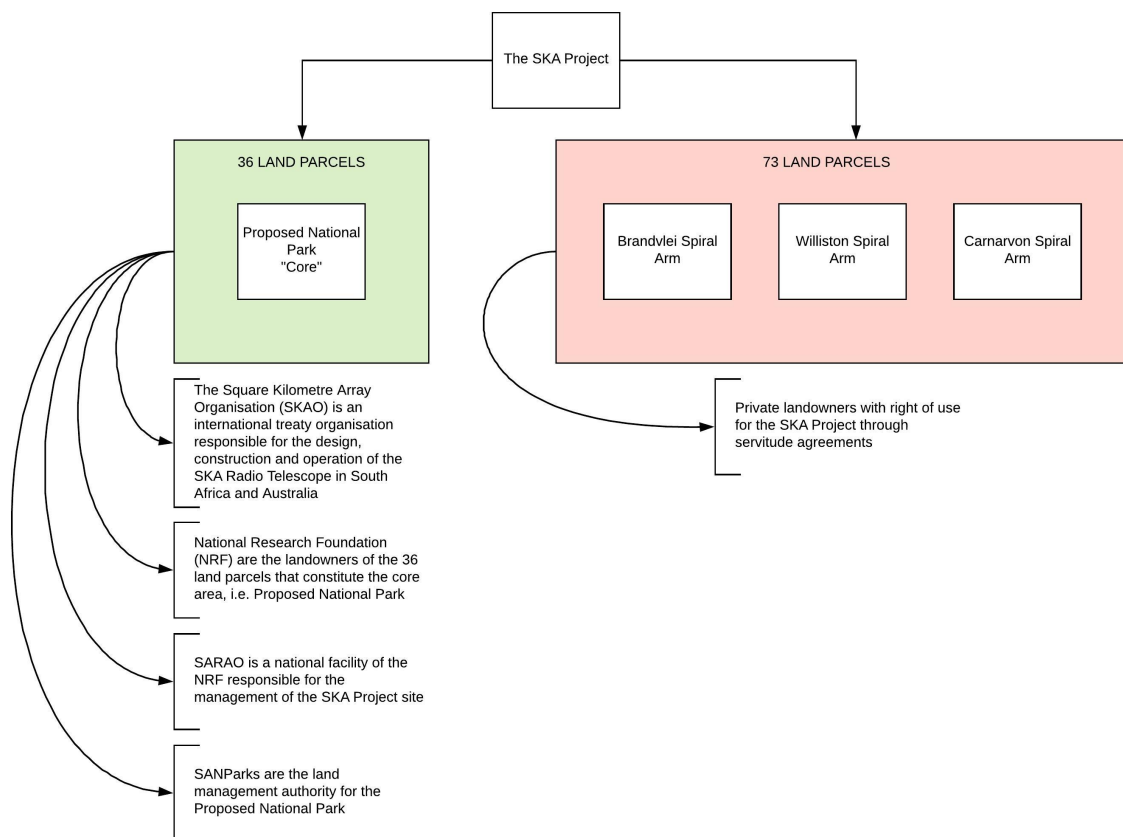


Figure 3-1: Ownership Structure of the SKA Project

Heritage resources are contemplated in terms of Section 3 of the NHRA. Section 3(1) states, “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 the heritage resources authorities”.

The national estate may include 2(a) places, buildings, structures and equipment of CS; (b) places to which oral traditions are attached or which are associated with living heritage; (c)

historical settlements or townscapes; (d) landscapes and natural features of CS; (e) geological sites of scientific or cultural importance; (f) archaeological or palaeontological sites; (g) graves and burial grounds; and (h) sites of significance relating to the history of slavery in South Africa.

3.4 Access

Guidance Note

Access relates to the free movement of proprietors and users of the heritage site or the restriction of movement to the heritage site to manage identified risks and liabilities. The management plan must be developed to facilitate access to the best benefit of society.

The Proposed National Park is serviced by a provincial and private road network (See Plan 2). The existing road network will facilitate at least four access points. Considering the nature of the Project, it was necessary to provide for the protection of the study areas astronomy geographic advantage from radio frequency (RFI) and electromagnetic interference (EMI). This was achieved through promulgation of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) (AGA Act) on 17 June 2008 (Government Gazette No. 32163). The AGA Act, in the context of this management plan, delineates the Karoo Central Astronomy Advantage Areas (KC-AAA), as well as provides the framework and principles to protect astronomy endeavours in South Africa. Therefore, access to the Proposed National Park will be defined Park Management Plan, taking into consideration the requirements of encapsulated in the Control of Access to Public Premises and Vehicles Act, 1985 (Act No. 53 of 1985).

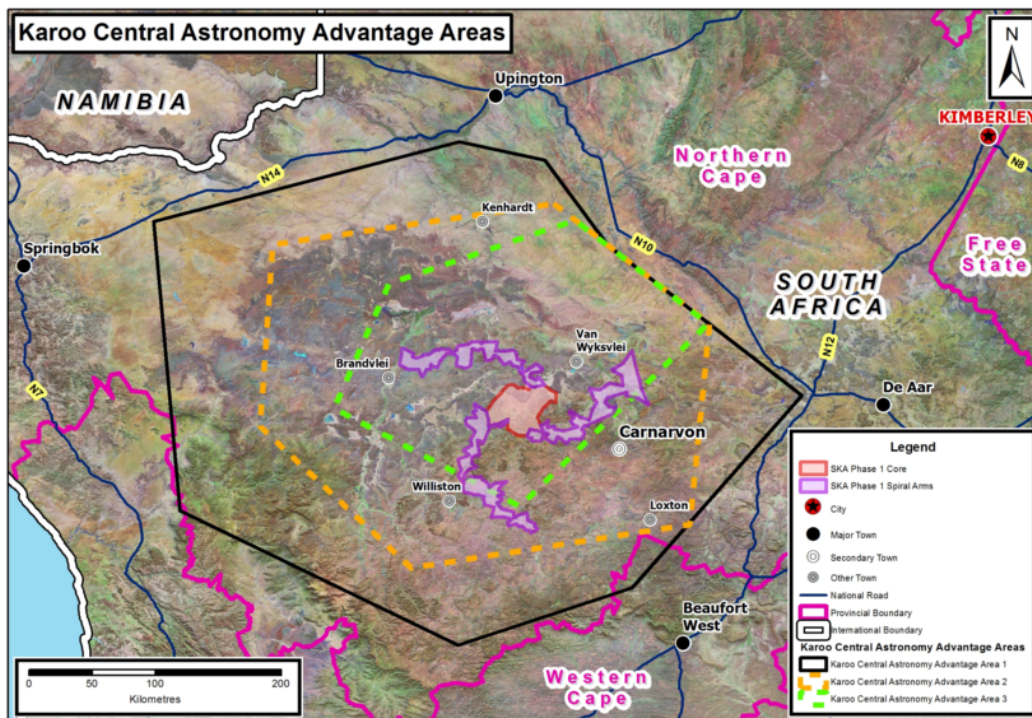


Figure 3-2: The KC-AAA as created by the AGA Act

Communities may be provided access to grave and cultural sites for ritual purposes. This must, in the absence of the Park Management Plan, be done by appointment through SARAO and under the escort of a SARAO staff member to ensure adherence to RFI and health and safety requirements.

SKA Project

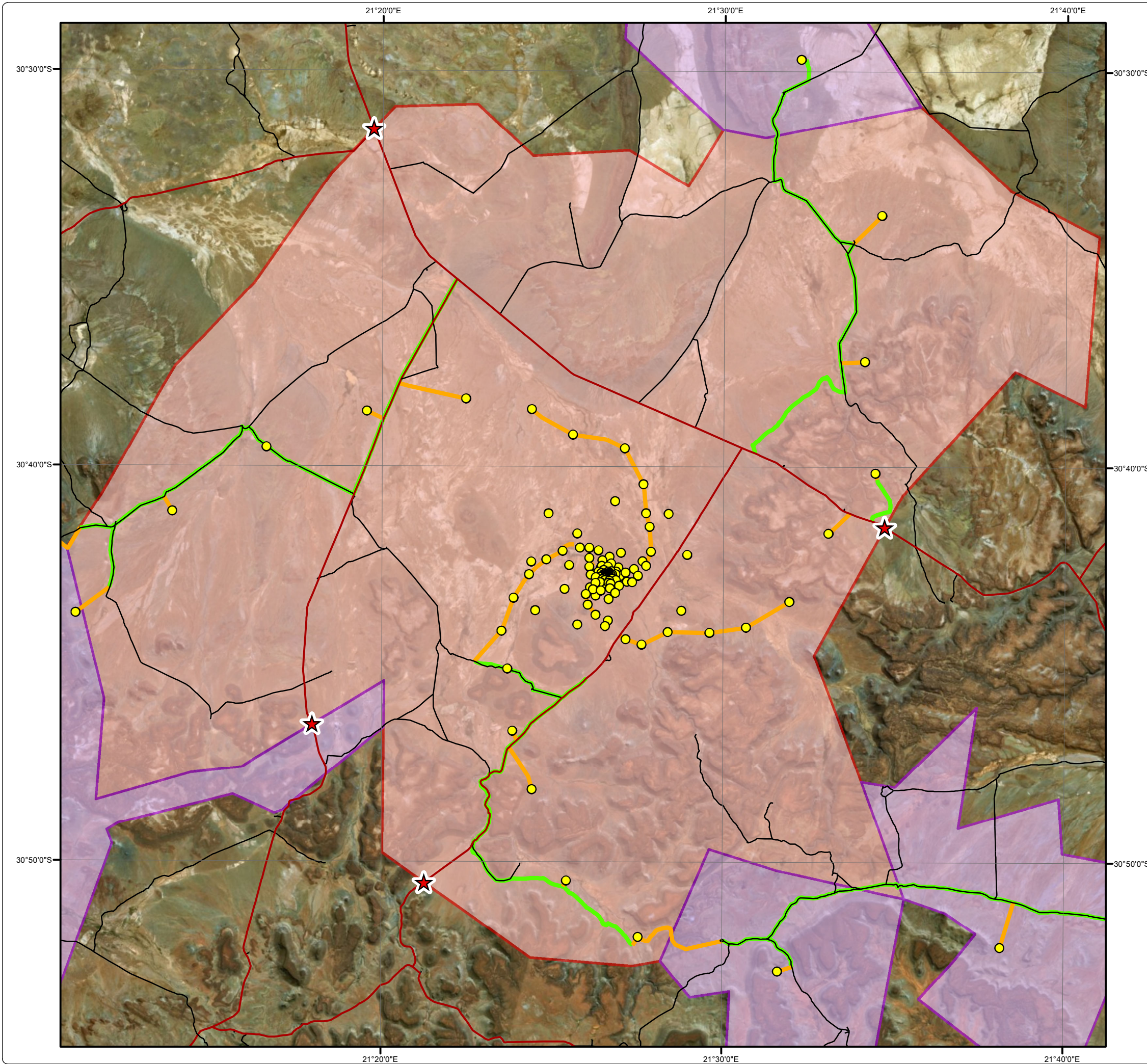
Access Routes

Legend

- SKA Phase 1 Core
- SKA Phase 1 Spiral Arms
- Access Points
- Satellite Dish
- Main Road
- Other Access Road

Access Routes

- Existing Road to be Upgraded
- New Road

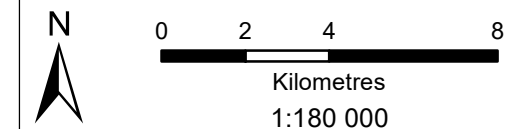


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4 Management Structures

Guidance Note

Implementation of a CMP requires co-operation between several entities that have bearing on the way various interests and policy objectives are implemented. These need to be captured in a CMP to define competencies, responsibilities and modalities of co-ordination. The management plan should contain a description of all these entities as well as a binding agreement of their competences and responsibilities in the context of the plan.

4.1 Legal Status of Entities

The international SKAO, currently a Pty (Ltd) company registered in the United Kingdom, will implement the SKA Project over two sites in Australia and South Africa respectively. Presently, work to establish an international Treaty Organization is underway where all SKA member countries will sign up to. As part of being awarded the SKA, the South African government must make available the site and existing infrastructure for the construction of the SKA. The NRF through its National Facility, SARAO is therefore responsible for providing the land and existing infrastructure to the international SKAO.

In support of the Project, the South African government promulgated the AGA Act, which in terms of Section 15(2) appointed the Department of Science and Technology (DST) as the primary Astronomy Management Authority of the KC-AAAs. In turn, the DST as the Astronomy Management Authority entered into a co-management agreement with the NRF in terms of Section 18 of the AGA Act.

The MeerKAT and SKA radio telescope has been identified as a Strategic Infrastructure Project (SIP 16) as part of the National Development Act reporting to the Presidential Infrastructure Coordinating Commission (PICC). As a strategic project of both national and international importance, the National Department of Environmental Affairs appointed the CSIR to undertake a Strategic Environmental Assessment (SEA) for the first phase of the SKA in South Africa. The outcome of the SEA process is an Integrated Environmental Management Plan (IEMP) which defines the management outcomes which must be implemented by the SKAO and the NRF.

One of the management outcomes of the IEMP is to declare a Protected Area. In light of this, the NRF has appointed SANParks as the Land Management Authority for the 'core' area (*i.e. proposed National Park*), to be declared a Protected Area in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PAA). The directive of SANParks is to implement the requirements contained within the IEMP that promote the conservation of biodiversity and cultural assets in line with SANParks mandate and values as detailed in Chapter 2 of the SANParks Framework for Developing and Implementing Management Plans document.

Heritage resources as contemplated in the NHRA form part of the national estate (Refer to Section 3.3 above). The national estate fall under the jurisdiction of the relevant heritage resource authorities established in respect of Section 4(d) of the NHRA. In the context of this CMP, these include SAHRA and NC-PHRA.

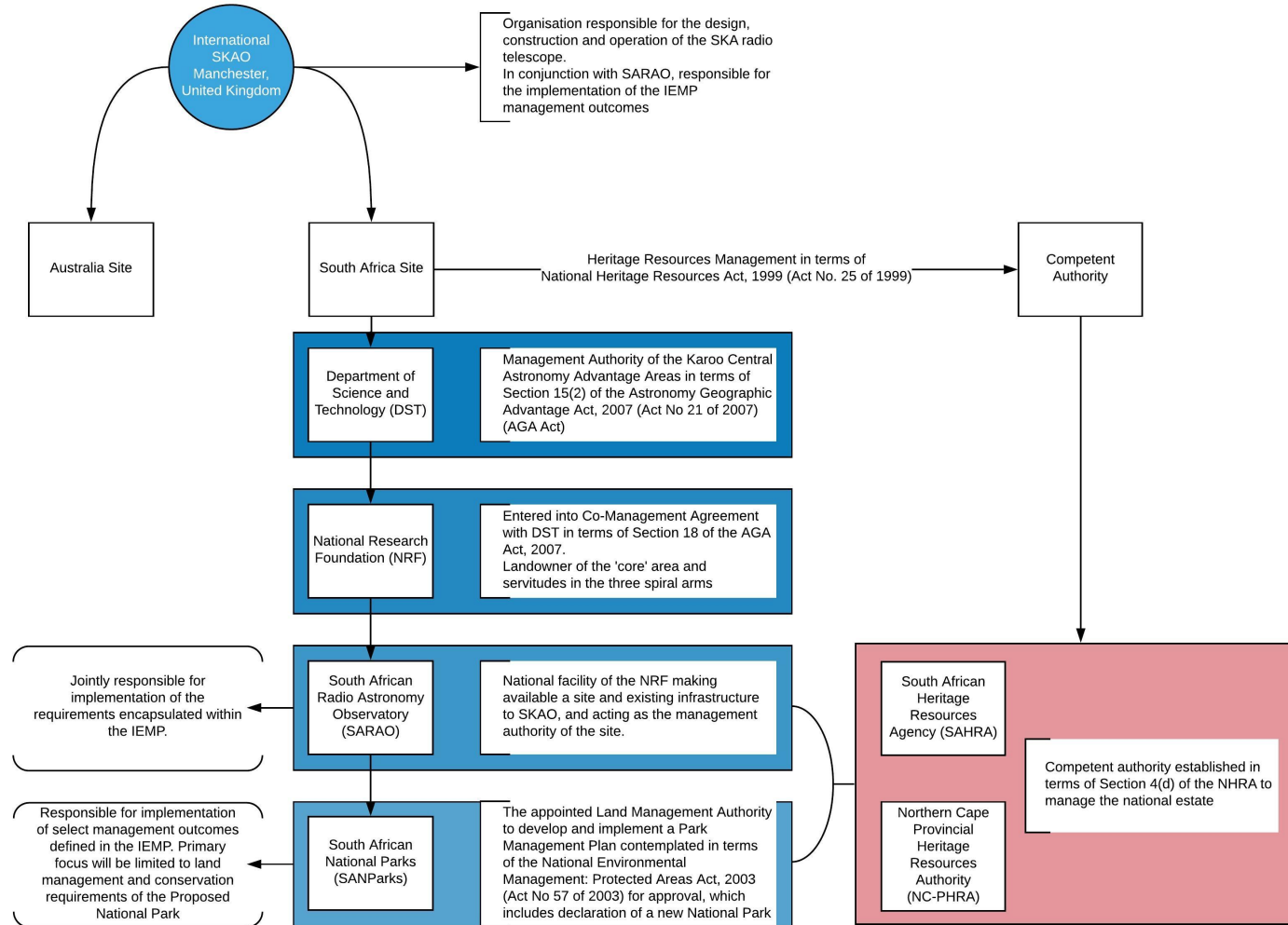


Figure 4-1: Summary of Primary Entities, Legal Status, and Abbreviated Responsibilities

4.2 Competencies and Responsibilities

The international SKAO is responsible for the design, construction and operation of the SKA radio telescope across Australia and South Africa respectively.

