



Prepared for:
SARAO Karoo Support Base



Contact person:
Gabriella Duncan

Tel: (053) 382 5000
Email: gduncan@sarao.ac.za



ENVIRONMENTAL SERVICES FOR THE PROPOSED CONSTRUCTION OF THE NEW KLEREFONTEIN EOC BUILDING

BASIC ASSESSMENT REPORT

DRAFT REPORT
REVISION 01

AUGUST 2023

Prepared by:
Delta Built Environment Consultants (Pty) Ltd

Contact person:
Neelan Maduray

Tel: (012) 368 1850
Fax: (012) 348 4738
Email: neelan.maduray@deltabec.com



DOCUMENT CONTROL

TITLE:	BASIC ASSESSMENT REPORT		
ELECTRONIC FILE LOCATION:	P22159_REPORT_02_BASIC_ASSESSMENT_REPORT_REV 00-Basic Assessment Report		
REPORT STATUS:	Draft		
REVISION NUMBER:	01		
CLIENT:	South African Radio Astronomy Observatory 2 Fir Street Black River Park Observatory (North Gate entrance) 7925 South Africa		
CONSULTANT:	Delta Built Environment Consultants (Pty) Ltd P.O. Box 35703 Menlo Park 0102		
DATE:	August 2023		
REFERENCE NUMBER:	P22159 / R8836		
PREPARED BY:	Neelan Maduray Pr.Sci.Nat Reg.EAP	HoD: Environmental Services	
REVIEWED BY:	Deborah Weldon Pr.Sci.Nat Reg.EAP	Principal EAP	
APPROVED BY:	Stanford Acres	Division 3: Advisory Services Manager	
DISTRIBUTION LIST:	COMPANY	NAME & SURNAME	
	SARAO	Gabriella Duncan	
		Alice Pienaar-Marais	

RECORD OF REVISIONS

REV. NO.	STATUS	DESCRIPTION OF REVISION	REV. DATE
00	Draft	Issued for comments	02/06/2023
01	Draft	Addressed comments	31/07/2023

EXECUTIVE SUMMARY

Delta Built Environment Consultants (Delta BEC) has been appointed by the South African Radio Astronomy Observatory (SARAO), which is a National Facility of the National Research Foundation (NRF), to conduct the Environmental Authorisation process (via a Basic Assessment) for the proposed construction of the New SKA1 Mid Engineering Operations Centre Building (EOC) at the SARAO Karoo Support Base on the Klerefontein farm. The construction and operations of SKA1_MID will be conducted by the SKA Observatory (SKAO) in partnership with the South African Radio Astronomy Observatory (SARAO). The SKA1_MID project is based in the Karoo and will see the construction and operation of 197 telescopes and support infrastructure.

SARAO is a National Facility of the NRF and has established its support base (SARAO Karoo Support Base) at Klerefontein. The Klerefontein farm is a state-owned property owned by the Provincial Administration of the Northern Cape for use by the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. The NRF entered into a Memorandum of Agreement with the Department of Agriculture on **13 December 2021** to enable SARAO to utilise identified land and buildings at Klerefontein. The old farmhouse is used by the SARAO Operations team and the health and safety team as office space.

The study area is located on the Klerefontein farm, which is approximately 10 km outside the town of Carnarvon. Carnarvon is located within the boundary of the Kareeberg Local Municipality, forming part of the Pixley Ka Seme District Municipality in the Northern Cape Province.

The SKA1-MID Engineering Operations Centre (EOC) will be an expansion of the current infrastructure on site where the current workshops will be expanded as a singular building to incorporate:

- New office space
- Additional workshops
- Expansion of generator facilities and diesel storage

The proposed construction will have the buildings illustrated on the figure below:



As part of the proposed activities a Radio Frequency Interference (RFI) chamber, Hydrogen Intensity and Real Time Analysis eXperiment (HIRAX) prototype and telecommunications mast will also be developed. The HIRAX prototype dishes is a temporary project and will be removed once the HIRAX guest instrument is installed on the farm Swartfontein which forms part of the land the NRF own known as the SKA site.

A pre-application meeting was held with the relevant Competent Authority, which is the Department of Forestry, Fisheries and the Environment (DFFE), to make the department aware of the proposed project initiation and receive guidance regarding the requirement for this proposed project.

In order to ensure that the proposed construction of the New EOC building is developed in an environmentally responsible manner, applicable environmental legislation and guidelines were taken into account.

Based on the aquatic assessment, neither the NFEPA nor the SANBI wetland databases indicated the presence of any wetland within the study area. Also, no wetlands were identified in the Northern Cape LUDS database. These desktop assessment findings were confirmed by a site assessment, i.e., that no areas that can be classified as wetlands.

The site assessment confirmed the presence of small watercourses and served to refine their extent further. The area was assessed by walking the ill-defined channels where they were visible and tracking the routes with a handheld GPS.

All watercourses within the proposed study area are very small, seasonal, and characterised by poorly defined channels, this is with the exception of the Die Leegte River.

Large parts of the study site have already been physically transformed by historic activities (approximately 70% of the study site). As such, vegetation on the remaining 30% of the site has not been physically disturbed but is considered to be secondary in nature and of poor biodiversity value. Although the DFFE Screening Tool identifies the site as a Critical

Biodiversity Area (CBA1) the terrestrial specialist, after conducting the site assessment, has confirmed that no areas within the study site are considered to contain pristine vegetation.

The Agricultural specialist stated that the proposed development is on Low sensitive land and declared that the site is of Low or Medium sensitivity for agriculture and will have no impact on the agricultural production capability.

The study further outlined that the development will not affect farming in any way and that there were no gaps in knowledge or data during the assessment. Therefore, the site is not regarded as high potential cropping land that should be protected for farming purposes.

The Heritage Assessment identified two (2) categories of heritage resources during the pre-disturbance survey:

- Isolated archaeological and historical / recent past findspots
 - During the pre-disturbance survey, individual surface artefacts were observed amongst heavily disturbed areas – these appeared to include dumped stone and sand material. These find spots included:
 - Fragments of European ceramic, fragments of blue glass and a clear glass bottle. These items may be associated with the structures still in use, or may be more modern; and
 - Stone Age materials including a broken, irregular blade and a flake. Both look fresh, although the flake has a patina and was made of hornfels.
 - These artefacts are likely not in a primary depositional context, given the disturbances observed in this area.
- Klerefontein Farmhouse and Werf
 - The Klerefontein Farmhouse was likely established around 1880 to 1900. The farmhouse would have been established as part of a sheep farm.
 - The werf includes several additional structures, established at different points in time. The werf includes two large animal kraals, a workshop building (dated 1952), a barn and an outhouse. These are described in more detail in the Built Heritage Impact Assessment Report.

Based on the preliminary visual assessment of the proposed SKA Klerefontein expansion, the recommendation of the specialist is that the development should be authorised based on the following motivations:

- The project will have positive alignment with local and regional planning.
- The remoteness of the location carries few receptors.
- There will be a small Zone of Visual Influence (ZVI) change to the surrounding landscape which is contained within the foreground (3km distance).
- There are no landscape-based tourism activities taking place within the project ZVI.
- No tourist view corridors or main routes fall within the project ZVI.
- The suitability of the architecture will not detract from the existing old farmhouse or old walled enclosure.
- There is suitable landscape planning for the proposed front vehicle parking area.

The Public Participation was conducted in accordance with the Environmental Impact Assessment Regulations (EIA), 2014 (as amended) as well as the DFFE's Public Participation Guideline in terms of NEMA EIA Regulations (2017).

To date the following has been done for the Public Participation phase:

- Distribution of Background Information Document (BID) to initially identified Interested and Affected Parties (I&APs).
- Publication of an advertisement in the **local** Noordwester Newspaper on 11th May 2023.
- Placement of five (5) site notices around the town of Carnarvon on 18th May 2023.
- Public meeting with the residents of the town of Carnarvon on 18th May 2023.

All comments received from the Public Participation phase will be addressed in the Final BAR, before submitting to DFFE, and will be sent to all registered I&APs.

Based on the outcomes of various assessments that were conducted for the proposed project together with all its infrastructure, it was determined that the proposed project will not have a significant negative impact on the surrounding environmental features. All proposed mitigation measures for this project should be implemented and monitored accordingly by an independent ECO.

It is therefore the EAP's opinion that the proposed project should be granted Environmental Authorisation as there are no fatal flaws.