The DST, as the Astronomy Management Authority, and NRF as the co-management entity and landowner, are ultimately responsible for the South African component of the Project.

SARAO is jointly responsible to implement the management outcomes contained in the IEMP.

SANParks is the appointed land management authority are responsible for development of a Park Management Plan for approval which include the declaration of a new National Park. Furthermore, they are responsible to implement select management outcomes defined in the IEMP.

The aforementioned entities are jointly responsible for the conservation and ethical management of heritage resources and the cultural landscape.

SAHRA and NC-PHRA are the competent authorities responsible for the regulation of the CMP in terms of the national legislative framework. The NHRA states:

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.

35. (1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.

36(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make the necessary arrangement for their conservation as they see fit.

4.3 Coordination Mechanisms between Entities

The South African Heritage Resources Information System (SAHRIS) platform will be the primary co-ordination mechanism between the various entities. The SAHRIS platform is in the public domain and will allow for process transparency. All documentation, including the HIA and CMP, will be captured under the unique SAHRIS Case ID: 12292¹².

¹² <http://www.sahra.org.za/sahris/cases/nrf4874-sarao-ska-hia-and-conservation-management-plan>

5 Principles for Planning and Action

This chapter details a situational analysis of the Project as relevant to HRM that informs the guiding principles of the CMP. The guiding principles in turn serve as the foundation to develop specific and achievable objectives, targets and strategies in line with the SANParks mission and defined Cultural Heritage Objectives for the Proposed National Park Management Plan.

These steps are presented separately in the following sections, culminating in a masterplan of action which SANParks must incorporate into the Proposed National Park Management Plan for implementation.

5.1 Situational Analysis

A situational analysis of the Project was undertaken by means of SWOT (*Strengths, Weaknesses, Opportunities, and Threats*). The SWOT Analysis identified:

- Current strengths of the Project as relevant to the HRM Process;
- Current weaknesses of the Project as relevant to the HRM Process;
- Achievable opportunities; and
- Threats to the implementation of the proposed masterplan of action.

The outcomes of the SWOT Analysis are summarised in Table 5-1. The identified strengths and weaknesses informed the development of the guiding principles of the CMP (Refer to Figure 5-1). These are presented in 5.2 below.

5.2 Guiding Principles

The defined guiding principles for this CMP are:

- Recognise the mandate to conserve heritage resources in terms of the South African national regulatory framework and best practice standards;
- Ensure the long-term sustainable conservation of the cultural landscape;
- Taking into account the requirements of the AGA Act, maintain and enhance the integrity of the cultural landscape and sense-of-place;
- Adhere to the established limits of acceptable change to heritage resources and cultural landscapes;
- Acknowledge the core area does not occur in isolation and planning must ensure integration with surrounding landscapes, and economic and social structures; and
- Accommodate strategic, flexible and iterative planning procedures.

Table 5-1: SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ The SKA project is an international project to construct the world’s largest radio telescope. An international Treaty Organization is being established and will be funded by all member countries who are signed up to the Treaty Organization; ▪ The MeerKAT and SKA Radio Telescope is a Strategic Integrated Project (SIP 16 reporting to the PICC); ▪ The SKA Phase 1 IEMP has been approved as an Environmental Management instrument in terms of Section 24 the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA); ▪ Heritage resources are formally protected by the NHRA, their management further informed by international best practice doctrinal text; ▪ Tangible heritage resources are known within the site-specific study area; ▪ Identified tangible heritage resources contribute to the understanding of the cultural landscape; ▪ OUV of the cultural landscape recognized; ▪ The HIA provides reasonable and feasible management and mitigation recommendations; ▪ The NRF are the landowners of the SKA site and servitudes, and SARAO is a National Facility of the NRF; ▪ SANParks are appointed as the land management authority; ▪ Management of the core area is not totally reliant on government grants and donations; ▪ A memorandum of understanding between SARAO and the San Council has been established and is being implemented; ▪ SKAO, SARAO and SANParks comprise a pool of technically qualified staff; ▪ The core area is serviced by an established road, power and fibre network; ▪ Site-specific study area is situated within the Karoo Highlands Tourism Route; ▪ Sutherland and Fraserburg towns have an established presence within tourism route; ▪ The Northern Cape Department of Economic Development and Tourism (NC-DEDT) have secured funding for the development of an SKA Exploratorium in Carnarvon for the purpose of multi-disciplinary information sharing and outreach programmes; 	<ul style="list-style-type: none"> ▪ The SKA Project has received some resistance from small sectors of the local community; ▪ Apparent disconnect between various parties to capitalize of identified socio-economic opportunities; ▪ The known tangible heritage resources within the site-specific study area do not represent an exhaustive list of heritage resources that may be present; ▪ Perception of core area limited to astronomy thematic links; ▪ Proposed changes to select heritage resources, such as the built environment, may affect the determined CS of the identified landscape; ▪ Distance of the core area from main centres may hinder the development of eco/cultural tourism; ▪ Limited capacity to develop eco/cultural tourism within the core area due to RFI restrictions as governed by the AGA Act; ▪ Absence of a tourism management plan for the core area; ▪ Prohibited use of electronics in core area due to RFI restrictions; ▪ Lack of adequate facilities for visitors.
Opportunities	Threats
<ul style="list-style-type: none"> ▪ The SKA Project can be a catalyst and key point for affirming our national identity and character when we consider the landscape as a palimpsest of cultural layers; ▪ Management of cultural heritage as a finite resource will ensure the accessibility to these resources for future generations; ▪ Implementation of recommended mitigation and management measures will reduce the intensity of the limited identified impacts, and can promote the enhancement of the attributed CS of the landscape; ▪ Affiliations with the Sol Plaatjies University Cultural Heritage and Archaeology Department and McGregor Museum can be strengthened through identification and undertaking of specific research projects; ▪ All vested stakeholders can align strategies to capitalize on identified socio-economic benefits; ▪ Potential to upskill local communities and create business opportunities at a local and regional level; ▪ The SKAO, NRF, SARAO and SANParks can actively promote cultural heritage themes; ▪ Thematic links between palaeontology, cultural heritage, cosmology and astrology can be developed and marketed within the Karoo Highlands Tourism Route and proposed SKA Exploratorium; ▪ Niche tourism products can be developed to cater to general public with specific interest in aforementioned themes while adhering to the SKA specific requirements and restrictions as encapsulated in the AGA Act 	<ul style="list-style-type: none"> ▪ Palaeontological and archaeological resources commonly occur at sub-surface levels, therefore may not have been previously identified and now susceptible to accidental exposure, damage or destruction; ▪ The core site-specific study area has not been declared a Protected Area under the NEM: PAA as yet; ▪ The Minister may reject the intent to declare the core site-specific study area a Protected Area under the NEM: PAA; ▪ The heritage resource authorities issuing a negative Record of Decision; ▪ Buy in from various entities in terms of proposed management measures; ▪ Ineffective co-operation, participation and communication between various entities;

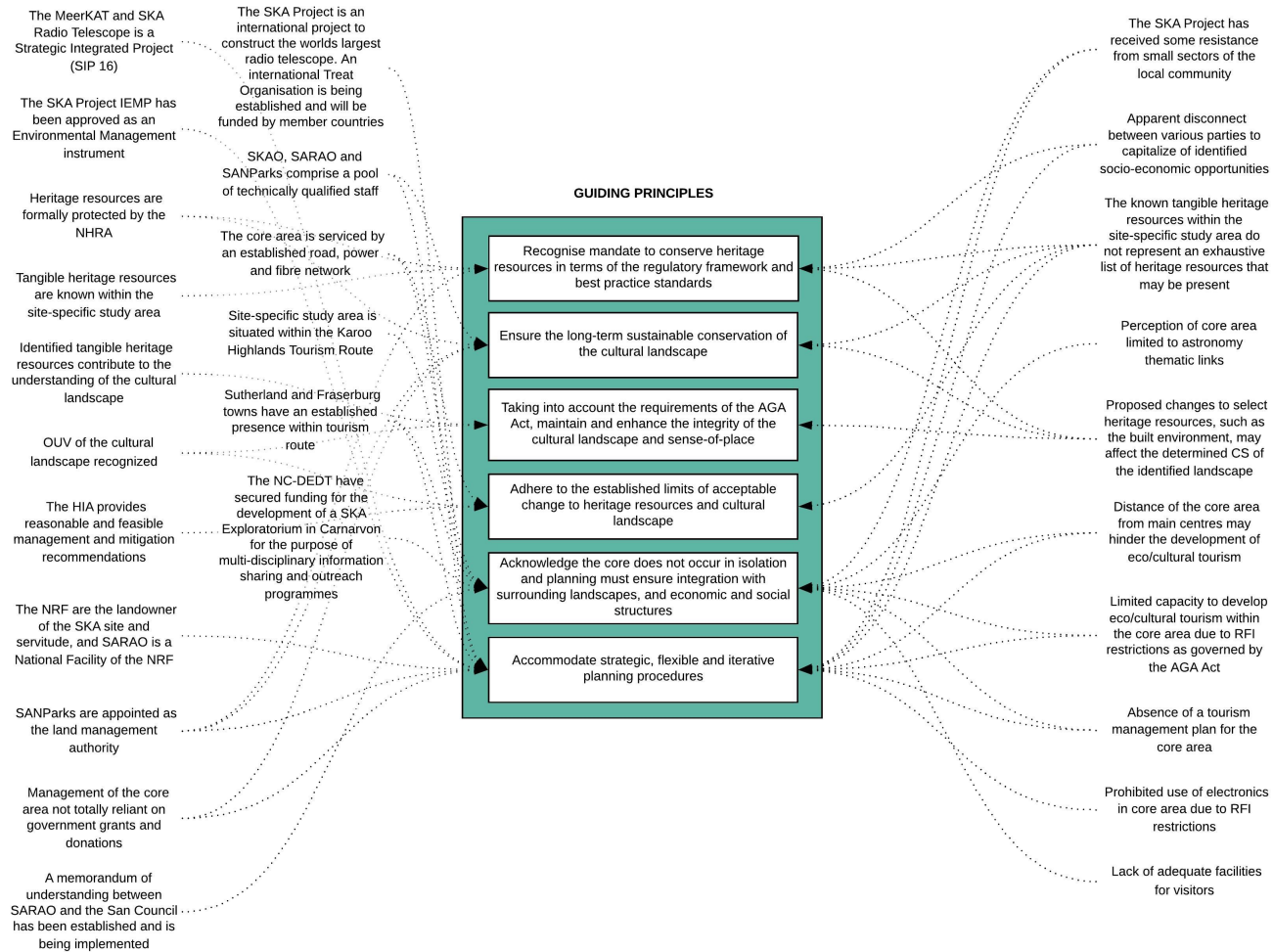


Figure 5-1: Identified Strengths and Weaknesses that Informed the Development of the Guiding Principles

5.3 Objectives, Targets and Strategies

Guidance Note

Principles for planning and actions are anchored in general strategies and policies. These will have specific targets that should be defined and met through the implementation of the CMP. What is best for a heritage site considering the specific, defined CS and the opportunities is the main objective of any CMP. Several aspects, such as preservation, access, provisions for science and research should be integrated with this objective, as well as a vision for the future and sustainable use.

The guiding principles serve as the foundation to defining specific objectives and developing achievable targets and strategies. In the context of this CMP, the guiding principles have been considered in conjunction with SANParks mission and defined Cultural Heritage Objectives for the Proposed National Park Management Plan to promote alignment and integration.

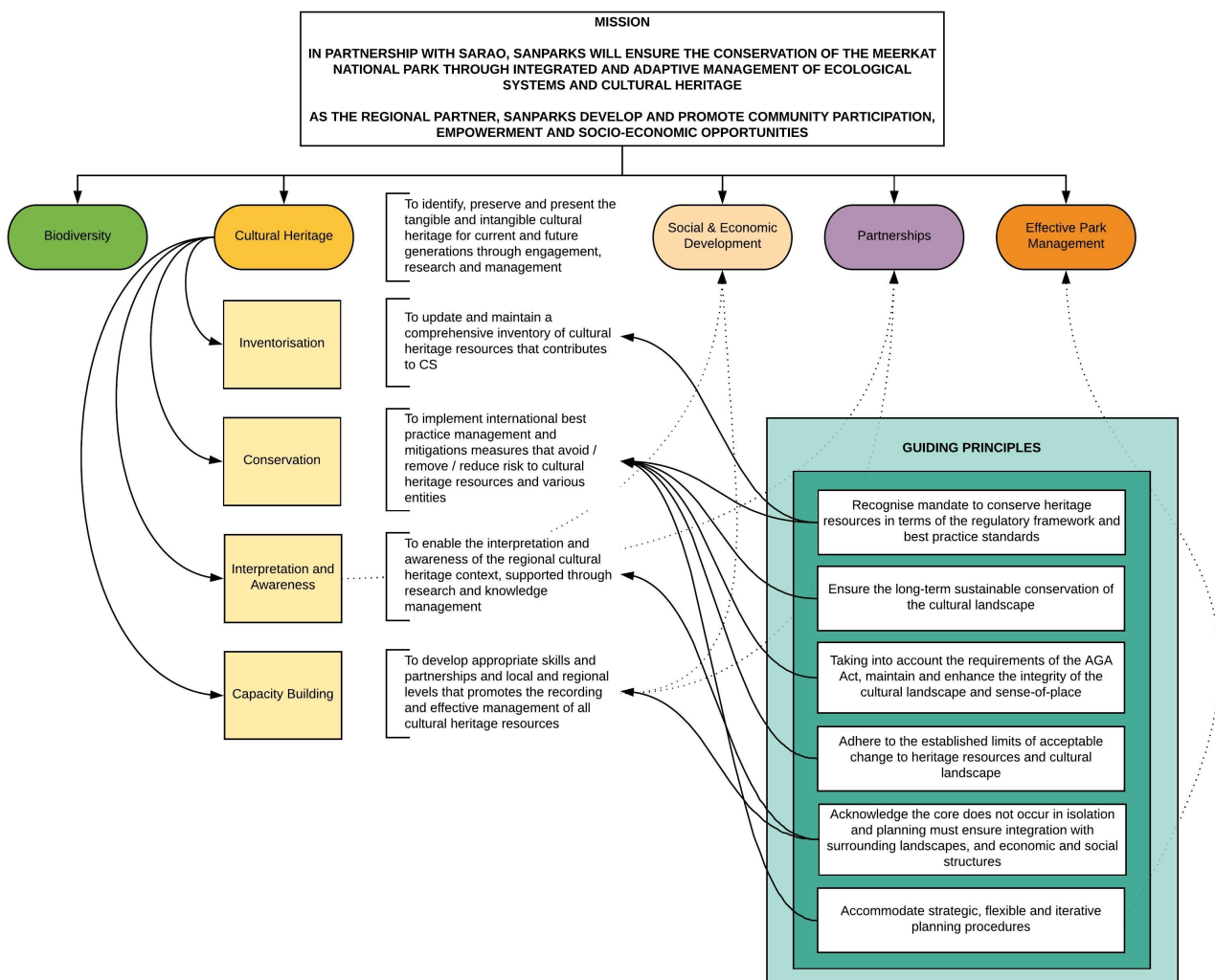


Figure 5-2: Defined Guiding Principles Considered in Conjunction to the SANParks Mission and Defined Cultural Heritage Objectives for the Proposed National Park Management Plan

Therefore, commensurate to this CMP the following objectives, targets and strategies are applicable:

Table 5-2: Cultural Heritage Objectives, Targets and Strategies

Cultural Heritage Objective		
To identify, preserve and present the tangible and intangible cultural heritage for current and future generations through engagement, research and management		
Sub-Objective	Target	Strategy
Inventorisation: To update and maintain a comprehensive inventory of cultural heritage resources that contributes to CS	Maintain a comprehensive inventory of cultural heritage resources within the Proposed National Park in accordance with the Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa (2017).	<ul style="list-style-type: none"> ▪ Have a Proposed National Park cultural heritage resource inventory on-site; ▪ Maintain the developed cultural heritage resource inventory created during the HRM Process; ▪ Utilise the GIS Interactive Map created during the HRM Process
	Update the comprehensive inventory of cultural heritage resources within the Proposed National Park, as and when required, in accordance with the Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa (2017).	<ul style="list-style-type: none"> ▪ Record all newly identified cultural heritage resources in accordance with the requirements of Chapter 11 of the Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa (2017); ▪ Utilise the Cultural Heritage Recording Document provided in Appendix B; ▪ Transfer all collected data from the Cultural Heritage Recording Document to the digital Proposed National Park cultural heritage inventory; ▪ Update the GIS Interactive Map quarterly.
	Update the Inventory of National Estate in terms of Section 39 of the NHRA.	<ul style="list-style-type: none"> ▪ A qualified and accredited archaeologist must audit the Proposed National Park cultural heritage inventory bi-annually and ground truth newly identified cultural heritage resources annually; ▪ Supply the vetted Proposed National Park cultural heritage inventory to SAHRA via SAHRIS annually.