TABLE OF CONTENTS

1	INTRODUCTION	14
1.1	PROJECT TITLE	14
1.2	INTRODUCTION	14
1.3	PURPOSE OF REPORT	14
1.4	SUMMARY OF AUTHORISATION REQUIREMENTS	15
1.5	LOCALITY OF THE PROPOSED PROJECT	15
1.6	STRUCTURE OF REPORT	18
2	APPROACH AND METHODOLOGY.....	22
2.1	APPLICABLE LEGISLATION, POLICIES, AND/OR GUIDELINES	22
2.1.1	ASTRONOMY GEOGRAPHIC ADVANTAGE ACT 21 OF 2007	22
4.1.1	THE INFRASTRUCTURE DEVELOPMENT ACT 23 OF 2014	22
4.1.2	CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT NO. 108, 1996)	23
4.1.3	NEMA AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS (2014, AS AMENDED)	23
4.1.4	NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25, 1999)	23
4.1.5	NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10, 2004)	24
4.1.6	NATIONAL WATER ACT (ACT NO. 36, 1998).....	24
4.2	WASTE, EFFLUENT, EMISSIONS, AND NOISE MANAGEMENT	24
4.2.1	SOLID WASTE MANAGEMENT	24
4.2.2	LIQUID EFFLUENT	25
4.2.3	EMISSION INTO THE ATMOSPHERE.....	25
4.2.4	GENERATION OF NOISE	25
4.2.5	WATER USE	25
4.3	DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER	26
4.3.1	DETAILS OF THE PROJECT TEAM.....	26
4.3.2	QUALIFICATIONS AND EXPERIENCE OF THE EAPs &/ ENVIRONMENTAL TEAM	26
4.3.2.1	Neelan Maduray.....	26
4.3.2.2	Deborah Weldon.....	27
4.3.2.3	Goodman Mahlangu	27
4.4	BASIC ASSESSMENT PROCESS	28
4.4.1	OBJECTIVES.....	28
4.4.2	SCREENING ASSESSMENT.....	28
4.4.3	IDENTIFIED SPECIALIST STUDIES.....	30
4.4.4	WATER USE LICENCE	31
4.4.5	DESCRIPTION OF LISTED ACTIVITIES TRIGGERED.....	31
4.4.6	PRE-APPLICATION	32
4.4.6.1	DFFE Pre-Application Meeting	32
5	PROJECT DESCRIPTION	33
5.1	APPLICANT DETAILS	33
5.2	DESCRIPTION OF THE PROPOSED PROJECT	33
5.3	LOCATION EXTENT	34
5.4	AFFECTED PROPERTIES	34
5.5	PROJECT ALTERNATIVES.....	35
5.5.1	PREFERRED ALTERNATIVE	35
5.5.1.1	Main Building	35
5.5.1.2	EOC Workshop Building Layout.....	42
5.5.1.3	EOC Vehicle Workshop Building.....	44
5.5.1.4	EOC Generator & Diesel Storage Building.....	45
5.5.1.5	EOC Old Shed/Workshop Building	46
5.5.1.6	EOC Old Farmhouse Building	48
5.5.1.7	Telecoms Mast	49
5.5.1.8	Hydrogen Intensity and Real Time Analysis eXperiment (HIRAX) Prototype.....	50
5.5.1.9	Radio Frequency Interference (RFI) Chamber	51
5.5.2	OTHER ALTERNATIVES.....	51

5.5.3	NO-GO ALTERNATIVES.....	51
5.5.4	SITE ACCESS.....	52
6	DESCRIPTION OF THE AFFECTED ENVIRONMENT	53
6.1	LAND USE AND CHARACTER OF THE SURROUNDING AREA.....	53
6.2	CLIMATE, TEMPERATURE AND RAINFALL	53
6.3	GEOLOGY AND TOPOGRAPHY.....	54
6.4	HYDROLOGY.....	55
6.4.1	STORMWATER MANAGEMENT.....	55
6.5	BIODIVERSITY AND TERRESTRIAL ECOSYSTEM.....	55
6.5.1	VEGETATION TYPE.....	55
6.6	HERITAGE AND PALAENTOLOGICAL.....	56
6.7	VISUAL AND LANDSCAPE	58
6.8	SOCIO-ECONOMIC ASPECTS.....	59
6.8.1	SOCIO-ECONOMIC ENVIRONMENT.....	59
6.8.2	EDUCATION	59
6.8.3	LEVEL OF EMPLOYMENT	59
6.8.4	ACCESS TO SERVICES	60
6.8.4.1	Access to Water	60
6.8.4.2	Access to Sanitation	60
6.8.5	THE ECONOMY AND EMPLOYMENT.....	61
6.8.6	SOCIO-ECONOMY VALUE OF THE ACTIVITY.....	61
6.8.7	PLANNING CONSIDERATIONS	62
6.8.7.1	National Conversation Level	62
6.8.7.2	Provincial Conservation Level	62
6.9	NEED AND DESIRABILITY	63
6.10	SPECIALIST STUDIES FINDINGS.....	63
6.10.1	AQUATIC.....	63
6.10.2	AGRICULTURAL.....	66
6.10.3	HERITAGE AND PALAEOLOGY	68
6.10.4	TERRESTRIAL.....	72
6.10.4.1	Vegetation.....	72
6.10.4.2	Mammals	74
6.10.4.3	Reptiles	74
6.10.4.4	Frogs.....	75
6.10.4.5	Birds	75
6.10.5	VISUAL.....	77
7	PUBLIC PARTICIPATION	80
7.1	COMPILATION OF A STAKEHOLDER DATABASE	80
7.2	METHODS OF PUBLIC PARTICIPATION	80
7.2.1	NEWSPAPER ADVERTISEMENT	80
7.2.2	SITE NOTICE.....	83
7.2.3	SITE PHOTOGRAPHS	84
7.2.4	PUBLIC MEETINGS.....	86
7.3	COMMENTS AND RESPONDS REPORT	87
8	DESCRIPTION AND ASSESSMENT OF IMPACTS	88
8.1	RISK ASSESSMENT METHODOLOGY.....	88
8.1.1	NATURE	88
8.1.2	PROBABILITY (P).....	88
8.1.3	DURATION RATING (D)	88
8.1.4	EXTENT RATING (E)	88
8.1.5	MAGNITUDE (M).....	89
8.1.6	SIGNIFICANCE (S).....	89
8.2	IMPACTS IDENTIFIED.....	90
8.2.1	CONSTRUCTION	90

8.2.1.1	Agriculture	90
8.2.1.2	Heritage	90
8.2.1.3	Terrestrial.....	94
8.2.2	NO-GO IMPACT.....	99
8.2.2.1	Visual.....	99
8.2.3	OPERATIONAL	100
8.2.3.1	Agriculture	100
8.2.3.2	Heritage	100
8.2.3.3	Terrestrial.....	100
8.2.4	DECOMMISSIONING PHASE.....	102
8.2.4.1	Heritage	102
8.3	CUMULATIVE IMPACTS	102
8.3.1	HERITAGE.....	102
8.3.2	TERRESTRIAL	103
9	CONCLUSION AND RECOMMENDATIONS	104
9.1	CONCLUSIONS.....	104
9.2	SPECIALIST RECOMMENDATIONS	104
9.2.1	AGRICULTURE.....	104
9.2.2	AQUATIC	104
9.2.3	HERITAGE.....	104
9.2.4	TERRESTRIAL	105
9.2.5	VISUAL.....	105
9.3	ENVIRONMENTAL IMPACT STATEMENT	107
10	REFERENCES.....	108
APPENDIX A:	LOCALITY MAP.....	109
APPENDIX B:	SDP.....	110
APPENDIX C:	PHOTOGRAPHS.....	111
APPENDIX D:	BIODIVERSITY OVERLAY MAP	112
APPENDIX E:	OTHER PERMITS AND LICENCES	113
APPENDIX F:	PUBLIC PARTICIPATION	114
APPENDIX F2:	COMMENTS AND RESPONDS REPORT	116
APPENDIX G:	SPECIALIST REPORTS	119
APPENDIX H:	EMPR.....	126
APPENDIX I:	ADDITIONAL INFORMATION.....	127
APPENDIX J:	MEETING MINUTES	130
APPENDIX K:	NEED AND DESIRABILITY	131

LIST OF FIGURES

Figure 1-1: Locality Map for Kareeberg Local Municipality.....	16
Figure 1-2: Locality Map for the proposed study area	17

Figure 3-1: Proposed EOC Extension Building (green)	34
Figure 3-2: EOC Main Building Layout - Ground Floor	35
Figure 3-3: EOC Main Building Layout – First Floor	38
Figure 3-4: EOC Workshop Building Layout	42
Figure 3-5: EOC Vehicle Service Workshop Building Layout.....	44
Figure 3-6: EOC Generator & Diesel Storage Building Layout	45
Figure 3-7: EOC Shed / Workshop Building layout.....	46
Figure 3-8: EOC Old Farmhouse Layout	48
Figure 3-9: Proposed Mast Layout	50
Figure 3-10: Proposed Mast	50
Figure 3-11: Floor Plan	51
Figure 4-1: Average temperature for Carnarvon	53
Figure 4-2: Average rainfall (mm) for Carnarvon	54
Figure 4-3: SAHRIS palaeosensitivity map for the site for the proposed Klerefontein upgrade shown within the yellow oval. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.	56
Figure 4-4: Watercourses (shown in blue) as identified and delineated during the site assessment	64
Figure 4-5: Poorly defined watercourse channel within the study site	65
Figure 4-6: The non-functional weir in the Die Leegte River, upstream of the existing SKA Klerefontein Facility	66
Figure 4-7: Functional weir in the Die Leegte River	66
Figure 4-8: Present land uses (2023)	67
Figure 4-9: Agricultural potential (DALRRD)	68
Figure 4-10: Isolated Surface Artefacts	69
Figure 4-11: Existing structures on the Klerefontein Werf.....	70
Figure 4-12 Results of the Pre-disturbance Survey.....	71
Figure 4-13: Prickly Pear “orchard” on site.....	73
Figure 4-14: Material stockpile area on site	73
Figure 4-15: Outline of the layout of the proposed Klerefontein Support Base and associated infrastructure	74
Figure 4-16: Viewshed analysis map of proposed structure	79
Figure 5-1: Proof of Publication	82
Figure 5-2: Site Notice 1	84
Figure 5-3: Site Notice 2	84
Figure 5-4: Site Notice 3	85
Figure 5-5: Site Notice 4	85
Figure 5-6: Site Notice 5	86
Figure 5-7: Delta BEC representative presenting to the community.....	87
Figure 5-8: Community attendees at Carnarvon Hoerskool.....	87

LIST OF TABLES

Table 1-1 Contents of the BAR (2014 EIA Regulations, as amended).....	18
Table 2-1: Details of EAP	26
Table 2-2: Summary of Sensitivities	29
Table 2-3: Animal species found on site	29
Table 2-4: Potential Specialist Studies – Proposed route and infrastructures.....	30
Table 2-5: Potentially Triggered Activities.....	31
Table 3-1: Applicant Details	33
Table 3-2: Main Building – Ground Floor Accommodation Schedule.....	35
Table 3-3: EOC Main Building – First Floor Accommodation Schedule.....	38
Table 3-4: EOC Workshop Building – Accommodation Schedule	42
Table 3-5: EOC Vehicle Service Workshop Building – Accommodation Schedule.....	44
Table 3-6: EOC Generator & Diesel Storage Building – Accommodation Schedule	45
Table 3-7: EOC Workshop Building – Accommodation Schedule	46

Table 3-8: EOC Workshop Building – Accommodation Schedule	48
Table 4-1: Sensitivity features identified for the animal and vegetation themes	56
Table 4-2: South Africa Overview of the Stone Age sequence	57
Table 4-3: Educational Level for Carnarvon.....	59
Table 4-4: Kareeberg Municipality employment data (aged 15-64).....	59
Table 4-5: Kareeberg Municipality source of water.....	60
Table 4-6: Kareeberg Municipality toilet facilities	60
Table 4-7: Kareeberg Municipality average household income	61
Table 4-8: Specialist Studies Undertaken	63
Table 4-9: Heritage Resources identified during the survey	69
Table 4-10: Outcome of the Site Sensitivity Verification	76
Table 4-11: Proposed Project Heights Table	77
Table 5-1: Site notice locations	86
Table 6-1: Significance Weightings.....	89
Table 6-2: Interactions and Impacts of Construction Phase Activities	90
Table 6-3: Summary of the Potential Direct Impact to the Klerefontein Kraal.....	91
Table 6-4: Summary of the Potential Indirect Impact to the Klerefontein Werf	92
Table 6-5: Loss of indigenous vegetation associated with the development during the construction phase ..	94
Table 6-6: Spreading of AIPS during the construction phase	94
Table 6-7: Contamination of the area by petrochemical spillages associated with the development.....	96
Table 6-8: Construction waste impacts associated with the development	97
Table 6-9: Domestic waste impacts associated with the development during construction phase	98
Table 6-10: Leaking portable toilet facilities impacts associated with the development	98
Table 6-11: No-go impacts associated with the development	99
Table 6-12: Interactions and Impacts of Operational Phase Activities.....	100
Table 6-13: Spreading of alien invasive vegetation during Operational Phase	100
Table 6-14: Contamination by domestic waste impact during the operational phase	101
Table 6-15: Interactions and Impacts of Decommissioning Phase Activities	102
Table 6-16: Summary of Potential Cumulative Impacts.....	102
Table 6-17: Cumulative impacts associated with the development.....	103
Table 7-1: Visual mitigation measures	105

GLOSSARY OF TERMS AND ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
COAR	Combined Observation Action Register
CoDR	Conceptual Design Review
DFFE	Department of Forestry, Fisheries, and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EOC	Engineering Operations Centre
ESA	Early Stone Age
GA	General Authorisation
GNR	Government Notice Regulations
HIRAX	Hydrogen Intensity and Real Time Analysis eXperiment
I&AP	Interested & Affected Parties
LSA	Later Stone Age
LN	Listing Notice
LUDS	Land Use Decision Support
MSA	Middle Stone Age
NCDA	Northern Cape Department of Agriculture
NCHRA	Northern Cape Heritage Resources Authority
NFEPA	National Freshwater Ecosystem Priority Areas
NEMA	National Environmental Management Act,1998 (Act No.107 of 1998)
NRF	National Research Foundation
OAR	Observation Action Register

PPP	Public Participation Process
RFI	Radio Frequency Interference
SANBI	South African National Biodiversity Institute
SARAO	South African Radio Astronomy Observatory
SKAO	Square Kilometre Array Observatory
SLA	Service Level Agreement
SMS	Site Maintenance Services
WUL	Water Use Licence
ZVI	Zone of Visual Influence

1 INTRODUCTION

1.1 PROJECT TITLE

Construction of the New Klerefontein Engineering Operations Centre (EOC) Building.

1.2 INTRODUCTION

Delta Built Environment Consultants (Delta BEC) has been appointed by the South African Radio Astronomy Observatory (SARAO), which is a National Facility of the National Research Foundation (NRF), to conduct the Environmental Authorisation process (via a Basic Assessment) for the proposed construction of the New SKA1 Mid Engineering Operations Centre Building (EOC) at the SARAO Karoo Support Base on the Klerefontein farm. The construction and operations of SKA1_MID will be conducted by the SKA Observatory (SKAO) in partnership with the South African Radio Astronomy Observatory (SARAO). The SKA1_MID project is based in the Karoo and will see the construction and operation of 197 telescopes and support infrastructure.

The NRF and the Northern Cape Department of Agriculture (NCDA) concluded a **Memorandum** of Agreement to secure the approximately 8,5 ha (red area) for use by SARAO/SKAO as the Support base for the SKA Project in the Karoo. The intended development by SARAO/SKAO on Klerefontein will be formally recorded per notarial deed on the Deed of the Klerefontein farm considering the value of the investment SARAO will be implementing on the 8,5 ha.

South Africa's National Infrastructure Plan incorporates the Square Kilometre Array (SKA) and MeerKAT projects as Strategic Integrated Projects (SIPs) (SIP 16). The aim of the project is to provide opportunity for Africa, and South Africa, to contribute towards global advanced science projects. As a SIP project, the proposed project is given a provision for a reduced timeframe for EIA and BA application processes.

1.3 PURPOSE OF REPORT

The Basic Assessment Report (BAR) has been prepared in compliance with Government Notice Regulations (GNR 326) promulgated in terms of Section 24(5) of NEMA (Act No. 107 of 1998). The Basic Assessment Process is to provide the Competent Authority, the Department of Forestry, Fisheries and the Environment (DFFE), with adequate information to make an informed decision on the Application. The BAR has been prepared according to the structure set out in Appendix 1 of the EIA Regulations, 2014 as amended in 2017. The Background Information Document has been circulated to all relevant state departments and registered Interested & Affected Parties (I&APs) for the legislated 30-day commenting period.

- Northern Cape Heritage Resources Authority (NCHRA)

- Kareeberg Local Municipality
- Pixley Ka Seme District Municipality
- Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL)
- Department's Biodiversity Conservation (DFFE)

These Departments were notified that the Draft BAR can be made available for review upon request.

Thereafter, all comments received by the EAP will be addressed and incorporated into the Final BAR. The timeframes for SIPs as per Schedule 2 of the Infrastructure Development Act (Act 23 of 2014) will be applied on this project.

1.4 SUMMARY OF AUTHORISATION REQUIREMENTS

The Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), promulgated in terms of Chapter 5 of NEMA, provide for the control of certain listed activities. Such activities are prohibited from commencing until written authorisation is obtained from the competent authority, which, in this case, is the DFFE. The proposed project triggers the need for a BA process to be undertaken for the DFFE to consider granting or refusing Environmental Authorisation (EA).

Registration of water uses in terms of the National Water Act, 1998 (No. 36 of 1998; NWA) is also required where the proposed works crosses or is within the regulated boundaries of watercourses, and if water supply is required from a water resource other than municipal supply. Applications for Section 21(c) and Section 21(i) water uses is in the process of being submitted to the DWS on behalf of SARAO for "impeding or diverting the flow of water in a watercourse" and "altering the bed, banks, course or characteristics of a watercourse".

There currently is a Water Use Licence (WUL) in place at Klerefontein for water abstraction from 2 boreholes (10/D54B/A/12523). All construction water will be sourced from these boreholes.

Section 38 of the National Heritage Resources Act, 1999 (NHRA) requires a Notice of Intent to Develop (NID) to be submitted to Northern Cape Heritage Resources Authority (NCHRA). This has been submitted and comments received from the NCHRA will be incorporated into the final submission to DFFE. This legislation provides for establishment of a provincial heritage resources authority to manage provincial and local heritage resources.

1.5 LOCALITY OF THE PROPOSED PROJECT

SARAO Karoo Support Base is located on the Klerefontein farm, which is approximately 10 km outside the town of Carnarvon. Carnarvon is located within the boundary of the Kareeberg Local Municipality, forming part of the Pixley Ka Seme District Municipality in the Northern Cape Province.