Cultural Heritage Objective		
To identify, preserve and present the tangible and intangible cultural heritage for current and future generations through engagement, research and management		
Sub-Objective	Target	Strategy
Conservation: To implement international best practice management and mitigations measures that avoid / remove / reduce risk to cultural heritage resources and various entities	Strive to achieve compliance with the principles encapsulated in Section 5 of the NHRA with specific reference to (7): <i>(b) Take account of material or cultural heritage value and involve the least possible alteration or loss of it;</i> <i>(e) safeguard the options of present and future generations.</i>	<ul style="list-style-type: none"> Implement the scope and procedures of the CMP as detailed in Chapter 6 below
	Comply with the requirements of the South African regulatory framework, with specific reference to the NHRA in terms of Sections 34(1), 35(4) and 36(3).	
	Promote the <i>in situ</i> conservation of all cultural heritage resources as far as is feasible.	
	Identify all risks to the <i>in situ</i> conservation of all cultural heritage resources and implement proactive management measures to avoid or remove risks.	
	Mitigate cultural heritage resources to reduce intensity of identified impacts and/or risks in accordance with the requirements of the South African regulatory framework, with specific reference to the NHRA in terms of Sections 34(1), 35(4) and 36(3), and the NHRA Regulations (GN R 548).	
Interpretation and Awareness: To enable the interpretation and awareness of the regional cultural heritage	Strive to achieve compliance with the principles encapsulated in Section 5 of the NHRA with specific reference to (7): <i>(c) promote the use and enjoyment of and access to heritage resources, in a way</i>	<ul style="list-style-type: none"> Establish partnerships with the Sol Plaatjies University Cultural Heritage and Archaeology Department and McGregor Museum to encourage cultural heritage research within the Proposed National Park;

Cultural Heritage Objective		
To identify, preserve and present the tangible and intangible cultural heritage for current and future generations through engagement, research and management		
Sub-Objective	Target	Strategy
context, supported through research and knowledge management.	<i>consistent with their cultural significance and conservation needs; and (f) be fully researched, documented and recorded</i>	<ul style="list-style-type: none"> Through the identified management structures (Refer to Chapter 4), other national, provincial and local government entities, and vested stakeholders, develop curated experiences, information sharing solutions and outreach programmes via the proposed SKA Exploratorium in Carnarvon.
Capacity Building: To develop appropriate skills and partnerships and local and regional levels that promotes the recording and effective management of all cultural heritage resources	<p>Strive to achieve compliance with the principles encapsulated in Section 5 of the NHRA with specific reference to (7):</p> <p><i>(d) contribute to social and economic development</i></p>	<ul style="list-style-type: none"> Identify human resources from the local community to assist in the partial implementation of the scope and procedures of the CMP as detailed in Section 6 below; Through the identified management structures (Refer to Chapter 4), other national, provincial and local government entities, and vested stakeholders, develop outreach programmes via the proposed SKA Exploratorium in Carnarvon.

5.4 Masterplan of Action

Guidance Note

All completed and planned actions should be listed in relation to the defined objectives to guide decision making processes of competent authorities. The masterplan is not static and should be continuously reviewed and updated to remain applicable to changes and developments.

The masterplan of action must be reviewed and updated by SKAO quarterly during the construction phase to facilitate proactive planning. The updated masterplan of action must be included in the SKA integrated construction schedule for SKA1.

The updated masterplan of action must be submitted to the competent authorities annually via the defined co-ordination mechanisms (Refer to Section 4.3 above).

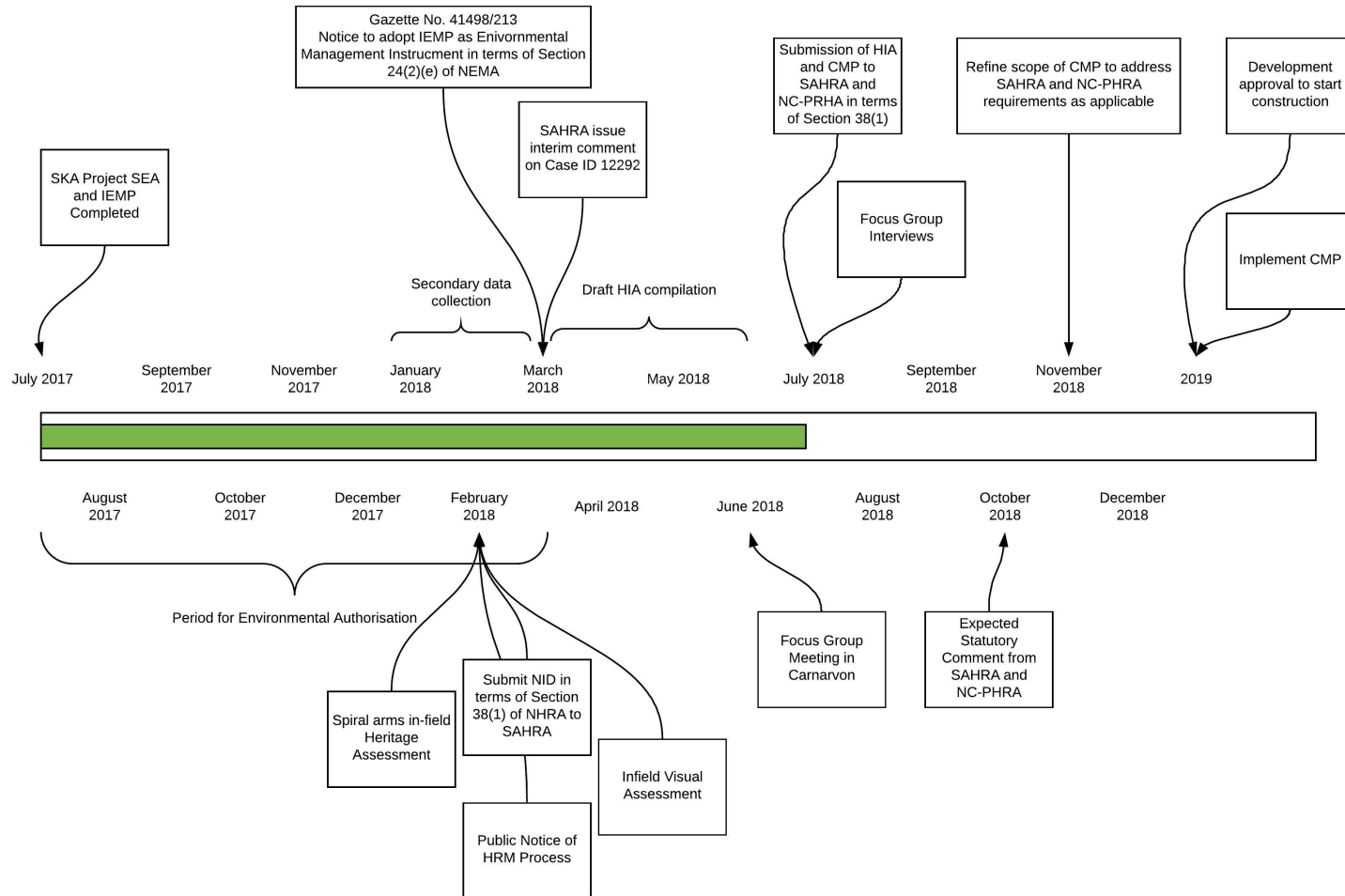


Figure 5-3: Current Masterplan of Action

6 Preservation Mechanisms

Guidance Note

Preservation, as the broadest objective of a CMP, is undertaken for specific purposes that must consider all aspects. A CMP must aim to balance the benefits of preservation with acceptable levels of degradation.

In accordance with the guiding principles and cultural heritage objectives discussed in Chapter 5 above, this chapter details the required preservation mechanism applicable to the SKA Project and Proposed National Park management.

To develop appropriate and feasible mechanisms commensurate to the nature of this Project, potential current and future risks to known cultural heritage resources and the cultural landscape must be identified. These are considered under Section 6.1 below. The consequent preservation mechanisms discussed in Section 6.2 and 6.3 include:

- Project-related mitigation measures;
- Heritage-related mitigation measures; and
- Preventative protection measures.

6.1 Current and Future Risks

Guidance Note

Current and future threats to heritage sites and the cultural landscape must be identified, defined and assessed. The CMP must aim at balancing risks with preservation to ensure threats become opportunities.

Current and future risks to cultural heritage resources and the cultural landscape in the context of the SKA Project and Proposed National Park were considered in the HIA (Refer to Appendix A). This section provides a summary of the identified current and future risks to the cultural landscape taking into consideration the nature of the Project.

The identified current and future risks to the cultural landscape are presented in the following table:

Table 6-1: Identified Current and Future Risks

Impact	Pre-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance
Direct impacts to palaeontological resources through the development of new roads or existing road upgrades	Permanent	Province/Region	Very low - negative	Moderately detrimental	Improbable	Negligible - negative

Impact	Pre-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance
Direct impact to identified fossil heritage on the Farm Son Tuin (Die Tuin)	Permanent	Province/Region	Moderate - negative	Highly detrimental	Unlikely	Minor - negative
Potential direct impacts to palaeontological resources - good integrity	Permanent	Province/Region	Very high - negative	Extremely detrimental	Probable	Minor - negative
Potential direct impacts to palaeontological resources - poor integrity	Permanent	Province/Region	Very low - negative	Moderately detrimental	Probable	Minor - negative
Direct impacts to multi-layered archaeological sites with medium CS	Permanent	Province/Region	Moderately high - negative	Highly detrimental	Improbable	Negligible - negative
Direct impacts to Stone Age scatters and isolated findspots with low CS	Permanent	Province/Region	Very low - negative	Moderately detrimental	Likely	Minor - negative
Direct impacts to Stone Age sites with high CS (SA-016)	Permanent	National	Extremely high - negative	Extremely detrimental	Likely	Moderate - negative
Indirect impacts to burial grounds and graves with very-high CS	Permanent	International	Extremely high - negative	Extremely detrimental	Highly unlikely	Negligible - negative

Impact	Pre-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance
Indirect impacts to Rock Art with medium to medium-high CS	Permanent	National	Moderately high - negative	Highly detrimental	Probable	Minor - negative
Potential direct impacts to unidentified archaeological resources with good integrity	Permanent	Province/Region	Moderately high - negative	Highly detrimental	Probable	Minor - negative
Potential direct impacts to unidentified archaeological resources with poor integrity	Permanent	Province/Region	Very low - negative	Moderately detrimental	Probable	Minor - negative
Demolition of historic built environment resources older than 60 years	Beyond project life	Local	Moderately high - negative	Moderately detrimental	Certain	Moderate - negative
Indirect impacts on Corbelled House structures within the site-specific area resulting in damage or destruction (BHS-1 & BHS-7)	Permanent	National	Extremely high - negative	Extremely detrimental	Improbable	Minor - negative
Indirect impacts on the Groot Paardekloof Farmstead (BHS-5) and School (BHS-6)	Permanent	National	Very high - negative	Extremely detrimental	Improbable	Minor - negative

Impact	Pre-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance
Indirect Impacts on graded heritage resources (BHS-2, BHS-3; BHS-4 and BHS-8)	Permanent	Municipal Area	Moderately high - negative	Highly detrimental	Unlikely	Minor - negative
Visual impacts through change of land use	Permanent	Province/ Region	Moderately high - negative	Highly detrimental	Certain	Major - negative
Visual impacts created during site clearing	Medium term	Province/ Region	Moderate - negative	Moderately detrimental	Certain	Moderate - negative
Visual impacts from construction of the antennas	Permanent	Province/ Region	Moderately high - negative	Highly detrimental	Certain	Major - negative
Visual impacts from the expansion of existing camps and construction of temporary camps	Permanent	Municipal Area	Moderate - negative	Highly detrimental	Certain	Moderate - negative
Visual impact from the development of new roads or upgrade of existing roads	Permanent	Municipal Area	Moderate - negative	Highly detrimental	Certain	Moderate - negative
Visual impact from the construction of Solar PV plants	Permanent	Municipal Area	Moderate - negative	Highly detrimental	Certain	Moderate - negative
Visual impacts of the power line and fibre optic networks	Permanent	Municipal Area	Moderate - negative	Highly detrimental	Certain	Moderate - negative
Visual impacts of the proposed	Permanent	Municipal Area	Moderately high -	Highly detrimental	Certain	Moderate - negative

Impact	Pre-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance
borrow pits and quarries			negative			
Visual impacts during operation of the SKA Radio Telescope	Permanent	Province/Region	Moderately high - negative	Highly detrimental	Certain	Major - negative
Visual impacts of the construction camps during the operational phase	Permanent	Municipal Area	Moderate - negative	Highly detrimental	Certain	Moderate - negative

6.2 Preventative Protection

Guidance Note

Preventative protection has important implications to the implementation of conservation management and future planning. These measures protectively cover the most vulnerable components to prevent degradation of the heritage sites and cultural landscapes from identified risks. These measures must aim at improving the conditions for preservation that can be adapted and refined through time.

The following preventative protection measures have been identified to remove, avoid or reduce the current and future risks as presented in Table 6-1.

Table 6-2: Preventative Protection Measures

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of above and below ground power cables	Construction	Palaeontology	Establish project-specific Chance Find Protocol (CFP) as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below)		Construction
		Archaeology	Where infrastructures that are not capable of realignment (i.e. antenna) are situated within the 50 m buffer, the identified heritage resources must be recorded in detail subject to the approval of a Section 35 Permit; Applicable to the following identified heritage resources: SA-005, SA-006, SA-012, SA-014, SA-015 and SA-017		Pre-construction
			SA-016 must be recorded in detail, this may include <i>inter alia</i> , distribution and density mapping, surface collections and test excavations subject to the approval of a Section 35 Permit; A Section 35 Destruction Permit must be drafted and submitted to SAHRA for adjudication; A Watching Brief undertaken by a suitably qualified and accredited archaeologist must be completed during earth moving activities to record all material cultural remains that may be exposed; The results of the Watching Brief must be compiled into a Watching Brief Report and submitted to SAHRA for noting.		Pre-construction Construction
			A minimum buffer of 50 m must be established around known possible burial grounds and graves sites HER-SKA008; HER-SKA016; HER-SKA027; HER-SKA056; BGG-001 and BGG-002; Buffers must be clearly demarcated and signage placed to indicate the presence of the resource; BGGs within the Proposed National Park must be maintained throughout the life of the Project		Pre-construction Construction
			A minimum buffer of 50 m must be established around known Rock Art sites RA-003, RA-004, RA-006, RA-007, RA-008, RA-009; RA-010; HER-SKA004; HER-SKA013; HER-SKA068; and HER-SKA069 Buffers must be clearly demarcated and signage placed to indicate the presence of the resource;		Pre-construction Construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of above and below ground power cables	Construction	Archaeology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).		Construction
		Built Environment	Establish a 1 km buffer around Grade II structures and the associated werf of BHS 7. Establish a 50 m buffer around Grade III B structure BHS 8. No project related activities may occur within the defined buffers; Powerlines routed through the defined buffer must be realigned to remove potential impacts		Pre-construction
			Establish a 1 km buffer around Grade II structures and associated werfs BHS 1; BHS 5; and BHS 6. No project related activities may occur within the defined buffer; Record the structures and werfs BHS 1, BHS 2, BHS 3, BHS 4, BHS 5, and BHS 6 in detail which may include <i>inter alia</i> measured drawings and photographs; Structures and werfs associated with BHS 1, BHS 5 and BHS 6 must be maintained throughout the Project life; Structures and werfs associated with BHS 2, BHS 3, and BHS 4 are protected under Section 34 of the NHRA. Any proposed alteration and /or demolition to these structures are subject to the approval of NC-PHRA as regulated by the NHRA Regulations; As far as possible, historic building material must be retained and made available for reuse in other historic structures within the local study area		Pre-construction
Visual	Powerline pylons must be galvanised / painted in natural hue to minimise visual disturbance; Trenched areas rehabilitated and revegetated with indigenous species in accordance with the requirements of the Ecological Assessment.	-	Construction		

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of camps	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below)		Construction
		Archaeology	Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).		Construction
			Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project		Pre-construction Construction Operation
		Built Environment	Any proposed alterations to existing structures older than 60 years, as presented in the HIA, are subject to approval by the NC-PHRA in accordance with Section 34 of the NHRA and NHRA Regulations		Pre-construction
		Visual	Existing historical structures to be maintained in accordance with Historic Built Environment Assessment; New metal structures must be galvanised or painted a natural hue with matt finish; Lights must be directed inwards; Down lighting to be used, low-pressure sodium lights to minimise light pollution		Construction Operation
Construction of new access roads and / or antenna base	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below).		Construction
		Archaeology	Establish a 50 m buffer around known multi-layered sites HER-SKA014; HER-SKA056; MXD-001; MXD-002 and MXD-003; Buffers must be clearly demarcated and signage placed to indicate the presence of the resource; New access roads routed through the defined buffer must be realigned to remove potential impacts		Pre-construction Construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of new access roads and / or antenna base	Construction	Archaeology	Establish a 50 m buffer around known stone age sites with low CS SA-001; SA-002; SA-005; SA-006; SA-007; SA-009; SA-012; SA-013; SA-014; SA-015; SA-017; New access roads routed through the defined buffer must be realigned to remove potential impacts	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction
			Where infrastructures that are not capable of realignment (i.e. antenna) are situated within the 50 m buffer, the identified heritage resources must be recorded in detail subject to the approval of a Section 35 Permit; Applicable to the following identified heritage resources: SA-005, SA-006, SA-012, SA-014, SA-015 and SA-017		Pre-construction
			SA-016 must be recorded in detail, this may include <i>inter alia</i> , distribution and density mapping, surface collections and test excavations subject to the approval of a Section 35 Permit; A Section 35 Destruction Permit must be drafted and submitted to SAHRA for adjudication; A Watching Brief undertaken by a suitably qualified and accredited archaeologist must be completed during earth moving activities to record all material cultural remains that may be exposed; The results of the Watching Brief must be compiled into a Watching Brief Report and submitted to SAHRA for noting.		Pre-construction Construction
			A minimum buffer of 50 m must be established around known possible burial grounds and graves sites HER-SKA008; HER-SKA016; HER-SKA027; HER-SKA056; BGG-001 and BGG-002; Buffers must be clearly demarcated and signage placed to indicate the presence of the resource; BGGs within the Proposed National Park must be maintained throughout the life of the Project		Pre-construction Construction
			A minimum buffer of 50 m must be established around known Rock Art sites RA-003, RA-004, RA-006, RA-007, RA-008, RA-009; RA-010; HER-SKA004; HER-SKA013; HER-SKA068; and HER-SKA069 Buffers must be clearly demarcated and signage placed to indicate the presence of the resource;		Pre-construction Construction
			Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project		Pre-construction Construction Operation