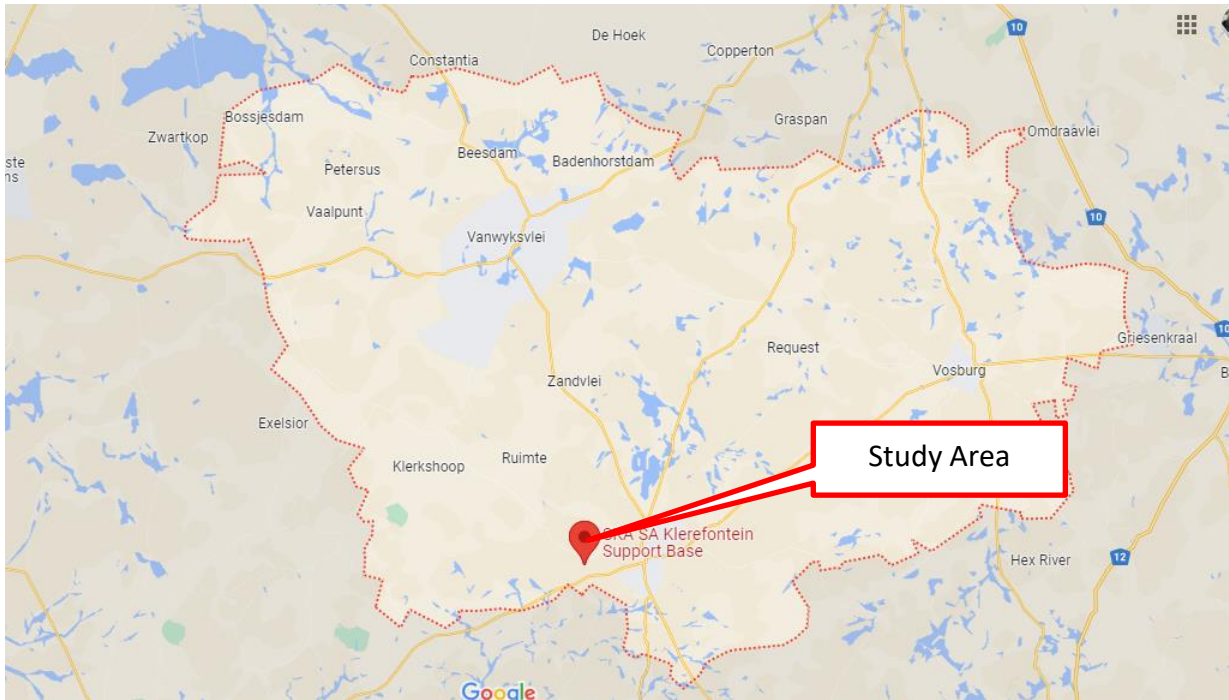


Figure 1-1: Locality Map for Kareeberg Local Municipality



Figure 1-2: Locality Map for the proposed study area

1.6 STRUCTURE OF REPORT

This Report has been drafted in accordance with the EIA Regulations (2014, as amended) and adheres to the requirements contained in Appendix 1 of GNR 326, as noted in Table 1.

Table 1-1 Contents of the BAR (2014 EIA Regulations, as amended)

2014 EIA REGULATIONS	DESCRIPTION OF EIA REGULATIONS REQUIREMENTS FOR BA REPORTS	LOCATION IN THE BAR
Appendix 1, Section 3 (a)	Details of –	
	The EAP who prepared the report; and the expertise of the EAP; and The expertise of the EAP, including a curriculum vitae.	Section 2.3 Appendix I2
Appendix 1, Section 3 (b)	The location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 1.5 and 3.4
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3.2
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered; A description of the activities to be undertaken, including associated structures and infrastructure.	Section 2.4.5 and 3.5 Appendix B
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 2.1
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 4.5 Appendix K
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	-
	Details of all alternatives considered;	Section 3.5
	Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 5 Appendix F

2014 EIA REGULATIONS	DESCRIPTION OF EIA REGULATIONS REQUIREMENTS FOR BA REPORTS	LOCATION IN THE BAR
	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Appendix F2
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated.	Section 8.2
	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 8.1
	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 8.2
	The possible mitigation measures that could be applied and level of residual risk;	Section 8.2, 8.3
	The outcome of the site selection matrix;	N/A
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	N/A
	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 9.1
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- A description of all environmental issues and risks that were identified during the environmental impact assessment process; and An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 8.1
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, including- Cumulative impacts; The nature, significance and consequences of the impact and risk; The extent and duration of the impact and risk; The probability of the impact and risk occurring;	Section 8.2

2014 EIA REGULATIONS	DESCRIPTION OF EIA REGULATIONS REQUIREMENTS FOR BA REPORTS	LOCATION IN THE BAR
	<p>The degree to which the impact and risk can be reversed;</p> <p>The degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>The degree to which the impact and risk can be avoided, managed or mitigated.</p>	
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 6.10, 8.2
Appendix 1, Section 3 (l)	<p>An environmental impact statement which contains-</p> <p>A summary of the key findings of the environmental impact assessment;</p> <p>A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</p> <p>A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p>	Section 8.2
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 8.2
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	N/A
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	-
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 9.2 and 9.3
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 9.3
Appendix 1, Section 3 (r)	<p>An undertaking under oath or affirmation by the EAP in relation to-</p> <p>The correctness of the information provided in the report;</p> <p>The inclusion of the comments and inputs from stakeholders and interested and affected parties;</p> <p>the inclusion of inputs and recommendations from the specialist reports where relevant; and</p>	Appendix I4 and F2, Section 9.1

2014 EIA REGULATIONS	DESCRIPTION OF EIA REGULATIONS REQUIREMENTS FOR BA REPORTS	LOCATION IN THE BAR
	Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	-
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	-
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

2 APPROACH AND METHODOLOGY

This chapter outlines the key legislative requirements applicable to the BA process, describes the objectives of the study, presents details of the BA process undertaken and describes the way forward.

2.1 APPLICABLE LEGISLATION, POLICIES, AND/OR GUIDELINES

To ensure that the proposed project is developed in an environmentally responsible manner, there are a number of environmental legislation and guidelines that need to be taken into account that are applicable to this project. These include:

2.1.1 ASTRONOMY GEOGRAPHIC ADVANTAGE ACT 21 OF 2007

The Astronomy Geographic Advantage (AGA) Act of 2007 is a legislation that gives the Minister of Science and Technology the power to protect areas, through regulations, that are of strategic national importance for astronomy and related scientific endeavours.

An area can only be protected after it has been declared as an Astronomy Advantage Area (AAA). The Minister must undertake an extensive and consultative public participation process with all interested and affected parties, recorded on a permanent data base. Once the Minister has declared a AAA, detailed regulations that flesh out what is and isn't allowed in the area, must also be published. The promulgation of these regulations must also follow an extensive public participation process.

The Astronomy Geographic Advantage Act 21 of 2007 aims:

- To provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy.
- To provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas.
- To provide for matters connected therewith.

4.1.1 THE INFRASTRUCTURE DEVELOPMENT ACT 23 OF 2014

The Infrastructure Development Act 23 of 2014 aims:

- To provide for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic.
- to ensure that infrastructure development in the Republic is given priority in planning, approval, and implementation.
- to ensure that the development goals of the state are promoted through infrastructure development.
- to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation, and operations; and

- to provide for matters incidental thereto.

4.1.2 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA (ACT NO. 108, 1996)

The project falls within the boundaries of South Africa. The Constitution of the Republic of South Africa has major implications for environmental management.

The main effects are the protection of environmental and property rights, and the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the locus standing of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right -

- To an environment that is not harmful to their health or well-being
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
 - Prevents pollution and ecological degradation
 - Promotes conservation; and
 - Secures ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

4.1.3 NEMA AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS (2014, AS AMENDED)

The EIA Regulations, 2014 (as amended), promulgated under NEMA (1998), focuses primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by State Departments and to provide for matters connected therewith. The proposed project triggers Listed Activities as stipulated in the EIA Regulations (2014, as amended), promulgated in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), as amended on 07 April 2017. Therefore, the applicant is required to obtain an Environmental Authorisation (EA) by way of a BA process.

4.1.4 NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25, 1999)

This Act legislates the necessity for a cultural and heritage impact assessment in areas earmarked for development that exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 m in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the

Northern Cape Heritage Resources Authority (NCHRA) and the Provincial Heritage Resources Authority.

4.1.5 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10, 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. This Act is applicable to this application for environmental authorisation as it requires the project applicant to consider the protection and management of local biodiversity.

4.1.6 NATIONAL WATER ACT (ACT NO. 36, 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected, as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation’s water resources are protected, used, developed, conserved, managed, and controlled in responsible ways. Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing, or recurring and must, therefore, comply with any prescribed waste standard or management practices.

4.2 WASTE, EFFLUENT, EMISSIONS, AND NOISE MANAGEMENT

4.2.1 SOLID WASTE MANAGEMENT

Will the activity produce solid construction waste during the construction/initiation phase?	YES X	NO
If YES, what estimated quantity will be produced per month?	TBD	
How will the construction solid waste be disposed of?		
All solid waste accumulated during construction will be kept in designated areas/construction campsite and disposed of by the contractor at the registered local landfill site. The contractor must provide the competent authority with disposal certificates from a registered landfill site during construction.		
Where will the construction solid waste be disposed of?		
Kareeberg Municipality Landfill site		
Will the activity produce solid waste during its operational phase?	YES X	NO
If YES, what estimated quantity will be produced per month?	TBD	

Can any part of the solid waste be classified as hazardous in terms of the NEM: WA?	YES X	NO
Is the activity that is being applied for a solid waste handling or treatment facility?	YES	NO X

4.2.2 LIQUID EFFLUENT

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO X
Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO X

4.2.3 EMISSION INTO THE ATMOSPHERE

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?	YES	NO X
If YES, is it controlled by any legislation of any sphere of government?	YES	NO

4.2.4 GENERATION OF NOISE

Will the activity generate noise?	YES X	NO
If YES, is it controlled by any legislation of any sphere of government?	YES X	NO
Describe the noise in terms of type and level:		
<ul style="list-style-type: none"> Noise will be generated during the construction phase only (from operating machinery, generators, etc.). The level of the noise generated will be minimal and below the 75 decibels threshold limit. Noise levels are to be kept within the legislated limits for the area, in accordance with the requirements of the relevant national and local noise control statutes. No additional noise (to that which is currently experienced) will be generated from the proposed project during the operational phase. 		

4.2.5 WATER USE

Municipal	Water board	Groundwater X	River, stream, dam or lake	Other Wetlands within 500 m and construction	The activity will not use water
-----------	-------------	-------------------------	----------------------------	---	---------------------------------

				within the 1:100-year floodline	
<p>A water use license application is currently being lodged with the Department of Water & Sanitation for water uses 21 (c), & (i). Both applications will run concurrently. There currently is a Water Use Licence (WUL) in place at Klerefontein for water abstraction from 2 boreholes (10/D54B/A/12523). All construction water will be sourced from these boreholes.</p>					

4.3 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

4.3.1 DETAILS OF THE PROJECT TEAM

Table 2-1: Details of EAP

DETAILS OF EAP ORGANISATION			
Organisation	Delta Built Environment Consultant		
Postal Address	Delta Built Environment Consultants (Pty) Ltd P.O. Box 35703 Menlo Park 0102		
Tel No.	012 368 1850		
Fax No.	012 348 4738		
NAME	QUALIFICATIONS	PROFESSIONAL REGISTRATIONS	TASKS AND ROLES
Neelan Maduray	BSc Hons Environmental Monitoring & Modelling	EAPASA (2022/4882) SACNASP (131274)	Lead EAP
Deborah Weldon	MSc Environmental Biology	EAPASA (2019/639) SACNASP (121210)	Report Reviewer
Goodman Mahlangu	Diploma in Environmental Science	In Progress	Report Compiler

4.3.2 QUALIFICATIONS AND EXPERIENCE OF THE EAPs &/ ENVIRONMENTAL TEAM

4.3.2.1 Neelan Maduray

Neelan completed a BSc (Honours) Environmental Monitoring & Modelling degree at the University of South Africa in 2019 and is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (131274) as well as a professionally Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2022/4882). Neelan has completed courses and training for ISO14001:2015 EMS Internal

Auditor, Integrated Environmental Management (IEM), Water Use Licence Applications (WULAs), Environmental Management, Environmental Legislation and Regulations, and Environmental Assessment.

Neelan has a great understanding of the environmental assessment processes in South Africa and all the relevant legislations and regulations. He has experience in environmental auditing, and compiling basic assessments, scoping and environmental impact assessments, ESIA's, mining permits, environmental management programmes and undertaking water use licence applications and conducting comprehensive screening for proposed developments. He has project managed a multitude of environmental projects throughout their life cycles.

4.3.2.2 Deborah Weldon

Deborah is a registered Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (Ref. 2019/639) and a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions (Ref. 121210). She has been in the environmental management field for over 22 years, working on small-scale developments through to large infrastructure (transport, water, and power) and manufacturing projects.

She has participated in the full project life-cycle, from conceptual, pre-feasibility and feasibility stages through to conducting Environmental & Social Impact Assessments (ESIAs) and, finally, to environmental compliance monitoring and auditing during construction. During the conceptual to feasibility stages, her involvement included the development of environmental and social design criteria, identification of environmental risks ("red flags") and initial stakeholder identification and engagement. Deborah has managed basic environmental assessments through to full ESIA's involving numerous specialist studies and iterative interaction with project design teams. She has worked as both an environmental control officer (ECO) and an Environmental Manager overseeing ECOs for large-scale construction projects, monitoring multiple contractors' compliance to environmental permits and approved Environmental & Social Management Plans (ESMPs).

Deborah has also acted as lender's technical advisor, conducting the environmental and social due diligence for projects seeking international finance. She has worked on projects in Cameroon, Ghana, Indonesia, Kenya, Lesotho, Liberia, Namibia, Nigeria, Malawi, Mozambique, South Africa, Swaziland and Tanzania.

4.3.2.3 Goodman Mahlangu

Goodman completed a Diploma in Environmental Science at the Tshwane University of Technology in 2022 and is currently a register student for Advance Diploma in Environmental Science at Tshwane University of Technology. With over one year's experience in environmental management projects ranging from small-

scale to large-scale infrastructure, he brings a wealth of knowledge and expertise to his work.

Goodman has an in-depth understanding of the environmental assessment processes in South Africa as well as all the relevant legislations and regulations. He has experience in environmental auditing, compiling basic assessments, scoping and environmental impact assessments, ESIA's, mining permits, environmental management programmes, as well as applying for water use licences and screening for proposed development projects comprehensively.

4.4 BASIC ASSESSMENT PROCESS

4.4.1 OBJECTIVES

In accordance with Appendix 1 of the EIA Regulations, 2014 (as amended), the objectives of the BA process are to:

- Identify the relevant policies and legislation relevant to the activity and determine how the activity complies with and responds to the policy and legislative context.
- Present the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.
- Identify and confirm the preferred activity, technology, and sites related to the project proposal.
- Undertake an impact assessment, inclusive of cumulative impacts, to determine the biophysical and socio-economic sensitivity of the project sites and assess the nature, significance, consequence, extent, duration and probability of impacts occurring.
- Assess the degree to which impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed, or mitigated.
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of residual risks that need to be managed and monitored.

The BA process consists of a series of steps to ensure compliance with these objectives and the EIA Regulations, 2014, as set out in GN No. R 982 (as amended by GN No. 326). The process involves an open, participatory approach to ensure that all potential impacts are identified, and that decision-making takes place in an informed, transparent, and accountable manner.

4.4.2 SCREENING ASSESSMENT



The summary of identified environmental sensitivities is provided in Table 2-2 below. The Terrestrial Biodiversity theme has been highlighted as "Very High" because the site falls within a Critical Biodiversity Area 1 (CBA1), as illustrated in Table 2-2. CBA1 areas are required to remain in a largely natural state due to their sensitivity and ecological importance. The Animal Species theme is highlighted as "High" as this also pertains to the Terrestrial Biodiversity theme. Specifically, the

animal species identified on site from the desktop screening are illustrated in Table 2-3.

Table 2-2: Summary of Sensitivities

THEME	VERY HIGH	HIGH	MEDIUM	LOW
Agriculture Theme				X
Animal Species Theme		X		
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage				
Civil Aviation			X	
Defence				X
Palaeontology Theme			X	
Plant Species				X
Terrestrial Biodiversity Theme	X			

Table 2-3: Animal species found on site

SCIENTIFIC NAME	COMMON NAME	SENSITIVITY	PICTURE
<i>Neotis ludwigii</i>	Ludwig's bustard	High	
<i>Chersobius boulengeri</i>	Karoo padloper or Boulenger's cape tortoise	Medium	

4.4.3 IDENTIFIED SPECIALIST STUDIES

After the screening assessment was conducted for the proposed study area, the following list of specialists was identified as per the generated reports. The relevant specialists have been highlighted in the table below as per the opinion of the EAP.

Table 2-4: Potential Specialist Studies – Proposed route and infrastructures

SPECIALIST STUDY	RELEVANT TO APPLICATION
Landscape/Visual Impact Assessment	✓ A Landscape/Visual Impact Assessment has been conducted as per the requirements in the DFFE Screening Tool Report.
Archaeological and Cultural Heritage Impact Assessment	✓ An HIA has been conducted and its findings outlined in this BAR.
Palaeontological Impact Assessment	✓ This has been covered in the HIA.
Terrestrial Biodiversity Impact Assessment	✓ As per the DFFE Screening Tool Report the proposed EOC building will be developed within a Critical biodiversity Area (CBA 1), therefore a Terrestrial Assessment is required for the specialist to verify this.
Aquatic Biodiversity Impact Assessment	✓ The study has been undertaken to determine the site's proximity to watercourses as well as the proposed development's impacts to the identified watercourses.
Hydrology Assessment	✓ A Hydrological Assessment was completed to determine the surface water attributes on the site and how the proposed development will affect it.
Socio-Economic Assessment	✓ Socio-economic impacts have been addressed in this BAR.
Plant and Animal Species Assessment	✓ This has been covered in the Terrestrial and Aquatic Biodiversity Impact Assessments.

4.4.4 WATER USE LICENCE

There is a Water Use Licence (10/D54B/A/12523) in place for Section 21(a), However, a Water Use Licence for Section 21(c) and (i) is currently being conducted for this proposed development.