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of new access roads and / or antenna base	Construction	Archaeology	Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Construction
		Built Environment	Establish a 1 km buffer around Grade II structures and the associated werf of BHS 7. Establish a 50 m buffer around Grade III B structure BHS 8. No project related activities may occur within the defined buffer; New access roads / antenna base routed through the defined buffer must be realigned to remove potential impacts		Pre-construction
		Visual	Employ dust suppression techniques to reduce dust generation where possible; The Solar PV Plants must be painted a natural hue with matt finish to blend into the surrounding environment as far as possible. If it is intended to remain unpainted, they must be galvanised so as to weather to a matt grey finish;		-
Construction of the fibre optic network	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below).		Construction
		Archaeology	Where infrastructures that are not capable of realignment (i.e. antenna) are situated within the 50 m buffer, the identified heritage resources must be recorded in detail subject to the approval of a Section 35 Permit; Applicable to the following identified heritage resources: SA-005, SA-006, SA-012, SA-014, SA-015 and SA-017		Pre-construction
			SA-016 must be recorded in detail, this may include <i>inter alia</i> , distribution and density mapping, surface collections and test excavations subject to the approval of a Section 35 Permit; A Section 35 Destruction Permit must be drafted and submitted to SAHRA for adjudication; A Watching Brief undertaken by a suitably qualified and accredited archaeologist must be completed during earth moving activities to record all material cultural remains that may be exposed; The results of the Watching Brief must be compiled into a Watching Brief Report and submitted to SAHRA for noting.		Pre-construction Construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Construction of the fibre optic network	Construction	Archaeology	<p>A minimum buffer of 50 m must be established around known possible burial grounds and graves sites HER-SKA008; HER-SKA016; HER-SKA027; HER-SKA056; BGG-001 and BGG-002; Buffers must be clearly demarcated and signage placed to indicate the presence of the resource; BGGs within the Proposed National Park must be maintained throughout the life of the Project</p>	<p>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage</p>	Pre-construction Construction
			<p>A minimum buffer of 50 m must be established around known Rock Art sites RA-003, RA-004, RA-006, RA-007, RA-008, RA-009; RA-010; HER-SKA004; HER-SKA013; HER-SKA068; and HER-SKA069 Buffers must be clearly demarcated and signage placed to indicate the presence of the resource;</p>		Pre-construction Construction
			<p>Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project</p>		Pre-construction Construction Operation
			<p>Development footprints within defined high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).</p>		Construction
		Built Environment	<p>Establish a 1 km buffer around Grade II structures and the associated werf of BHS 7. Establish a 50 m buffer around Grade III B structure BHS 8. No project related activities may occur within the defined buffer; Power lines routed through the defined buffer must be realigned to remove potential impacts</p>		Pre-construction
			<p>Establish a 1 km buffer around Grade II structures and associated werfs BHS 1; BHS 5; and BHS 6. No project related activities may occur within the defined buffer; Record the structures and werfs BHS 1, BHS 2, BHS 3, BHS 4, BHS 5, and BHS 6 in detail which may include <i>inter alia</i> measured drawings and photographs; Structures and werfs associated with BHS 1, BHS 5 and BHS 6 must be maintained throughout the Project life; Structures and werfs associated with BHS 2, BHS 3, and BHS 4 are protected under Section 34 of the NHRA. Any proposed alteration and /or demolition to these structures are subject to the approval of NC-PHRA as regulated by the NHRA Regulations; As far as possible, historic building material must be retained and made available for reuse in other historic structures within the local study area</p>		Pre-construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation	
Construction of the fibre optic network	Construction	Visual	Trenched areas rehabilitated and revegetated with indigenous species in accordance with the requirements of the Ecological Assessment.	-	Construction	
Establishment of borrow pits	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation	
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below).		Construction	
		Archaeology	Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).		Construction	
			Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project		Pre-construction Construction Operation	
Establishment of stone quarries	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project		The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below).			Construction
		Archaeology	Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).			Construction
			Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project			Pre-construction Construction Operation
Upgrade of existing roads	Construction	Palaeontology	Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage		Pre-construction Construction Operation
			Development footprints underlain by lithologies of moderate to very-high palaeontological sensitivity must be monitored during construction (Refer to 6.3 below).			Construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Upgrade of existing roads	Construction	Archaeology	Development footprints within defined high to very-high archaeological sensitivity locations must be monitored during construction (Refer to 6.3 below).	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Construction
			Establish project-specific CFP as a condition of authorisation for implementation throughout the life of the Project.		Pre-construction Construction Operation
		Built Environment	Establish a 1 km buffer around Grade II structures and the associated werf of BHS 7. Establish a 50 m buffer around Grade III B structure BHS 8. No project related activities may occur within the defined buffer; Access roads routed through the defined buffer must be realigned to remove potential impacts		Pre-construction
			Establish a 1 km buffer around Grade II structures and associated werfs BHS 1; BHS 5; and BHS 6. No project related activities may occur within the defined buffer; Record the structures and werfs BHS 1, BHS 5 and BHS 6 in detail which may include <i>inter alia</i> measured drawings and photographs; Structures and werfs associated with BHS 1, BHS 5 and BHS 6 must be maintained throughout the Project life		Pre-construction
Visual	In as far as feasible, seal roads to limit dust generation; Employ dust suppression techniques to reduce dust generation; Implement speed limits on gravel roads to reduce dust generation.	-	Construction Operation		
Operation of SKA Project and Proposed National Park	Operation	Built Environment	Establish a 1 km buffer around Grade II structures and associated werfs BHS 1; BHS 5; and BHS 6. No project related activities may occur within the defined buffer; Record the structures and werf BHS 1, BHS 2, BHS 3, BHS 4, BHS 5, BHS 6 and BHS 8 in detail which may include <i>inter alia</i> measured drawings and photographs; Structures and werfs associated with BHS 1, BHS 5 and BHS 6 must be maintained throughout the Project life; Structures and werfs associated with BHS 2, BHS 3, and BHS 4 are protected under Section 34 of the NHRA. Any proposed alteration and /or demolition to these structures are subject to the approval of NC-PHRA as regulated by the NHRA Regulations; As far as possible, historic building material must be retained and made available for reuse in other historic structures within the local study area	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Pre-construction

Activity	Phase	Aspect	Management and Mitigation Requirements	Compliance with Standards	Time Period for Implementation
Operation of SKA Project and Proposed National Park	Operation	Archaeology	Develop an access protocol taking into consideration the requirements of the AGA Act and consequent RFI restrictions, as well as health and safety requirements, to afford individuals access to grave and cultural sites for ritual purposes (Refer to Section 3.4 above).	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) Regulations to the National Heritage Resources Act (GN R 548) South African Heritage Resources Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports International Finance Corporation Performance Standards 8: Cultural Heritage	Construction Operation
			A minimum buffer of 50 m must be established around known possible burial grounds and graves sites HER-SKA008; HER-SKA016; HER-SKA027; HER-SKA056; BGG-001 and BGG-002; Buffers must be clearly demarcated and signage placed to indicate the presence of the resource; BGGs within the Proposed National Park must be maintained throughout the life of the Project		Operation

6.3 Monitoring

Guidance Note

A CMP cannot be static and must be conceived in terms of a cycle. Defined measures must be implemented, evaluated, reviewed, and if necessary altered or withdrawn. Monitoring should target specific issues, measure specific parameters of change or react to specific events. Monitoring should be measured against recorded baseline conditions.

Monitoring activities will be required throughout the life of the Project. In general, the identified resources as per Chapter 8 below will assume overall responsibility for the monitoring requirements detailed in this section. Where necessary, external technical specialists must be appointed to comply with the requirements of the CMP.

The monitoring requirements will be discussed in relation to the construction and operational phases of the SKA Project and Proposed National Park separately. These requirements must be reviewed on a quarterly basis assess their effectiveness, alter where necessary, and withdraw requirements no longer relevant.

6.3.1 Construction Phase

Construction activities pose the greatest threat to tangible heritage resources within the cultural landscape. To manage the risk of damage and/or destruction to these resources, the required monitoring measures are encapsulated in Table 6-3:

Table 6-3: Monitoring Requirements during Construction of the SKA Project

Activity	Sensitivity ¹³	Responsible	Requirements
Construction activities in relation paleontological sensitivities	Very high	Palaeontologist	<ul style="list-style-type: none"> On-site inspection¹⁴; Guide construction to avoid possible impacts to chance finds Record and assess identified chance finds Implement requirements of NHRA and NHRA Regulations Compile Watching Brief Report for submission to SAHRA
	High	SARAO Site Supervisor	Implement CFP (See Appendix C)
	Moderate		
	Low		
Negligible	N/A	No requirements	
Construction activities in relation to defined archaeological sensitivities	Very high	Archaeologist	<ul style="list-style-type: none"> On-site inspection; Guide construction to avoid possible impacts to chance finds Record and assess identified chance finds Implement requirements of NHRA and NHRA Regulations Compile Watching Brief Report for submission to SAHRA
	High	SARAO Site Supervisor	Implement CFP (See Appendix C)
	Moderate		
	Low		
	Very low		
Negligible			

¹³ Refer to interactive map for detailed delineations of palaeontological/archaeological sensitivities within the Proposed National Park

¹⁴ Daily infield inspection of development footprint prior to commencement of earth moving activities. Monitoring of earth moving activities.

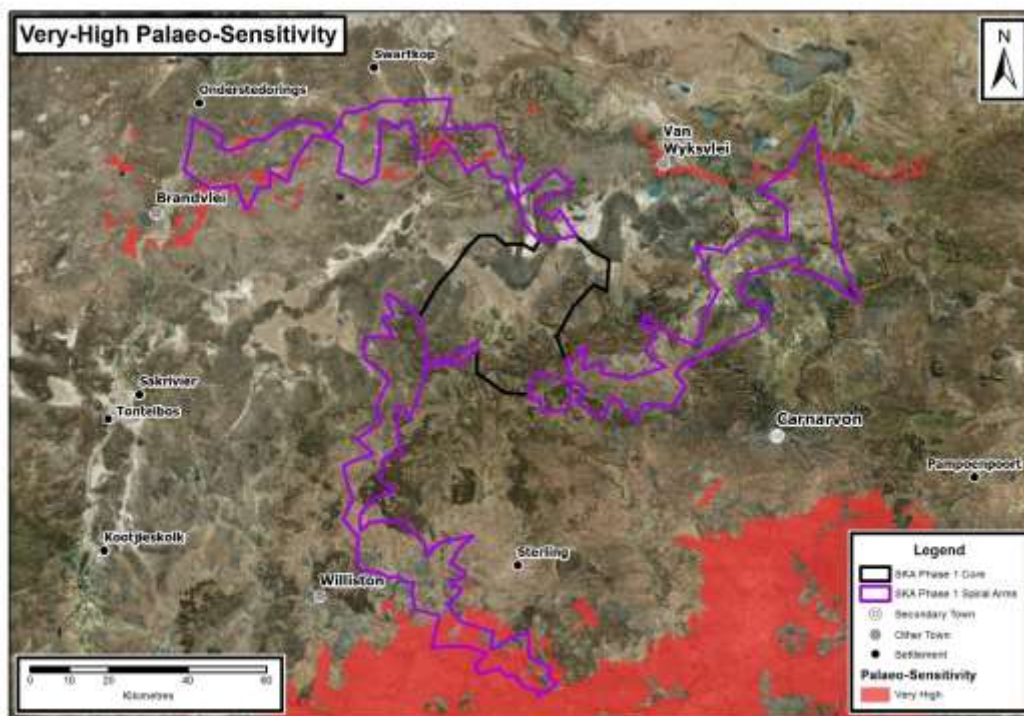


Figure 6-1: High – Very High Palaeo-Sensitivity Areas to be Monitored by Palaeontologist

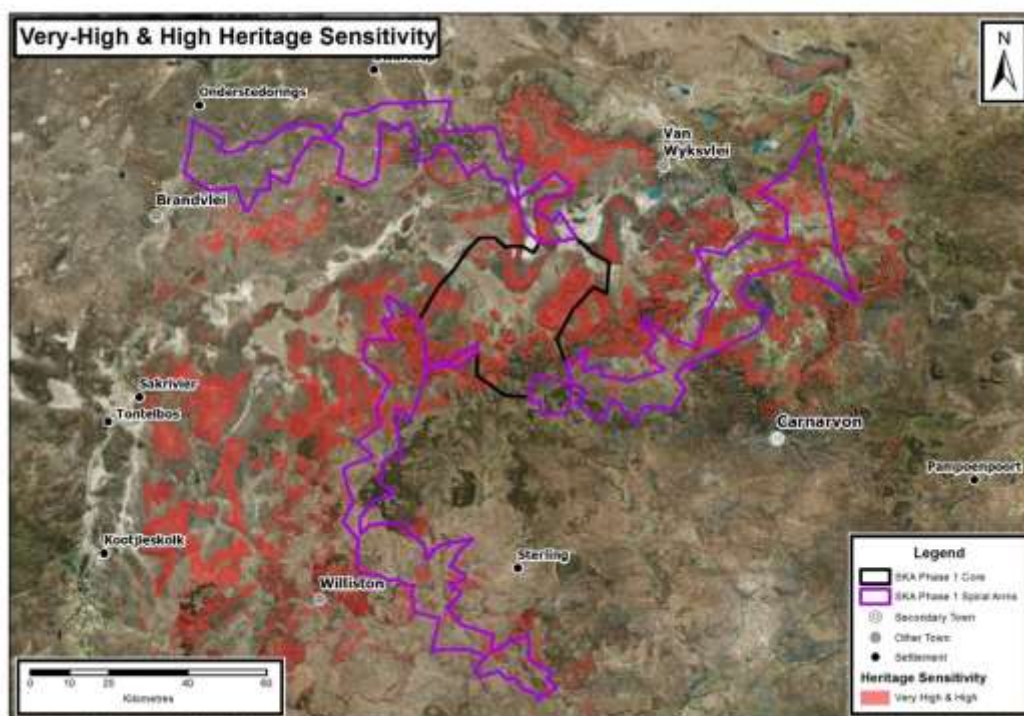


Figure 6-2: High – Very High Archaeological Sensitivity Areas to be Monitored by Archaeologist

6.3.2 Operational Phase

Identified heritage resources within the boundaries of the Proposed National Park must be monitored against a baseline to measure changes through time, or react to specific events. The monitoring requirements during the operational phase of the Project are presented in Table 6-4.

Table 6-4: Monitoring Requirements during Operation of the Proposed National Park

Resource	Responsible	Frequency	Pro / Reactive	Method
BHS 1	SANParks Cultural Conservation Officer	Quarterly	Proactive	<ul style="list-style-type: none"> ▪ Record <i>status quo</i> through photographs; ▪ Maintain records; ▪ Report on monitoring results as required (See Section 6.4 below).
BHS 5				
BHS 6				
BHS 1	Conservation Architect	Annually	Proactive	<ul style="list-style-type: none"> ▪ Visually assess the <i>status quo</i>; ▪ Review monitoring results against baseline conditions; ▪ Review and update management measures
BHS 5				
BHS 6				

6.4 Progress Reporting

Guidance Note

Progress reporting should present details to the *status quo*, state of degradation or stability to guide proactive management measures and competent authority decisions. Progress reporting is important as it correlates baseline conditions to the effectiveness of measures contained in the CMP.

Progress reporting must be completed by a palaeontologist and archaeologist as prescribed in Table 6-2 and Table 6-3 during the construction phase of the SKA Project.

SARAO and SANParks are responsible for reporting as prescribed in Table 5-2 and Table 6-4 on an annual basis. Progress reports must be distributed via the defined co-ordination mechanisms (Refer to Section 4.3 above).

7 Awareness

Guidance Note

The CMP must make provision for the dissemination of information to the public. Means of communication may vary considerably across various platforms. Nonetheless, information pertaining to the heritage sites, the cultural landscapes and the proposed management thereof must be freely available.

7.1 Public Awareness

The aim of this section is to identify and organise activities to achieve the widest dissemination of knowledge generated from the prior assessments and subsequent implementation of the CMP in line with the SANParks mission and ‘partnership’ objective¹⁵. Awareness initiatives encapsulated within the Proposed National Park Management Plan must consider the findings of the HRM Process as a basis in:

- Identifying cultural heritage producers and consumers;
- Establishing relevant knowledge sharing partnerships;
- Engaging established partnership to enhance the understanding of the cultural landscape; and
- Refine sources and mediums for affective dissemination of information.

An approach for the affective dissemination of information as relevant to this CMP is summarised in Table 7-1.