4.4.5 DESCRIPTION OF LISTED ACTIVITIES TRIGGERED

Table 2-5 below provides a breakdown of the potentially triggered activities for this project that require environmental authorisation.

Table 2-5: Potentially Triggered Activities

ACTIVITY NO(S):	LISTING NOTICE 1 OF THE EIA REGULATIONS, 2014, AS AMENDED.	APPLICABILITY TO PROPOSED PROJECT
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	An area of approximately 1.5 ha will be cleared.
67	Phased activities for all activities— where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold,	The current infrastructure at the SKA Support Base does not trigger an Environmental Authorisation; however, if considered together with the new developments described above, do trigger a Basic Assessment.
ACTIVITY NO(S):	LISTING NOTICE 3 OF THE EIA REGULATIONS, 2014, AS AMENDED.	APPLICABILITY TO PROPOSED PROJECT
10 (g) (ii) (iii) (ee)	<p>The development and related operation of facilities or infrastructure for the storage or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.</p> <p>(g) Northern Cape</p> <p>(ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;</p> <p>(iii) Outside urban areas;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	The proposed fuel tanks will increase the capacity of the existing fuel tank to 66m ³ .

Due to the above triggered activities, the following will be required:

- Environmental Authorisation
 - This will be done via the Basic Assessment process as only Listing Notice 1, and 3 activities were triggered.

4.4.6 PRE-APPLICATION

4.4.6.1 DFFE Pre-Application Meeting

A pre-application meeting was held on 4 March 2023 with DFFE via MS Teams. The objective of the pre-application meeting was to present the project to the Department and to confirm all listed activities pertaining to the development and specialist studies that will be pertinent to the application. Please refer to Appendix J for the minutes of the meeting.

5 PROJECT DESCRIPTION

This chapter provides details of the applicant, presents a description of the proposed project and the affected properties, and provides information on the project alternatives considered.

5.1 APPLICANT DETAILS

The applicant details are provided in Table 5-1.

Table 5-1: Applicant Details

APPLICANT	National Research Foundation (NRF)
CONSULTANT	Delta Built Environment Consultants
ADDRESS	Black River Park North 2 Fir St Cape Town 7925
CONTACT PERSON	Alice Pienaar-Marias
TEL	082 778 9141
EMAIL	pienaar@sarao.ac.za

5.2 DESCRIPTION OF THE PROPOSED PROJECT

Klerfontein Support Base will be used as a support camp for the construction of the SKA. The support base will comprise of an Engineering Operations Centre (EOC), telecommunications mast, RFI chamber, prototype for the HIRAX telescope, parking facilities, office space and accommodation facilities.

South Africa's National Infrastructure Plan incorporates the Square Kilometre Array (SKA) and MeerKAT projects as Strategic Integrated Projects (SIPs). The project aims to provide opportunity for Africa and South Africa to contribute towards global advanced science projects. As a SIP project, the proposed project is given a provision for a reduced timeframe for the EIA and BA application process.

The SKA1-MID Engineering Operations Centre (EOC) will be an expansion of the current infrastructure on site where the current workshops will be expanded as a singular building to incorporate new office space, additional workshops, expansion of generator facilities and diesel storage. There is also a second building on site, which is the old farmhouse.

The proposed new Engineering Operations Centre (EOC) is illustrated in Figure 5-1 below.



Figure 5-1: Proposed EOC Extension Building (green)

Within the proposed study area, a Radio Frequency Interference (RFI) chamber, prototype for the Hydrogen Intensity and Real Time Analysis eXperiment (HIRAX) telescope and a telecommunications mast will be part of the proposed infrastructure to be developed at the Klerefontein support base. The HIRAX prototype dishes is a temporary project and will be removed once the HIRAX telescope is developed at the SKA Site.

5.3 LOCATION EXTENT

The Klerefontein Support Base will be developed within a total area of 8.5 ha.

5.4 AFFECTED PROPERTIES

The property on which the support base is located, is owned by Northern Cape Department of Agriculture, Environmental Affairs, Land Reform and Rural Development with the deed number T000057572/2011.

FARM NAME	PORTION/FARM NUMBER	21 digit SG number
Klederenfontein	0	C01700000000052700000

5.5 PROJECT ALTERNATIVES

5.5.1 PREFERRED ALTERNATIVE

5.5.1.1 Main Building

The new proposed EOC Main Building will be a double storey that will accommodate the reception area offices, meeting rooms, server rooms, ablutions, and general breakout area. The building shall make provision for one housekeeping cupboard per floor with an area of 15m².

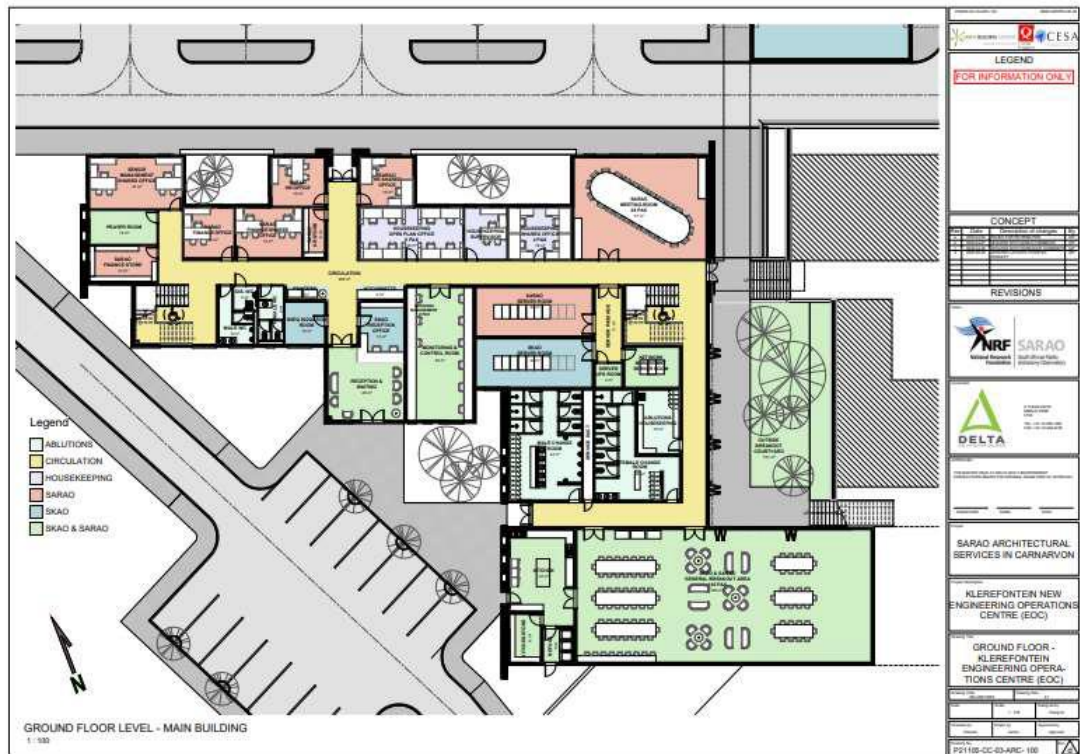


Figure 5-2: EOC Main Building Layout - Ground Floor

Table 5-2: Main Building – Ground Floor Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2160-2100	Central Store	27	2	EOC_REQ_1035 EOC_REQ_1250 EOC_REQ_1266 EOC_REQ_1310
2.	F2160-2150	Central Store Office	13	-	EOC_REQ_1316
3.	F2160-2170	Central Store Office Safe	14	-	EOC_REQ_1346

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
4.	F2160-2200	Forklift Store	14	1	EOCREQ_1246 EOC_REQ_1344
5.	F2160-2300	SKAO Material Store	19	2	EOC_REQ_1250 EOC_REQ_1345
6.	F2160-1106	SARAO HR Office	15	1	EOC_REQ_1246 EOC_REQ_1341
7.	F2160-1107	SARAO HR store	6	-	EOC_REQ_1343
8.	F2160-1108	SARAO HR shared office	15	2	EOC_REQ_1250 EOC_REQ_1342
9.	F2160-1109	Visitor's Shared Office	22	2	EOC_REQ_1246 EOC_REQ_1347
10.	F2160-1109	Housekeeping Supervisor Office	12	1	EOC_REQ_1246 EOC_REQ_1307
11.	F2160-1109	Housekeeping Shared Office	18	4	EOC_REQ_1250 EOC_REQ_1308
12.	F2160-1112	SARAO meeting room for 25 people	77	25	EOC_REQ_1026 EOC_REQ_1046 EOC_REQ_1242 EOC_REQ_1243 EOC_REQ_1244
13.	F2160-1113	Male Water Closet	8	-	EOC_REQ_1096
14.	F2160-1114	Female Water Closet	8	-	EOC_REQ_1096
15.	F2160-1115	Disable Water Closet	3	-	EOC_REQ_1101
16.	F2160-1116	Printer area	3	-	-
17.	F2160-1117	SHEQ induction room	10	5	EOC_REQ_1078
18.	F2160-1118	Kitchenette	4	-	-
19.	F2160-1119	SKAO & SARAO Reception Office	15	2	EOC_REQ_1074 EOC_REQ_1075 EOC_REQ_1246
20.	F2160-1120	Reception & Waiting Area	28	-	EOC_REQ_1072 EOC_REQ_1076