Table 7-1: Approach to Creating Awareness

Principles	Relevance
Goals <i>Specific goals trying to accomplish</i>	<ul style="list-style-type: none"> ■ Compliances with the South African regulatory framework; ■ Widest dissemination of knowledge generated from the assessment;
Objectives <i>Specific objectives to achieve defined goal</i>	<ul style="list-style-type: none"> ■ Identify users of information; ■ Determine sources of access and appropriate mediums; ■ Define possible barriers; and ■ Detailed public disclosure of information at the earliest possible stage.
Users <i>Potential users</i>	<ul style="list-style-type: none"> ■ SKAO, NRF, SARAO, other affiliated facilities or entities, service providers and business partners; ■ General public;

¹⁵ To establish and nurture partnerships at local levels and regional scales by creating, participating-in and maintaining engagement platforms including knowledge sharing alliances.

Principles	Relevance
	<ul style="list-style-type: none"> ▪ Local communities; ▪ Traditional authorities; ▪ Heritage authorities; ▪ Government; ▪ Non-Governmental Organisations; and ▪ International research community.
<p>Content <i>Salient information for specific user groups</i></p>	HRM Process
	<ul style="list-style-type: none"> ▪ Methodologies; ▪ Findings; ▪ Results of analysis; and ▪ Recommendations and requirements
	Proposed National Park
	<ul style="list-style-type: none"> ▪ Research programmes; ▪ Results of research; ▪ Cultural landscape descriptions
<p>Source <i>Users access</i></p>	<ul style="list-style-type: none"> ▪ SAHRIS; ▪ SARAO digital portals; ▪ SANParks digital portals; ▪ SANParks Access and Benefit Sharing Programmes; ▪ Carnarvon SKA Exploratorium
<p>Medium <i>Best method for information sharing</i></p>	HRM Process
	<ul style="list-style-type: none"> ▪ Announcement materials; ▪ Advertisements; ▪ Stakeholder meetings; ▪ Workshops; ▪ Written and visual communication; ▪ Reporting
	Proposed National Park
	<ul style="list-style-type: none"> ▪ Workshops; ▪ Written communication; ▪ Visual communication
<p>Access <i>Process to make information</i></p>	<ul style="list-style-type: none"> ▪ Announcement materials; ▪ Advertisements; ▪ Stakeholder meetings;

Principles	Relevance
<i>accessible</i>	<ul style="list-style-type: none"> ▪ Workshops; ▪ Written and visual communication; ▪ Reporting.
Availability <i>Promoting awareness of information availability</i>	<ul style="list-style-type: none"> ▪ Digital portals; ▪ Local print media (<i>where available</i>); ▪ Print materials; and ▪ Community notice boards.
Barriers <i>Determination of obstacle for information dissemination barriers for targeted users</i>	<ul style="list-style-type: none"> ▪ Ineffective promotion of awareness; ▪ Limited access forums; ▪ Lack of technical understanding; and ▪ Consultation fatigue.

Of particular relevance to the CMP is the Heritage Education (HE) partnership between the Department of Basic Education, National Heritage Council and SANParks. This, along with the Stakeholder Relationship Programme as defined in the Proposed National Park Management Plan, can be used as vehicles for awareness creation.

7.2 Contractor Awareness

The SKAO, SARAO and / or SANParks are responsible for ensuring that a suitably qualified specialist develop project specific training material to allow service providers with the necessary skills to implement the contents of this CMP and the CFP (Appendix C). Training material must at a minimum:

- Define employer and employee responsibilities;
- Explain the cultural heritage sensitivities of the SKA site and servitudes;
- Provide visual guides to the heritage resources types known to occur within the cultural landscape; and
- Detail the 'conserve' protocol.

The developed training material, as well as the contents of the CMP and CFP must be included as part of an induction process.

8 Resources

Guidance Note

A CMP must detail the resources required for its implementation. Resources from other entities that promote the management objectives and actions should be listed.

The SKAO, SARAO and SANParks will implement the CMP throughout the life of the Project and operation of the Proposed National Park respectively. The organisational structure is presented in the following organogram:



Figure 8-1: Organisational Structures Responsible for Implementing the CMP

The SKAO, SARAO and/or SANParks will enlist the services of a technical specialist as and when required in accordance with the requirements prescribed in Table 5-2 and Chapter 6 above.

Financial resourcing will be encapsulated in the Proposed National Park Management Plan.

9 Sustainable Use and Vision for the Future

Guidance Note

A CMP must adapt through time to meet the specific requirements for the continued use of the heritage sites and cultural landscapes for the benefit of society.

The SKAO, SARAO and SANParks are committed to the *in situ* conservation of identified heritage resources as far as is feasible, taking into consideration the specific requirements of this Project. Where *in situ* conservation of tangible heritage resources are not feasible, the recommended mitigation measures will be implemented to preserve the heritage resources through record.

Sustainable use is explicit in SANParks mission statement, and informs their Objectives Hierarchy. Sustainable use and vision for the future is aligned with the SANParks social and economic objective to develop sustainable techno-eco tourism opportunities within the restrictions of the AGA Act¹⁶. In the context of this CMP, tangible heritage resources could be a contributing aspect to these developments if:

- The CS of the heritage resources are taken into account when developing specific opportunities;
- The acceptable limits of change to the heritage resources are considered and respected;
- A specific heritage site management plan (HSMP¹⁷) for each proposed opportunity is drafted in conjunction with a technical specialist and submitted to SAHRA and NC-PHRA for review and approval; and
- The approved HSMP is included in this CMP as an addendum.

¹⁶ Please refer to the Proposed National Park Management Plan for detailed descriptions

¹⁷ The HSMP must comply with the requirements of the SAHRA Guidelines for the Development of Plans for the Management of Heritage Sites or Places

Conservation Management Plan

The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact
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Appendix A: Heritage Impact Assessment

Please access the HIA and associated appendices from:
<http://www.sahra.org.za/sahris/heritage-reports/nrf4874-hia>

Conservation Management Plan

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Appendix B: Cultural Heritage Recording Document

SITE RECORDING AND PRELIMINARY CONDITIONAL ASSESSMENT FORM



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Recorder:		Date:	
Classification:	Immovable	Movable	Intangible
Location:	Photograph Numbers:		
Ref No:	Co-ordinates		

1. Immovable Heritage Resources

SAHRIS ID Reference:			
Type of resource:	Paleontological & Archaeological Sites, Buildings, Monuments, Heritage Places, Burials	Age / Industry / Period:	Cultural period / style / associated persons / history
Resource Description Summary:			
Functional Type:		Current Function:	Original / changed from past / current function

Please proceed to Section 4

2. Movable Heritage Resources

SAHRIS ID Reference:			
Type of resource:	Artefacts, artworks, books, documents machines, clothing	Age / Industry / Period:	
Resource Description Summary:			
Quantity recorded:			

Please proceed to Section 4

3. Intangible Heritage Resources

SAHRIS ID Reference:			
Type of resource:		To whom is the resource significant?	
Describe the resource or summarise provided information:			
Restrictions/sensitivities:	None	No photographs	Do not publish
<i>Please note any restrictions with regard to this information</i>	Other:		
Informant / source of information:			Wishes to remain anonymous

Please proceed to Section 4 (if necessary)

Type of Resource: Archaeological – ESA, MSA, LSA, EFC, LFC; Battlefield, Burial Grounds & Graves, Historical Built Environment, Intangible / Living, Monuments & Memorials, Palaeontological, Recent heritage, Struggle / Liberation heritage
Summary Description: Artefact: isolated surface, Artefact: Low density surface scatter, <10.1 sq m, Artefact: medium density surface scatter, <20.1 sq m, Artefact: high density surface scatter, >20.1 sq m, Artefact: embedded in rock matrix, Burial ground: Undetermined, Single grave, ≤10 graves, ≤20 graves, ≤50 graves, >100 graves; Deposit: ash, ≤1 cm, ~5 cm, ~10 cm, ~20 cm, >20 cm; Deposit: charcoal; Deposit: Faunal; Deposit: Kraal; Fossil, hominin: embedded in rock matrix; Fossil, hominin: isolated surface; Fossil, hominin: embedded in rock matrix; Fossil, invertebrate: embedded in rock matrix; Fossil, invertebrate: isolated surface; Fossil, invertebrate: tracks; Fossil, plant: embedded in rock matrix; Fossil, plant: isolated surface; Fossil, vertebrate: embedded in rock matrix; Fossil, vertebrate: isolated surface; Fossil, vertebrate: tracks; Fossil: breccia with visible remains; Fossil: breccia without visible remains; Rock art: combination; Rock art: engraving; Rock art: painting; Shelter: including artefact/s;
 Shelter: including artefact/s + deposit; Shelter: including artefact/s + deposit + structures; Shelter: rock art + artefacts / deposit / structures; Shelter: rock art combination; Shelter: rock art engraving; Shelter: rock art painting; Site: high complexity, multiple components >2500 sq m / 50 x 50 m; Site: low complexity, multiple components <25 sq m / 5 x 5 m; Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m; Structural: complex, e.g. weir; Structural: functional, e.g. fences, wind pumps, troughs; Structural: industrial, e.g. warehouse, headgear; Structural: remains, e.g. daga, hut floor, foundations, bricks; Structural: stonewall; Other

SITE RECORDING AND PRELIMINARY CONDITIONAL ASSESSMENT FORM

4. Description and Notes						
<p>Please provide a brief description of the resource:</p>						
Condition of the resource:	Damaged	Poor	Fair	Good		
Quality of the resource: (Scales of damage)	Poor	Fair	Good	Excellent		
<p>Please describe: <i>(including scale of damage or neglect and factors influencing the integrity of the resource)</i></p>						
	Negligible	Low	Medium	Med-Hi	High	V. High
<p>Statement of Significance: <i>(please provide a brief assessment of the significance of the resource, in your opinion)</i></p>	Consider aesthetic, historic, scientific and social criteria					
<p>Are there any observable / apparent threats / impacts to the resource?</p>						
<p>Please include any additional notes here: <i>(e.g. any notable features, additional information from an informant, damage)</i></p>						

Type of Resource: Archaeological – ESA, MSA, LSA, EFC, LFC; Battlefield, Burial Grounds & Graves, Historical Built Environment, Intangible / Living, Monuments & Memorials, Palaeontological, Recent heritage, Struggle / Liberation heritage
Summary Description: Artefact: Isolated surface, Artefact: Low density surface scatter, <10:1 sq m, Artefact: medium density surface scatter, <20:1 sq m, Artefact: high density surface scatter, >20:1 sq m, Artefact: embedded in rock matrix, Burial ground: Undetermined, Single grave, ≤10 graves, ≤20 graves, ≤50 graves, >100 graves; Deposit: ash, ≤1 cm, ~5 cm, ~10 cm, ~20 cm, >20 cm; Deposit: charcoal; Deposit: Faunal; Deposit: Kraal; Fossil, hominin: embedded in rock matrix; Fossil, hominin: tracks; Fossil, invertebrate: embedded in rock matrix; Fossil, invertebrate: isolated surface; Fossil, invertebrate: tracks; Fossil, plant: embedded in rock matrix; Fossil, plant: isolated surface; Fossil, vertebrate: embedded in rock matrix; Fossil, vertebrate: isolated surface; Fossil, vertebrate: tracks; Fossil: breccia with visible remains; Fossil: breccia without visible remains; Rock art: combination; Rock art: engraving; Rock art: painting; Shelter: including artefact/s; Shelter: including artefact/s + deposit; Shelter: including artefact/s + deposit + structures; Shelter: rock art + artefacts / deposit / structures; Shelter: rock art combination; Shelter: rock art engraving; Shelter: rock art painting; Site: high complexity, multiple components >2500 sq m / 50 x 50 m; Site: low complexity, multiple components <25 sq m / 5 x 5 m; Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m; Structural: complex, e.g. werf; Structural: functional, e.g. fences, wind pumps, troughs; Structural: industrial, e.g. warehouse, headgear; Structural: remains, e.g. daga, hut floor, foundations, bricks; Structural: stonewall; Other

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Appendix C: Chance Finds Protocol



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The South African Radio Astronomy Observatory Square Kilometre Array Heritage Impact Assessment and Conservation Management Plan Project

Chance Finds Protocol

Project Number:

NRF4874

Prepared for:

The South African Radio Astronomy Observatory

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Acronyms

AGA Act	Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007)
BGG	Burial Grounds and Graves
Bya	Billion years ago
CE	Common Era
CFP	Chance Find Protocol
CMP	Conservation Management Plan
CS	Cultural Significance
ECO	Environmental Control Officer
ESA	Earlier Stone Age
ha	Hectare
HIA	Heritage Impact Assessment
HRAs	Heritage Resource Authorities
HRM	Heritage Resources Management
HSMP	Heritage Site Management Plan
I&APs	Interested and Affected Parties
ICOMOS	International Council on Monuments and Sites
IEMP	Integrated Environmental Management Plan
IFC	International Finance Corporation
KC-AAA	Karoo Central Astronomy Advantage Areas
Kya	Thousand years ago
LSA	Later Stone Age

MSA	Middle Stone Age
Mya	Million years ago
NC-PHRA	Northern Cape Provincial Heritage Resources Authority
NEM: PAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	The National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NKBK	Ngwao Boswa jwa Kapa Bokone
NRF	National Research Foundation
OUV	Outstanding Universal Value
PMP	Park Management Plan
RFI	Radio Frequency Interference
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANParks	South African National Parks
SAPS	South African Police Service
SARAO	South African Radio Astronomy Observatory
SKA	Square Kilometre Array
SKAO	International Square Kilometre Array Organisation
WHCA	World Heritage Convention Act, 1999 (Act No. 49 of 1999)

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1 Introduction

This document constitutes the Chance Finds Protocol (CFP) as applicable to the South African Radio Astronomy Observatory (SARAO) Square Kilometre Array (SKA) Project to define the palaeontological and archaeological chances finds procedures. This document needs to be seen in the context of the Conservation Management Plan (CMP).

This document provides the international SKA Organisation (SKAO), SARAO and SANParks with the appropriate response guidelines to the identification of heritage resources. These guidelines have been extracted and adapted from the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the NHRA Regulations, 2000 (Government Notice Regulations [GN R] 548). Other policies and legislation considered in the compilation of these guidelines include:

- The World Heritage Convention Act, 1999 (Act No. 49 of 1999) (WHCA);
- The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM:PAA) and the related Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa (GN R 1356, promulgated 8 December 2017);
- International Council on Monuments and Sites (ICOMOS): International Charter for the Conservation and Restoration of Monuments and Sites, 1964 (*Venice Charter*);
- ICOMOS: Charter for the Protection and Management of the Archaeological Heritage, 1990;
- ICOMOS: International Cultural Tourism Charter, 1999;
- ICOMOS: Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005;
- ICOMOS: Québec Declaration on the Preservation of the Spirit of Place, 2008;
- Operational Guidelines for the Implementation of the World Heritage Convention, 12 July 2017; and
- International best practice guidelines including the World Bank guidelines, Equator Principles and the International Finance Corporation (IFC) Performance Standards.

The aim of this protocol is to provide the necessary tools to:

1. SKAO for implementing during construction and operational phases of the SKA Project and SARAO during construction of other guest instruments on site that reduces the intensity of manifested impacts to exposed previously unidentified palaeontological and archaeological resources; and
2. SANParks for implementing in the management of the Proposed National Park.

The objective of this protocol is to avoid and/or reduce operational risks that may result due to chance finds, whilst considering international best practice.

2 Definitions

The following definitions are applicable to this protocol:

Table 2-1: Applicable definitions

Alter	Any action affecting the structure, appearance or physical properties of a <i>place</i> whether by way of structural or other works, or any other means.
Archaeological	<p>Any material remains that were produced or created by humans or that resulted from any human activity and that are unused and older than 100 years. This includes artefacts, human and hominid remains and artificial features and structures.</p> <p>Archaeology also refers to Rock Art that is defined as any form of painting, engraving or other graphic representation on fixed rock surfaces or loose rocks or stones that was made by humans and that are older than 100 years, including a 10 m area surrounding such site.</p> <p>Archaeology also includes:</p> <ul style="list-style-type: none"> ▪ Any wrecks or parts thereof that was wrecked in South Africa more than 60 years ago, including any cargo, debris or artefacts found or associated with it; and ▪ Any features, structures and artefacts older than 75 years that are associated with military history, including the sites on which they are found.
Archaeologist	A trained professional who uses scientific methods to excavate record and study archaeological sites and deposits.
Conservation	The protection, maintenance, preservation and sustainable use of “ <i>places</i> ” to safeguard their “ <i>cultural significance</i> ”.