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
21.	F2160-1121	Monitor & Control Room (including Network Management area)	50	8	EOC_REQ_1103 EOC_REQ_1120 EOC_REQ_1132
22.	F2160-1122	SARAO Server Room	32	-	EOC_REQ_1071 EOC_REQ_1102 EOC_REQ_1119
23.	F2160-1123	SKAO Server Room	32	-	EOC_REQ_1102 EOC_REQ_1119
24.	F2160-1124	Serve UPS Room	4	-	EOC_REQ_1116
25.	F2160-1125	Network Management Server Room	12	-	EOC_REQ_1128 EOC_REQ_1132
26.	F2160-1126	Male Changing Room	44	-	EOC_REQ_1096 EOC_REQ_1101
27.	F2160-1127	Female Changing Room	36	-	EOC_REQ_1096 EOC_REQ_1101
28.	F2160-1128	Ablutions Housekeeping	15	-	EOC_REQ_1093 EOC_REQ_1095
29.	F2160-1129	Kitchen	32	15	EOC_REQ_1085 EOC_REQ_1092
30.	F2160-1130	Kitchen Store	8	-	EOC_REQ_1087
31.	F2160-1131	Refuse Area	6	-	EOC_REQ_1088
32.	F2160-1132	SKAO & SARAO General Breakout Area	222	145	EOC_REQ_1079 EOC_REQ_1084
33.	F2160-1133	Outside Breakout Court Yard	151	-	EOC_REQ_1081

EOC Main Building first floor layout is illustrated on Figure 5-3 below and the required first floor accommodation schedule is listed in Table 5-3 below.

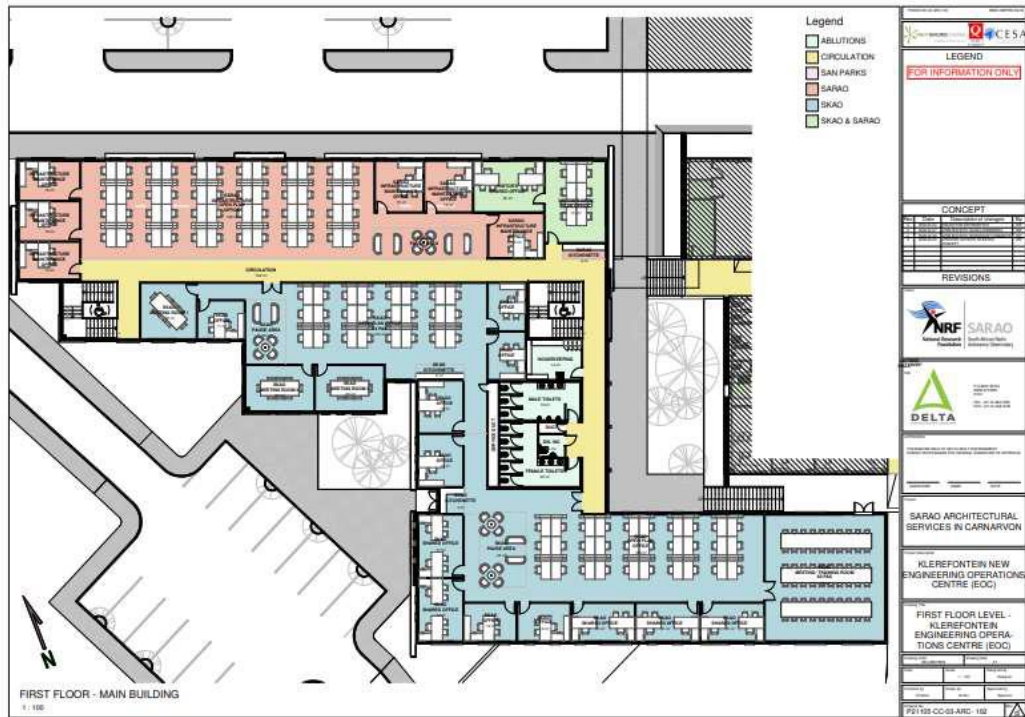


Figure 5-3: EOC Main Building Layout – First Floor

Table 5-3: EOC Main Building – First Floor Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2160-1201	Infrastructure Site Operations Office 1	15	1	EOC_REQ_1245 EOC_REQ_1246
2.	F2160-1202	Infrastructure Site Operations Office 2	15	1	EOC_REQ_1245 EOC_REQ_1246
3.	F2160-1203	Infrastructure Site Operations Office 3	14	1	EOC_REQ_1245 EOC_REQ_1246
4.	F2160-1204	Infrastructure Site Operations Office 4	15	1	EOC_REQ_1245 EOC_REQ_1246
5.	F2160-1205	Infrastructure Site Operations Office 5	15	1	EOC_REQ_1245 EOC_REQ_1246
6.	F2160-1206	Infrastructure Site Operations Office 6	15	1	EOC_REQ_1245 EOC_REQ_1246

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
7.	F2160-1207	SARAO Infrastructure Site Operations Open Plan	XX	21	EOC_REQ_1253 EOC_REQ_1335
8.	F2160-1208	SARAO Pause Area	19	XX	-
9.	F2160-1209	Infrastructure Site Maintenance Office	15	1	EOC_REQ_1246 EOC_REQ_1336
10.	F2160-1210	Infrastructure Site Maintenance Shared Office 1	20	2	EOC_REQ_1250 EOC_REQ_1337
11.	F2160-1211	Infrastructure Site Maintenance Shared Office 2	20	2	EOC_REQ_1250 EOC_REQ_1337
12.	F2160-1212	Infrastructure Site Maintenance Shared Office 3	20	2	EOC_REQ_1250 EOC_REQ_1337
13.	F2160-1213	SARAO Infrastructure Site Maintenance Open Plan	XX	17	EOC_REQ_1338
14.	F2160-1214	SARAO Kitchenette	4	-	-
15.	F2160-1215	SKAO Meeting Room 1 for 8 people	19	8	EOC_REQ_1026 EOC_REQ_1058 EOC_REQ_1260
16.	F2160-1216	SKAO Meeting Room 2 for 8 people	20	8	EOC_REQ_1026 EOC_REQ_1058 EOC_REQ_1260
17.	F2160-1217	SKAO Meeting Room 3 for 8 people	20	8	EOC_REQ_1026 EOC_REQ_1058 EOC_REQ_1260
18.	F2160-1218	SKAO office 1	11	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
19.	F2160-1219	SKAO office 2	11	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
20.	F2160-1220	SKAO office 3	11	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
21.	F2160-1220	SKAO office 4	12	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
22.	F2160-1222	SKAO office 5	12	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
23.	F2160-1223	SKAO office 6	12	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
24	F2160-1224	SKAO office 7	12	1	EOC_REQ_1033 EOC_REQ_1034 EOC_REQ_1248
25.	F2160-1225	SKAO Shared Office 1	17	2	EOC_REQ_1035 EOC_REQ_1249
26.	F2160-1226	SKAO Shared Office 2	17	2	EOC_REQ_1035 EOC_REQ_1249
27.	F2160-1227	SKAO Shared Office 3	15	2	EOC_REQ_1035 EOC_REQ_1249
28.	F2160-1228	SKAO Shared Office 4	15	2	EOC_REQ_1035 EOC_REQ_1249
29.	F2160-1229	SKAO Pause Area 1	16	-	-
30.	F2160-1230	SKAO Pause Area 2	22	-	-
31.	F2160-1231	SKAO Open Plan Office 1	124	24	EOC_REQ_1026 EOC_REQ_1037 to EOC_REQ_1039 EOC_REQ_1045 EOC_REQ_1046 EOC_REQ_1251 EOC_REQ_1255
32.	F2160-1232	SKAO Open Plan Office 2	169	30	EOC_REQ_1026 EOC_REQ_1037 to EOC_REQ_1039 EOC_REQ_1045

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
					EOC_REQ_1046 EOC_REQ_1252
33.	F2160-1233	SKAO Kitchenette 1	5	-	-
34.	F2160-1234	SKAO Kitchenette 2	4	-	-
35.	F2160-1235	SKAO Meeting / Training Room for 60 people	95	60	EOC_REQ_1026 EOC_REQ_1241 EOC_REQ_1243 EOC_REQ_1244
36.	F2160-1236	Housekeeping	14		EOC_REQ_1093 to EOC_REQ_1095
37.	F2160-1237	Male Toilets	19		EOC_REQ_1096 to EOC_REQ_1101
38.	F2160-1238	Female Toilets	23		EOC_REQ_1096 to EOC_REQ_1101
39	F2160-1239	Disabled Toilet	4		EOC_REQ_1096 to EOC_REQ_1101

5.5.1.2 EOC Workshop Building Layout



Figure 5-4: EOC Workshop Building Layout

Table 5-4: EOC Workshop Building – Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2160-2100	Central Store	500	-	EOC_REQ_1225 EOC_REQ_1240
2.	F2160-2150	Central Store Office	16	1	EOC_REQ_1248
3.	F2160-2170	Central Store Office Safe	7	-	EOC_REQ_1236
4.	F2160-2200	Forklift Store	59	-	-
5.	F2160-2300	SKAO Material Store	36	-	EOC_REQ_1143 EOC_REQ_1145
6.	F2160-2400	SARAO Material Store	36	-	EOC_REQ_1143 EOC_REQ_1144
7.	F2160-2500	Mechanical Workshop	180	-	EOC_REQ_1133 EOC_REQ_1142
8.	F2160-2600	Workshop Office	28	5	EOC_REQ_1250
9.	F2160-2710	Receiver Workshop (Laminar Flow Room)	50	-	EOC_REQ_1147 EOC_REQ_1166