<p>Cultural Significance (CS)</p>	<p>The aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. A heritage may have cultural significance or other special value because of its:</p> <ul style="list-style-type: none"> ▪ Importance in the community, or pattern of South Africa's history; ▪ Possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage; ▪ Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage; ▪ Importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects; ▪ Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group; ▪ Importance in demonstrating a high degree of creative or technical achievement at a particular period; ▪ Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons; ▪ Strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and ▪ Significance relating to the history of slavery in South Africa.
<p>Development</p>	<p>Any physical intervention, excavation, or action that could cause changes to the nature, appearance, fabric of a place. In addition, development might also influence the stability or future well-being of a place. Development could include:</p> <ul style="list-style-type: none"> ▪ Construction, alteration, demolition, removal or change of use of a place or a structure at a <i>place</i>; ▪ Carrying out any works on or over or under a <i>place</i>; ▪ Any change to the natural or existing condition or topography of land; and ▪ Any removal or destruction of trees, or removal of vegetation or topsoil.
<p>Excavation</p>	<p>The scientific excavation, recording and retrieval of archaeological deposit and objects through the use of accepted archaeological procedures and methods, and excavate has a corresponding meaning.</p>

Field Rating	<p>SAHRA requires heritage resources to be provisionally rated in accordance with Section 7 of the NHRA that provides a three tier grading system of resources that form part of the national estate. The rating system distinguishes between four categories:</p> <ul style="list-style-type: none"> ▪ Grade I: Heritage resources with qualities so exceptional that they are of special national significance; ▪ Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; ▪ Grade III: Other heritage resources worthy of conservation; and ▪ General Protected: i.e. generally protected in terms of Sections 33 to 37 of the NHRA.
General Protection	<p>General protections are afforded to:</p> <ul style="list-style-type: none"> ▪ Objects protected in terms of laws of foreign states; ▪ Structures older than 60 years; ▪ Archaeological and palaeontological sites and material and meteorites; ▪ Burial grounds and graves; and ▪ Public monuments and memorials.
Grave	<p>The place of interment (burial ground) and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such <i>place</i>.</p>
Heritage Resource	<p>Any place of cultural significance.</p>
Heritage Resources Authority	<p>The South African Heritage Resources Agency (SAHRA), established in terms of Section 11, or, insofar as the NHRA is applicable in or in respect of a province, a provincial heritage resources authority, in this instance the Northern Cape Provincial Heritage Resources Authority (NC-PHRA).</p>
Heritage Site	<p>Any place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.</p>
Living/Intangible Heritage	<p>The intangible aspects of inherited culture that could include cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems, the holistic approach to nature, society and social relationships.</p>
Major Find	<p>If the resource cannot feasibly be rescued in a specified timeframe without compromising the detailed material recovery and contextual observations, the resource is considered a Major Find.</p>

Object	Any movable property of cultural significance that are protected in terms of the NHRA, including: <ul style="list-style-type: none"> ▪ All archaeological artefacts; ▪ All palaeontological and rare geological specimens; ▪ All meteorites; and ▪ Any other object referred to in section 3 of the Act.
Owner	Includes the owner's (National Research Foundation [NRF] or other owners of the land on which a heritage <i>object</i> or <i>place</i> is located) authorised agent and any person with a real interest in the property.
Palaeontological	Any fossil remains or traces of animals or plants that were alive in the geological past, and any site that contains such fossils. Fossil fuels such as coal, and fossiliferous rock intended for industrial use are, however, excluded.
Palaeontologist	A trained professional who uses scientific methods to excavate, record and study fossils and palaeontological sites.
Place	A place may include: <ul style="list-style-type: none"> ▪ (a) The <i>site</i>; ▪ (b) A <i>structure</i> such as a stonewall or historic building; ▪ (c) A group of structures such as a werf; and ▪ (d) In relation to the management of a place, includes the immediate surroundings of a place.
Site	Any area of land, including land covered by water, and including any <i>structures</i> thereon.
Structure	Any works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

3 Roles and Responsibilities

The roles and responsibilities are aligned to the management structures and resources as defined in Chapters 4 and 8 of the CMP respectively. These are detailed in Table 3-1

Table 3-1: Primary Positions and Responsibilities

Position	Responsibility
Archaeologist	On-site monitoring of earth moving activities during construction and/or operational phases in areas with high to very high archaeological sensitivity. The SKAO / contractors must provide detailed programme for construction works to plan the physical presence of the contractor-appointed archaeologist. Outcomes of monitoring must be collated into a Watching Brief Report for submission to SAHRA and NC-PHRA via SAHRIS.

Position	Responsibility
Palaeontologist	<p>On-site monitoring of earth moving activities during construction and/or operational phases in areas with very high palaeontological sensitivity. The SKAO / contractors must provide detailed programme for construction works to plan the physical presence of the contractor-appointed archaeologist.</p> <p>Cursory monitoring of earth moving activities during construction and/or operational phases in areas with moderate palaeontological sensitivity.</p> <p>Outcomes of monitoring must be collated into a Watching Brief Report for submission to SAHRA and NC-PHRA via SAHRIS.</p>
SKAO Construction Execution Manager	<p>Accountable for all aspects of the SKA Project and its associated activities, including ensuring that the construction and operational activities comply with all relevant legislation, regulations, minimum requirements, constitution and international conventions / protocols and other requirements to which the SKAO and SARAO subscribes.</p>
Site Manager	<p>Responsible for ensuring this CFP is implemented.</p> <p>Bring to the attention of the Environmental Control Officer (ECO) the requirements encapsulated within the Conservation Management Plan (CMP) and this CFP. Work directly with the ECO to ensure the necessary assessment and requirements are implemented.</p> <p>Ensure all relevant staff receive the necessary training to implement the CFP and other requirements encapsulated within the CMP.</p>
SKAO & SARAO Environmental Control Officer/s	<p>Responsible for ensuring all activities and the potential risks to cultural heritage are considered by thorough implementation of this procedure. This includes the allocation of appropriate resources to undertake such assessments. These can include, but are not limited to:</p> <ul style="list-style-type: none"> ▪ External specialist consultants; and ▪ Internal specialists. <p>On-site inspection of earth moving activities during construction and/or operational phases in areas with very low to moderate archaeological sensitivity, and low palaeontological sensitivity.</p>
SANParks Park Manager	<p>Accountable for all aspects of the Proposed National Park and its associated activities, including ensuring that all activities comply with all relevant legislation, regulations, minimum requirements, constitution and international conventions / protocols and other requirements to which SANParks subscribes.</p>
SANParks Senior Ranger	<p>Responsible for bringing to the attention of the Ecological and Cultural Conservation Officers the requirements encapsulated within the CMP and this CFP.</p> <p>Ensure all relevant staff receive the necessary training to implement</p>

Position	Responsibility
	the CFP and other requirements encapsulated within the CMP.
SANParks Conservation / Outreach Officer	<p>Responsible for ensuring all activities and the potential risks to cultural heritage are considered by thorough implementation of this procedure. This includes the allocation of appropriate resources to undertake such assessments. These can include, but are not limited to:</p> <ul style="list-style-type: none"> ▪ External specialist consultants; and ▪ Internal specialists.

4 Potential Chance Finds

The study area is known to comprise tangible and intangible heritage resources ranging from palaeontological through to the historical period. This chapter details the potential tangible heritage resources that may be identified or accidentally exposed through implementation of the Project. The potential palaeontological and archaeological resources are discussed separately under Sections 4.1 and 4.2 respectively

4.1 Palaeontological Resources

Palaeontological resources are associated with specific geological contexts. These may manifest as fossil heritage exposed through surface outcrops or during construction activities and comprise aquatic fauna, fauna, flora and trace fossils.

Table 4-1: Potential Fossil Heritage

Geological Context	Fossil Heritage Type	Examples
Beaufort Group	Fauna	Dinocephalians, Dicynodonts, Gorgonopsians, Therocephalians, Cynodonts and primitive reptiles (e.g. Pareiasaurs)
Ecca Group	Aquatic Fauna	Temnospondyl amphibians, Palaeoniscoid fish, non-marine bivalves, and Phyllopod crustaceans.
	Flora	Petrified wood, rarer leaves of Glossopteris, Horsetail stems, plant rootlet horizons.
	Trace Fossils	Tetrapod trackways, burrows and coprolites. Arthropod trackways and burrows, "worm" burrows, fish fin trails.

Table 4-2 and Table 4-3 present the possible aquatic fauna, fauna and flora fossil heritage that may be identified. Where available, diagrams and photographs have been provided in Appendix A as a reference tool.

Table 4-2: Aquatic Fauna and Fauna within the *Abrahamskraal*, *Koonap* and *Volkrust* Formations

Aquatic Fauna and Vertebrates	
Group	Genera
Amphibia	<i>Rhinesuchus</i>
Biarmosuchia	<i>Hipposaurus</i>
Captorhinida	<i>Eunotosaurus</i> ; <i>Bradysaurus</i> ; and <i>Embrithosaurus</i>
Dicynodontia	<i>Pristerodon</i> and <i>Diictodon</i>
Dinocephalia	<i>Anteosaurus</i> ; <i>Paranteosaurus</i> ; <i>Titanosuchus</i> ; <i>Jonkeria</i> ; <i>Struthiocephalus</i> ; <i>Struthiocephaloides</i> ; <i>Taurocephalus</i> ; <i>Avenantia</i> ; <i>Criocephalus</i> ; <i>Delphinognathus</i> ; <i>Moschops</i> ; <i>Riebeeckosaurus</i> ; <i>Keratocephalus</i> ; <i>Mormosaurus</i> ; <i>Phocosaurus</i> ; <i>Tapinocephalus</i> ; and <i>Styracocephalus</i>
Gorgonopsia	<i>Galesuchus</i> ; <i>Scylacognathus</i> ; <i>Broomisaurus</i> ; <i>Eoarctops</i> ; and <i>Aelurosaurus</i>
Pelycosauria	<i>Elliotsmithia</i>
Pisces	<i>Namaichthys</i> and <i>Atherstonia</i>
Therocephalia	<i>Glanosuchus</i> ; <i>Alopecodon</i> ; <i>Scylacosaurus</i> ; <i>Lycosuchus</i> ; <i>Blattoidealestes</i> ; <i>Icticephalus</i> ; and <i>Pristerognathus</i>

Table 4-3: Flora within the *Abrahamskraal*, *Koonap* and *Volkrust* Formations

Flora		
Type	Genera	Number of species
Mosses	<i>Buthelezia</i>	1
Sphenophytes	<i>Sphenophyllum</i> , <i>Raniganjia</i> , <i>Phyllothea</i> , and <i>Schizoneura</i>	6
	<i>Sphenopteris</i>	1
	<i>Glossopteris</i> :	Minimum: 11 leaf types, 6 fructifications.
Cordaitales	<i>Noeggerathiopsis</i>	1
Conifers?	<i>Taeniopteris</i> ; <i>Pagiophyllum</i> ; and <i>Benlightfootia</i>	3
	<i>Australoxylon</i>	1

Flora		
Type	Genera	Number of species
	<i>Prototaxoxylon</i>	1

4.2 Archaeological Resources

The study area is known to be archaeologically rich, with known resource types to comprise

- Earlier (ESA) and Middle Stone Age (MSA) lithic artefacts;
- Later Stone Age (LSA) artefacts attributed to the /Xam group;
- Rock Art engravings attributed to various San groups, and the /Xam in particular;
- LSA artefacts and pottery attributed to Khoekhoe groups;
- Rock Art paintings attributed to Khoekhoe groups;
- 18th and 19th century settlement of Xhosa groups in the Northern Cape, and their interactions with the /Xam, Korana and Griqua; and
- Migrations of the frontier farmers from the Cape Colony into the region;

With settlement of the landscape, it is probable that previously unidentified burial grounds and graves (BGG) dating from the LSA through to the historical period occur within the defined boundaries of the SKA Project and Proposed National Park.

Where available, diagrams and photographs have been provided in Appendix B as a reference tool.

5 Chance Finds Protocol

To reduce the intensity of potential impacts to unidentified palaeontological and archaeological resources, the following procedure must be adopted and implemented during:

- SKA Project construction phase;
- SKA Project operational phase;
- The construction and operations of other guest instruments on the SKA site; and
- SANParks operation of the Proposed National Park.

This procedure is applicable to all resources defined in the CMP and this CFP.

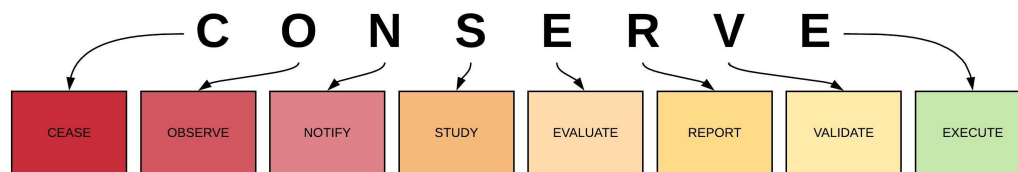


Table 5-1: The CONSERVE Procedure

Cease	Upon identification of any heritage aspect, all works in the immediate vicinity must cease
Observe	The approximate extent of the chance find must be determined and protected from further disturbance. Where necessary, establish access controls and place visible markers and signage to identify the find.
Notify	In the absence of a specialist, i.e. palaeontologist or archaeologist, the identifier must inform the Site Manager / ECO of the find, and immediate management measures. A palaeontologist and/or archaeologist must then be notified ¹ by the Site Manager.
Study	A qualified specialist must complete a cursory assessment of the chance find. This can be accomplished through: <ul style="list-style-type: none"> ▪ Telephonic correspondence with the ECO – verbal descriptions; ▪ Emails - photographs; and ▪ Site inspection by the specialist.
Evaluate	The qualified specialist will evaluate the chance find to determine the extent of the exposure, whether any protections in terms of Sections 34, 35 or 36 are applicable, and what minimum management and/or mitigation measures are required.
Report	The designated responsible person must ensure suitable reporting and documentation is undertaken. Documentation must start with the initial find report and include records of all action taken, persons involved and contacted, comments received and any findings. All records must be supplied to SAHRA and NC-PHRA for adjudication.
Validate	SAHRA and NC-PHRA must validate the preceding steps through issuing of formal comment to: <ul style="list-style-type: none"> ▪ Prescribe additional management and/or mitigation measures required; ▪ Consent to continuation of work in the immediate vicinity of the chance find.
Execute	Execute the required management and/or mitigation measures or recommence with work.

¹ Minimum requirements for providing information to a technical specialist will be detailed in the contractor awareness training material

5.1 Fossil Finds Procedure

The Project specific fossil finds procedure is presented in Figure 5-1

5.2 Archaeological Finds Procedure

The Project specific archaeological finds procedure is presented in Figure 5-2.

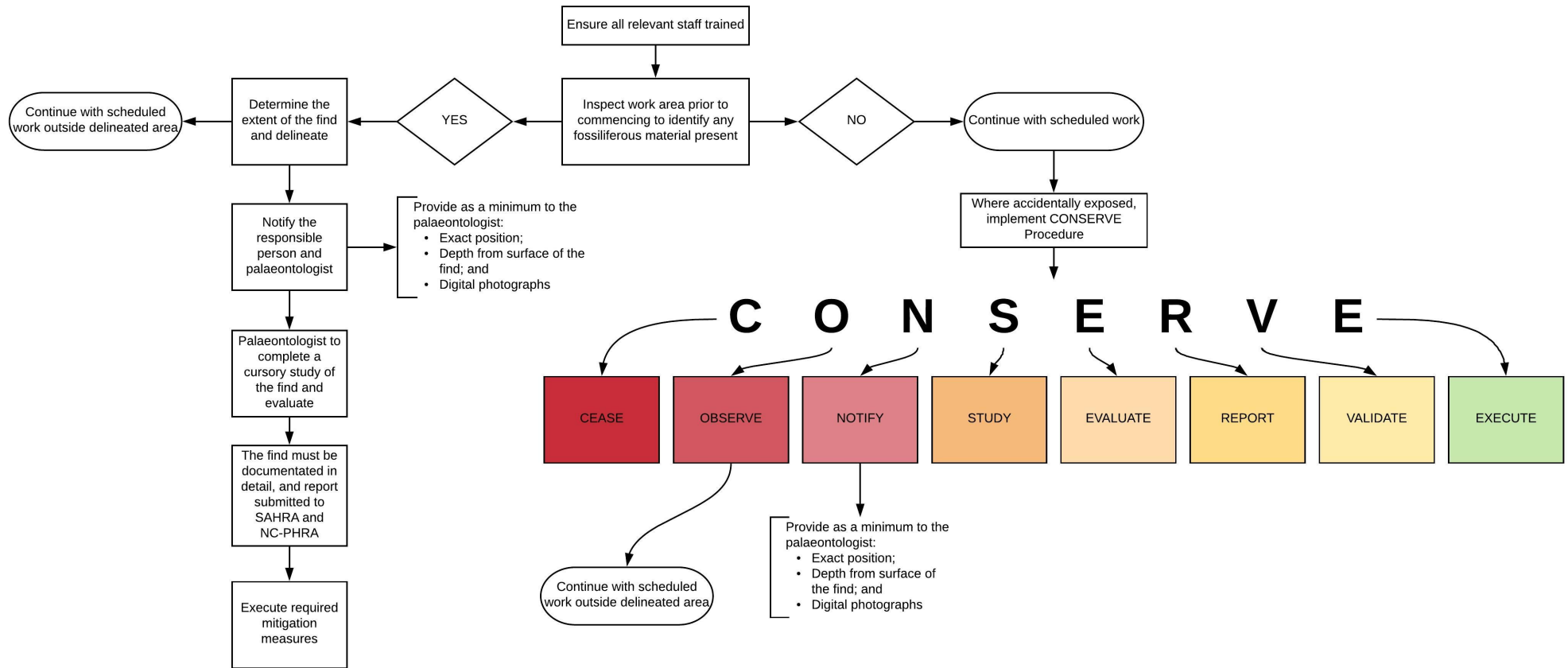


Figure 5-1: Recommended Fossil Finds Procedure

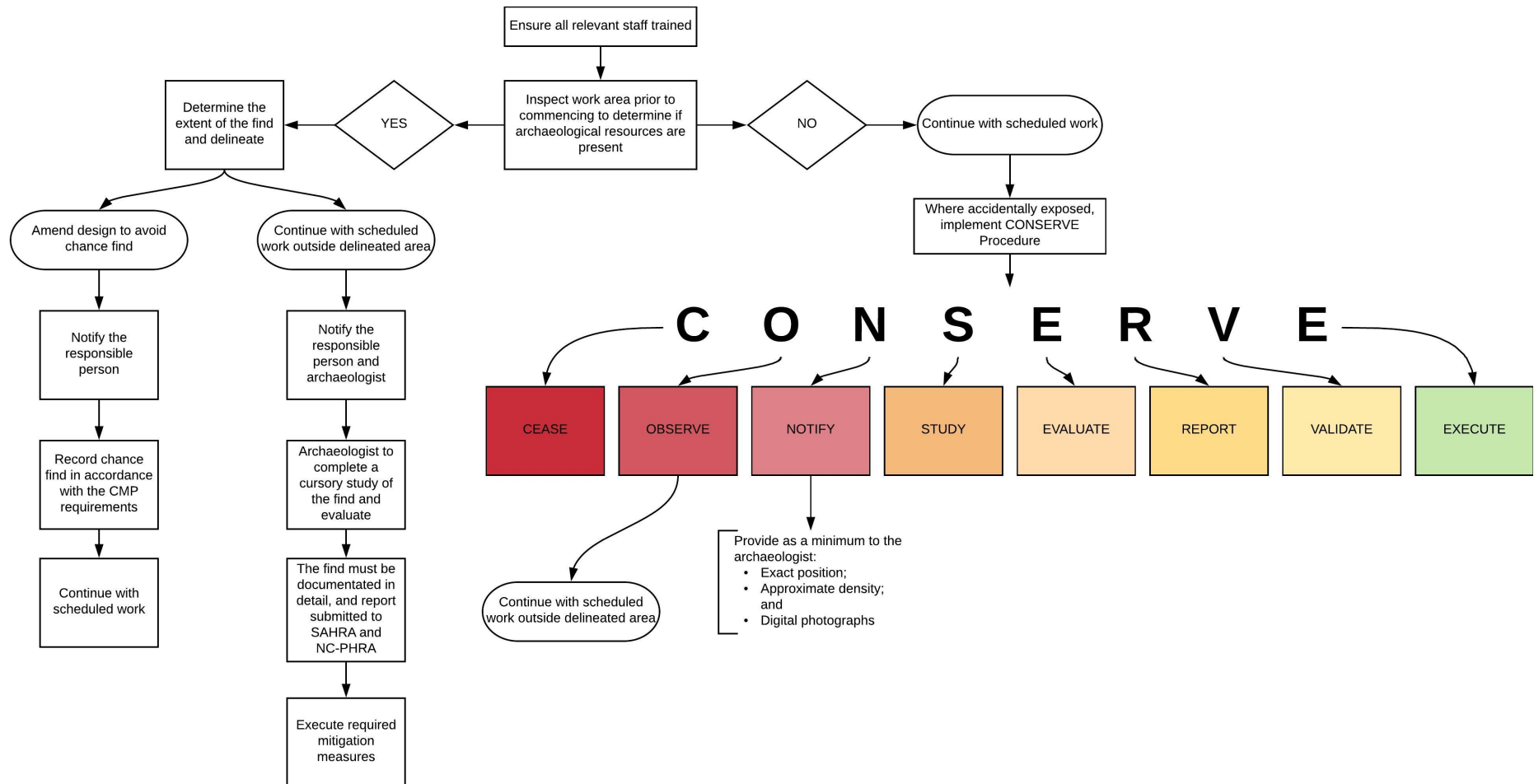


Figure 5-2: Recommended Archaeological Finds Procedure

5.3 Burial Grounds and Graves

All burial grounds and graves must be conserved *in situ*. Infrastructure design must be amended to avoid impacts to the graves, and principles contained within the Heritage Impact Assessment (HIA) must be adhered to.

In the event that burial grounds and graves are accidentally exposed during construction and/or operational activities, the CONSERVE Procedure must be implemented. In addition to the steps outlined in Table 5-1, the following additional requirements are applicable.

- The responsible person (Site Manager) must notify the South African Police Service (SAPS) and SAHRA BGG Unit;
- The SAPS and SAHRA BGG Unit² must inspect the grave(s) to determine:
 - The temporal context of the graves: i.e. whether the burial is forensic, an authentic burial grave (an informal grave or a grave older than 60 years and which is afforded general protection under Section 36 of the NHRA) or archaeological (older than 100 years and afforded general protection under Section 35 of the NHRA); and
 - Whether additional graves or burials exist in the vicinity.

6 Rescue Excavations and Major Finds

A rescue excavation refers to a mitigation strategy wherein palaeontological or archaeological resources are removed from the context in which they were identified within a short timeframe. This applies to finds where the amount or significance of the find is circumscribed and it is feasible to remove the material without comprising the contextual data. The strategy employed during these mitigations depends on several factors regarding the find and its context. The time span for these excavations is less than one week and is most likely between one and three days.

If the resource cannot feasibly be rescued in that timeframe without compromising the detailed material recovery and contextual observations, these resources are considered a Major Find. These require a more careful, controlled excavation. In the event of a Major Find, there are two options:

- *Avoidance*: the Major Find is avoided through a redesign of the Project or relocation of Project infrastructure. This ensures minimal impact to the site. The find site will require site protection measures, including the erection of fences and/or barricades, or stabilising the find site and refilling the excavation. This option is preferred should the excavation of the find site be delayed substantially or indefinitely; or

² It must be noted, however, that SAHRA generally delegate their responsibility to archaeologist to inspect the grave site and submit a report on the findings to the SAHRA BGG Unit for consideration. Should this be required, SARAO and/or SANParks must enlist the services of a suitably-qualified specialist to inspect the exposed burial(s) in consultation with the SAPS.

- *Emergency Excavation*: this refers to the ‘no option’ situation where avoidance is not feasible due to design, financial and time constraints. This option can delay construction and add time constraints to the excavation, which could lead to irrevocable compromise of scientific quality. The emergency excavation is not generally the preferred option for a Major Find.

These alternatives must be discussed and decided upon in conjunction with the relevant responsible persons before the mitigation measure is implemented for the Major Find.

7 Conclusion

The CFP presented in this document serve as an international best practice policy for the accidental discovery of palaeontological resources, archaeological resources and BGG. Based on the definitions provided within this document, and the proposed lines of communication, the international SKAO, SRAO and / or SANParks will be able to mitigate the accidental exposure of heritage resources, palaeontological resources and BGG throughout the implementation of the Project. Where necessary, the Digby Wells HRM unit is available to assist with the recommendation of mitigations for the accidental discovery or exposure of chance finds.

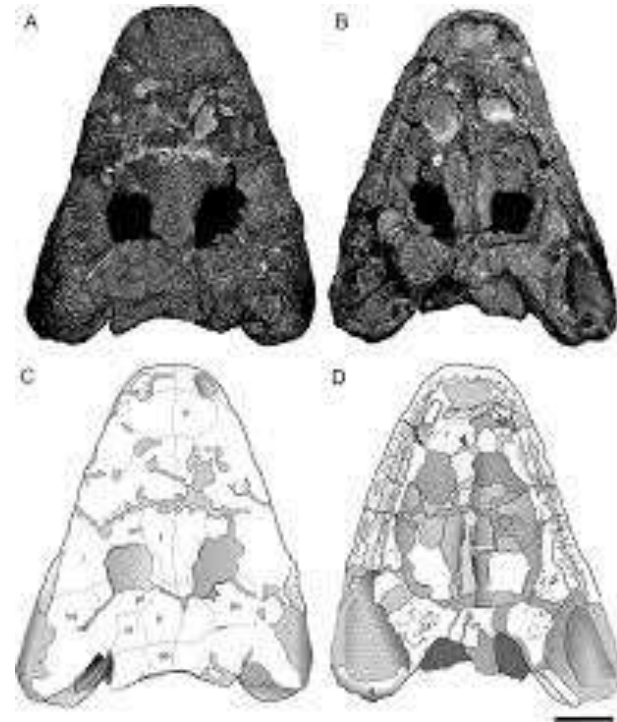
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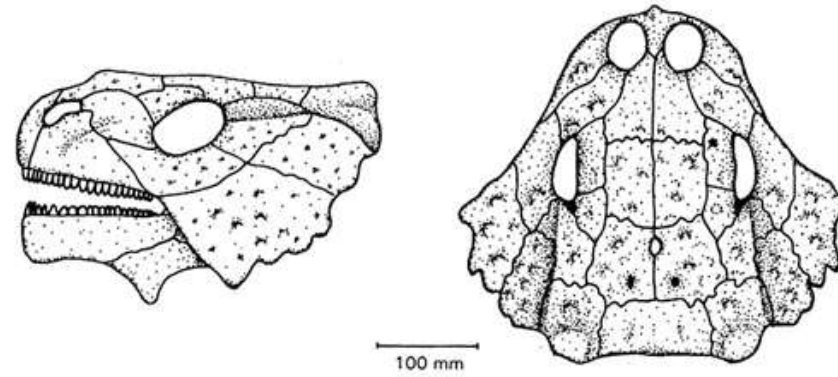


Appendix A: Photographs of Potential Fossil Finds



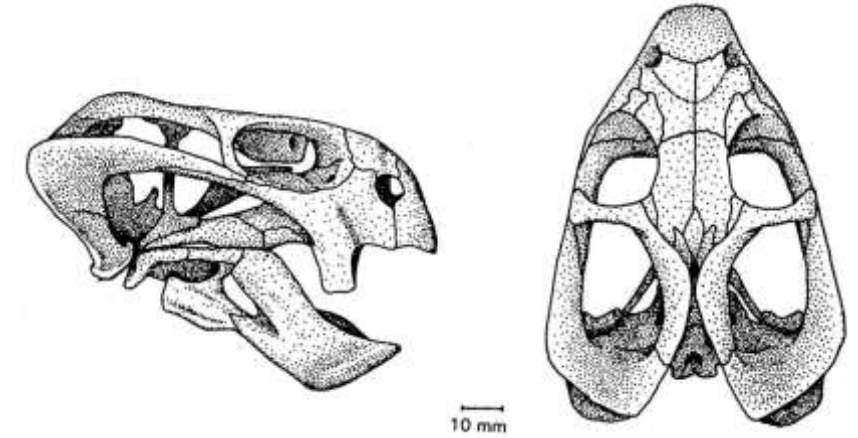
Skull holotype of *Rhinesuchus beaufortensis* (Amphibia). Scale bar shows 5 cm

(Marsicano, et al., 2016)



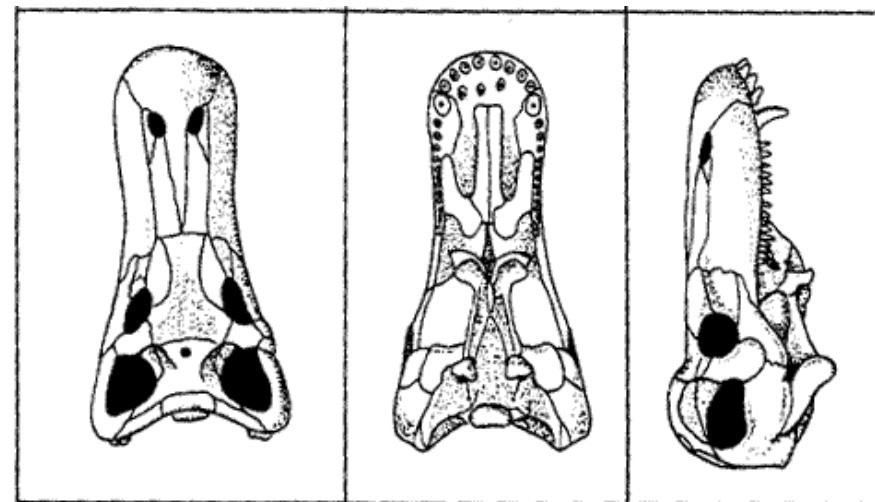
Lateral and dorsal views of a skull of *Bradysaurus* sp. (Captorhinida)

(Rubidge, 1995)



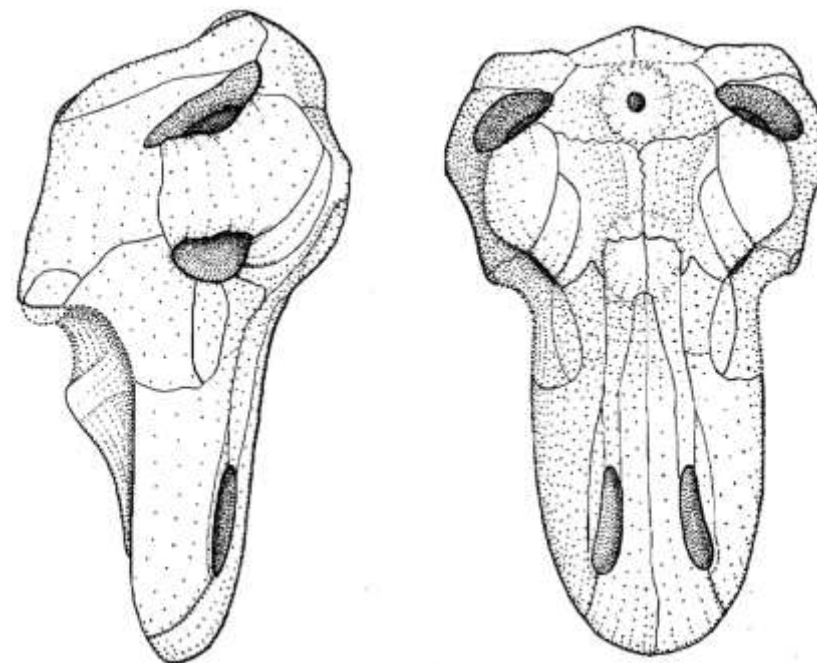
Line drawing of *Diictodon* (Dicynodontia)

(Rubidge, 1995)



Drawings of *Jonkeria* skull (Dinocephalia)

Invalid source specified.



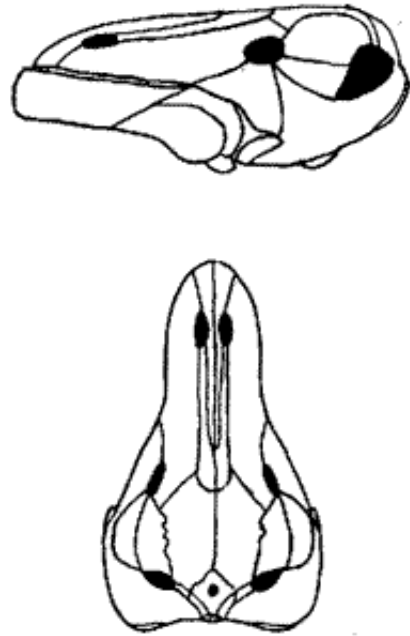
Projections of the skull of *Struthiocephalus akraalensis* (Dinocephalia)

(Boonstra, 1952)



Lateral view of the skull of *Moschops capensis* (AM4950)

(Benoit, et al., 2017)



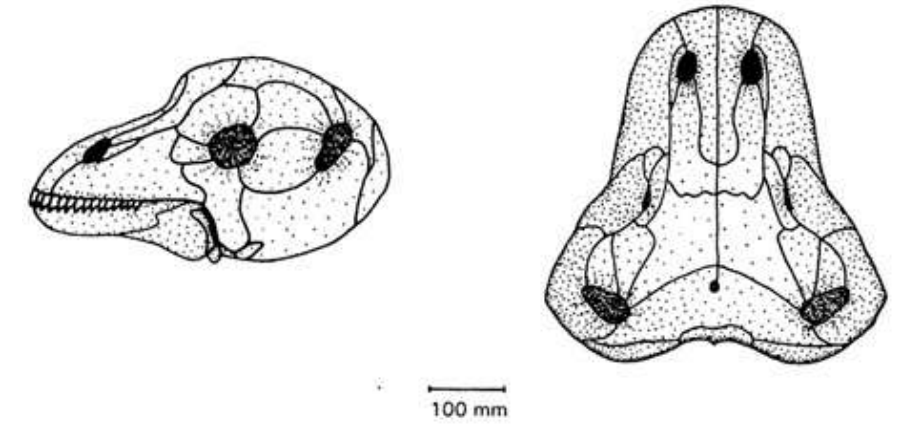
Line drawing of a *Riebeeckosaurus* (Dinocephalia)

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Drawings of *Keratocephalus* (Dinocephalia)

Invalid source specified.



Lateral and dorsal views of a skull of *Tapinocephalus* sp. (Dinocephalia)

(Rubidge, 1995)

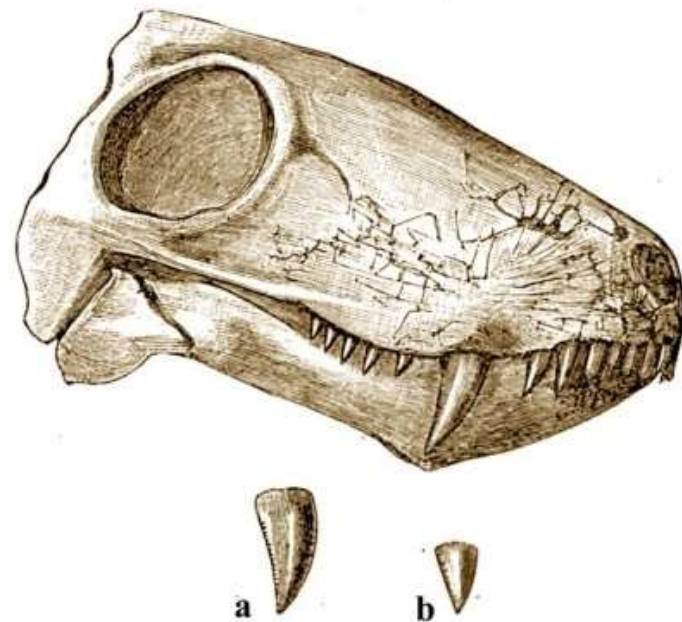


Image of a *Aelurosaurus* (Gorgonopsia)

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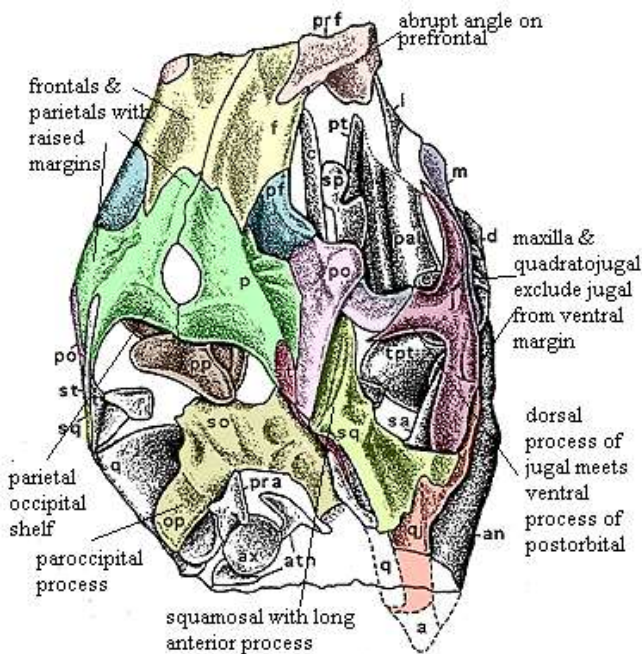
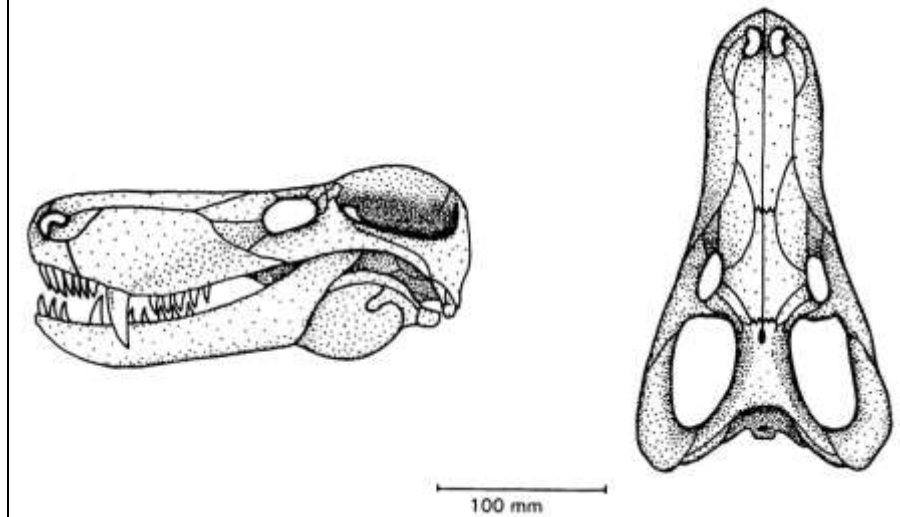


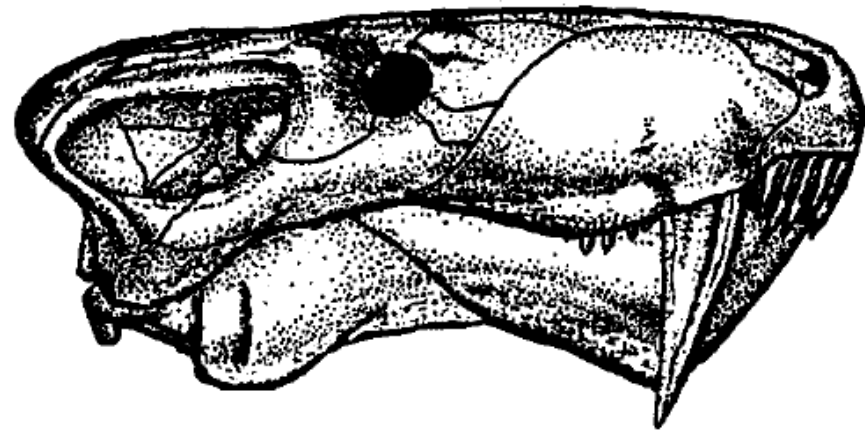
Illustration of the *Elliotsmithia* holotype (Pelycosauria)

Invalid source specified.



Line drawings of *Pristerognathus* (Therocephalia)

(Rubidge, 1995)



Drawing of an early therocephalian *Lycosuchus* (Therocephalia)

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Photograph of *Raniganjia lanceolata* (Sphenophytes)



Photograph of *Phyllothea australis* stem (Sphenophytes)



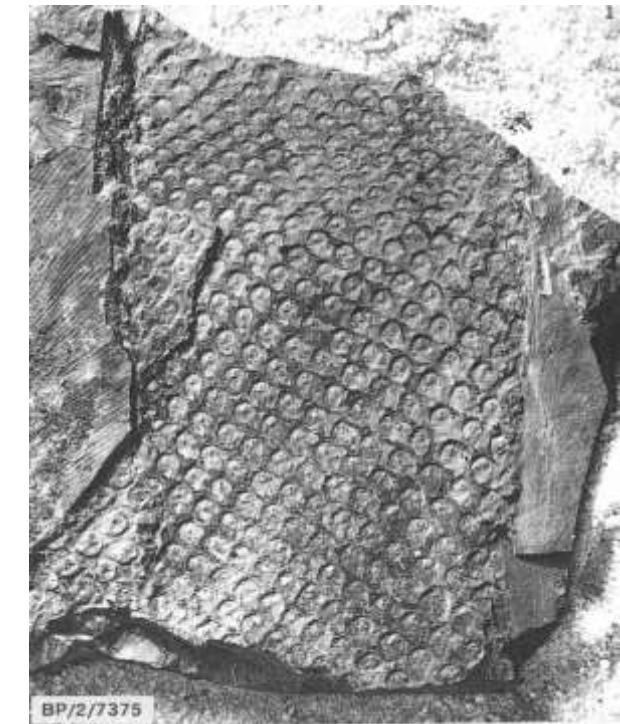
Example of an impression of a *Glossopteris* leaf with prominent midvein, identified on the municipal grounds for the radio tower southwest of Williston (Sphenophytes)



Photograph of fossil ferns



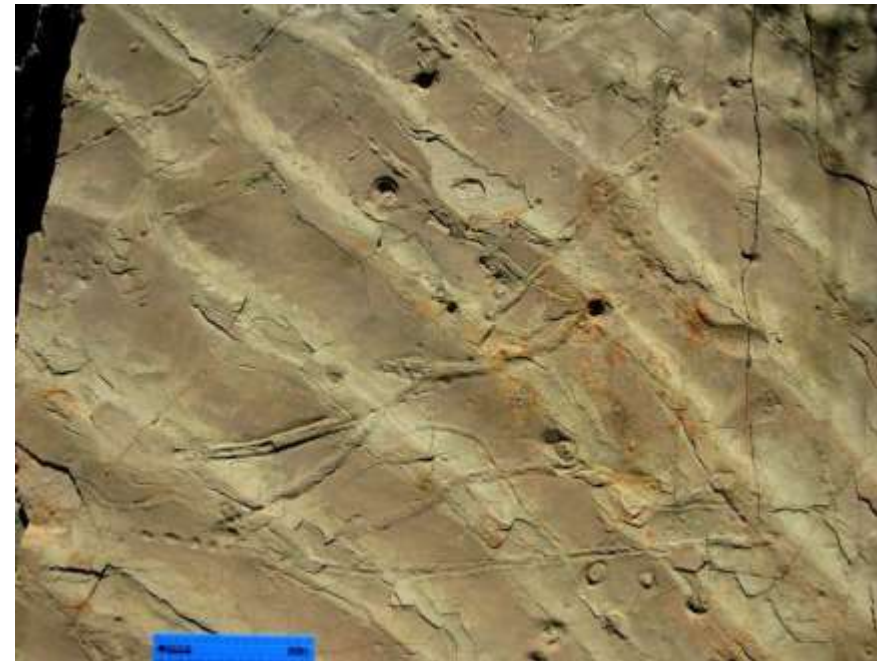
Example of a *Calamites* culm identified on the farm Sandtuin



Photograph of a *Lycopod* stem



Example of a pseudo-fossil (a natural formation which resembles a fossil but which is not)



Wave-rippled storm sandstone showing invertebrate burrows, Vaalberg (north of Carnarvon)

(Almond, 2016)



Strap-shaped invertebrate burrows within the Prince Albert Formation mudrocks near Brandvlei

(Almond, 2016)



Portion of a small log of petrified wood from Blaauwkranz near Carnarvon

(Almond, 2016)



Shelly coquina made up of a wind-blown accumulation of millions of tiny *Tomichia* (non-marine gastropods) southwest of Brandvlei

(Almond, 2016)

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Appendix B: Photographs of Potential Archaeological Finds



Example of ESA lithics

Adapted from Esterhuysen & Smith (2007)



Example of an MSA lithic (Site BGG-001)



Example of LSA lithics (site SA-015)



Examples of MSA and LSA lithics, Ostrich Eggshell (OES) and pottery sherd (site SA-014)



Lower grinding stone (site SA-014)



High-density archaeological scatter of lithics and OES (site SA-016)



Example of hairline engraving on a dolerite boulder (site RA-008)



Example of rock paintings (site RA-009)



Example of rock paintings (site RA-010)



Examples of historical material culture, including European ceramics, glass and spent ammunition (also includes a lithic) (site HST-001)



Example of a metal implement identified at a historical site (HST-001)



A mixture of LSA (lithic, OES) and historical (glass, European ceramic) identified at site RA-009



Example of built heritage (site BHS-5)



Example of a corbelled house (BHS-7)

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Appendix C: Recording Form

SITE RECORDING AND PRELIMINARY CONDITIONAL ASSESSMENT FORM



DIGBY WELLS
ENVIRONMENTAL

Recorder:		Date:	
Classification:	Immovable	Movable	Intangible
Location:	Photograph Numbers:		
Ref No:	Co-ordinates		

1. Immovable Heritage Resources

SAHRIS ID Reference:			
Type of resource:	<small>Paleontological & Archaeological Sites, Buildings, Monuments, Heritage Places, Burials</small>	Age / Industry / Period:	<small>Cultural period / style / associated persons / history</small>
Resource Description Summary:			
Functional Type:		Current Function:	<small>Original / changed from past / current function</small>

Please proceed to Section 4

2. Movable Heritage Resources

SAHRIS ID Reference:			
Type of resource:	<small>Artefacts, artworks, books, documents machines, clothing</small>	Age / Industry / Period:	
Resource Description Summary:			
Quantity recorded:			

Please proceed to Section 4

3. Intangible Heritage Resources

SAHRIS ID Reference:			
Type of resource:		To whom is the resource significant?	
Describe the resource or summarise provided information:			
Restrictions/sensitivities:	None	No photographs	Do not publish
<small>Please note any restrictions with regard to this information</small>	Other:		
Informant / source of information:			Wishes to remain anonymous

Please proceed to Section 4 (if necessary)

Type of Resource: Archaeological – ESA, MSA, LSA, EFC, LFC; Battlefield, Burial Grounds & Graves, Historical Built Environment, Intangible / Living, Monuments & Memorials, Palaeontological, Recent heritage, Struggle / Liberation heritage
Summary Description: Artefact: isolated surface, Artefact: Low density surface scatter, <10.1 sq m, Artefact: medium density surface scatter, <20.1 sq m, Artefact: high density surface scatter, >20.1 sq m, Artefact: embedded in rock matrix, Burial ground: Undetermined, Single grave, ≤10 graves, ≤20 graves, ≤50 graves, >100 graves; Deposit: ash, ≤1 cm, ~5 cm, ~10 cm, ~20 cm, >20 cm; Deposit: charcoal; Deposit: Faunal; Deposit: Kraal; Fossil, hominin: embedded in rock matrix; Fossil, hominin: isolated surface; Fossil, invertebrate: embedded in rock matrix; Fossil, invertebrate: isolated surface; Fossil, invertebrate: tracks; Fossil, plant: embedded in rock matrix; Fossil, plant: isolated surface; Fossil, vertebrate: embedded in rock matrix; Fossil, vertebrate: isolated surface; Fossil, vertebrate: tracks; Fossil: breccia with visible remains; Fossil: breccia without visible remains; Rock art: combination; Rock art: engraving; Rock art: painting; Shelter: including artefact/s;
 Shelter: including artefact/s + deposit; Shelter: including artefact/s + deposit + structures; Shelter: rock art + artefacts / deposit / structures; Shelter: rock art combination; Shelter: rock art engraving; Shelter: rock art painting; Site: high complexity, multiple components >2500 sq m / 50 x 50 m; Site: low complexity, multiple components <25 sq m / 5 x 5 m; Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m; Structural: complex, e.g. weir; Structural: functional, e.g. fences, wind pumps, troughs; Structural: industrial, e.g. warehouse, headgear; Structural: remains, e.g. daga, hut floor, foundations, bricks; Structural: stonewall; Other

SITE RECORDING AND PRELIMINARY CONDITIONAL ASSESSMENT FORM

4. Description and Notes						
<p>Please provide a brief description of the resource:</p>						
Condition of the resource:	Damaged	Poor	Fair	Good		
Quality of the resource: (Scales of damage)	Poor	Fair	Good	Excellent		
<p>Please describe: <i>(including scale of damage or neglect and factors influencing the integrity of the resource)</i></p>						
<p>Statement of Significance: <i>(please provide a brief assessment of the significance of the resource, in your opinion)</i></p>	Negligible	Low	Medium	Med-Hi	High	V. High
Consider aesthetic, historic, scientific and social criteria						
<p>Are there any observable / apparent threats / impacts to the resource?</p>						
<p>Please include any additional notes here: <i>(e.g. any notable features, additional information from an informant, damage)</i></p>						

Type of Resource: Archaeological – ESA, MSA, LSA, EFC, LFC; Battlefield, Burial Grounds & Graves, Historical Built Environment, Intangible / Living, Monuments & Memorials, Palaeontological, Recent heritage, Struggle / Liberation heritage
Summary Description: Artefact: Isolated surface, Artefact: Low density surface scatter, <10:1 sq m, Artefact: medium density surface scatter, <20:1 sq m, Artefact: high density surface scatter, >20:1 sq m, Artefact: embedded in rock matrix, Burial ground: Undetermined, Single grave, ≤10 graves, ≤20 graves, ≤50 graves, >100 graves; Deposit: ash, ≤1 cm, ~5 cm, ~10 cm, ~20 cm, >20 cm; Deposit: charcoal; Deposit: Faunal; Deposit: Kraal; Fossil, hominin: embedded in rock matrix; Fossil, hominin: tracks; Fossil, invertebrate: embedded in rock matrix; Fossil, invertebrate: isolated surface; Fossil, invertebrate: tracks; Fossil, plant: embedded in rock matrix; Fossil, plant: isolated surface; Fossil, vertebrate: embedded in rock matrix; Fossil, vertebrate: isolated surface; Fossil, vertebrate: tracks; Fossil: breccia with visible remains; Fossil: breccia without visible remains; Rock art: combination; Rock art: engraving; Rock art: painting; Shelter: including artefact/s; Shelter: including artefact/s + deposit; Shelter: including artefact/s + deposit + structures; Shelter: rock art + artefacts / deposit / structures; Shelter: rock art combination; Shelter: rock art engraving; Shelter: rock art painting; Site: high complexity, multiple components >2500 sq m / 50 x 50 m; Site: low complexity, multiple components <25 sq m / 5 x 5 m; Site: medium complexity, multiple components >25 sq m / 5 x 5 m to <2500 sq m / 50 x 50 m; Structural: complex, e.g. werf; Structural: functional, e.g. fences, wind pumps, troughs; Structural: industrial, e.g. warehouse, headgear; Structural: remains, e.g. daga, hut floor, foundations, bricks; Structural: stonewall; Other

Conservation Management Plan

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Appendix D: GNR 548 Applications Checklist

Requirement	Format	Relevant Field on SAHRIS	Step	Section 34 – Structures	Section 35 – Paleontology & Archaeology	Section 36 – Burial Grounds and Graves	Section 37 – Monuments and Memorials
Create SAHRIS Application	-		1	x	x	x	x
Provide motivation and significance opinion	-	Expanded Motivation	2	x	x	x	x
Provide photographs	JPEG	Case Images	4	x	x	x	x
Provide copies of original drawings	PDF	Additional Documents	4	x	-	-	-
Relevant title deed information	PDF	Additional Documents	4	x	-	-	-
Plans numbered and coloured	PDF	Additional Documents	4	x	-	-	-
Proof of Professional Accreditation	PDF	Membership Number in Profile	4	x	x	x	x
Proof of Public Participation	PDF	Online Comments / Consent Letter	4	x	x	x	x
Proof of payment	PDF	Proof of Payment	4	x	x	x	x
Create Site	-	Permit for Sites / Objects	3	x	x	x	x
Full SAHRIS Site Recording linked to Site	-	{Fill Out in Site Recording Record}	3	-	x	-	-
Curating Institution Consent	PDF	Online Comments / Consent Letter	4	-	x	-	-