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
10.	F2160-2740	Receiver Workshop (RF Workshop)	150	-	EOC_REQ_1147 EOC_REQ_1166
11.	F2160-2770	Receiver Workshop (Cryogenic/Vacuum Workshop)	150	-	EOC_REQ_1147 EOC_REQ_1166
12.	F2160-2810	Reverberation Workshop (Reverberation Chamber)	43	-	EOC_REQ_1167 EOC_REQ_1224
13.	F2160-2830	Reverberation Workshop (Reverb Equipment Chamber)	16	-	EOC_REQ_1167 to EOC_REQ_1224
14.	F2160-2850	Reverberation Workshop (Reverb Measurement Area1 Chamber)	81	-	EOC_REQ_1167 to EOC_REQ_1224
15.	F2160-2870	Reverberation Workshop (Reverb Store Area 2)	91	-	EOC_REQ_1167 to EOC_REQ_1224
16.	F2160-2900	Helium Compressor Area	12	-	EOC_REQ_1163 EOC_REQ_1166
17.	F2160-2950	Ablutions Unisex Water Closet	28	-	EOC_REQ_1096 EOC_REQ_1101
18.	F2160-2970	Housekeeping	5	-	EOC_REQ_1093 EOC_REQ_1095

5.5.1.3 EOC Vehicle Workshop Building

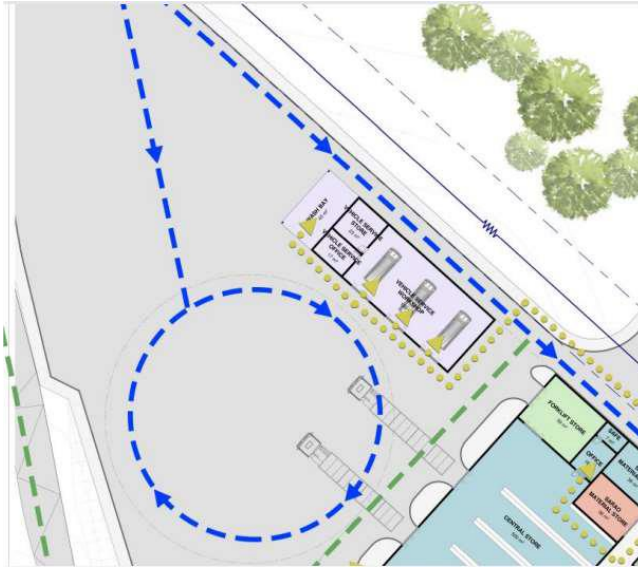


Figure 5-5: EOC Vehicle Service Workshop Building Layout

Table 5-5: EOC Vehicle Service Workshop Building – Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2160-3100	Wash Bay	45	-	EOC_REQ_1311 EOC_REQ_1315
2.	F2160-3200	Vehicle Service Office	17	1	EOC_REQ_1311 EOC_REQ_1315
3.	F2160-3300	Vehicle Service Store	23	-	EOC_REQ_1311 EOC_REQ_1315
4.	F2160-3400	Vehicle Service Workshop	150	-	EOC_REQ_1311 EOC_REQ_1315

5.5.1.4 EOC Generator & Diesel Storage Building

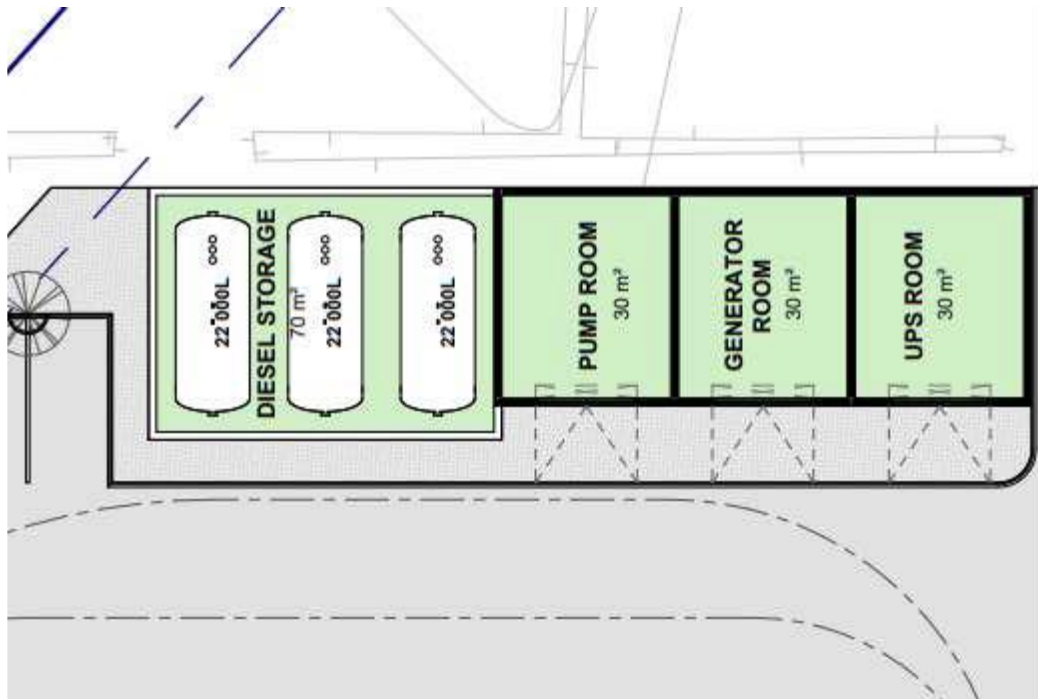


Figure 5-6: EOC Generator & Diesel Storage Building Layout

Table 5-6: EOC Generator & Diesel Storage Building – Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2160-4110	Diesel Storage Tank 1)	70	-	EOC_REQ_1317 EOC_REQ_1319
2.	F2160-4120	Diesel Storage Tank 2)			
3.	F2160-4130	Diesel Storage Tank 3)			
4.	F2160-4200	Pump Room	30	-	EOC_REQ_1317 EOC_REQ_1319
5.	F2160-4300	Generator Room	30	-	EOC_REQ_1317 EOC_REQ_1319
6.	F2160-4400	UPS Room	30	-	EOC_REQ_1317 EOC_REQ_1319

5.5.1.5 EOC Old Shed/Workshop Building

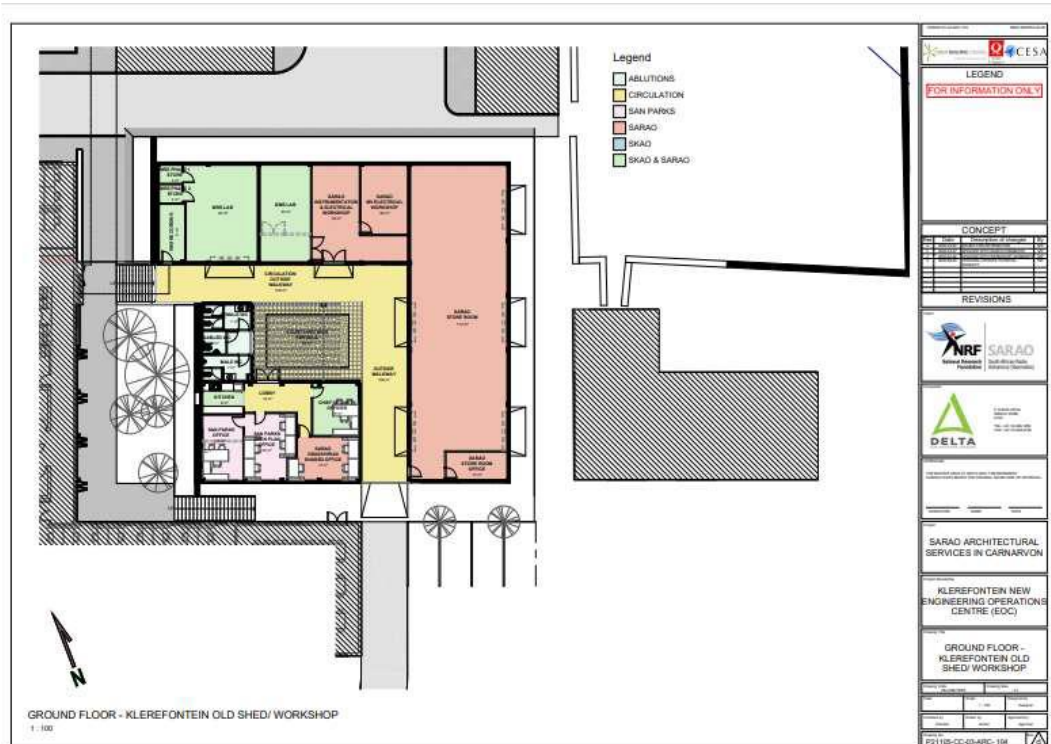


Figure 5-7: EOC Shed / Workshop Building layout

Table 5-7: EOC Workshop Building – Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2130-0101	MRS Phase 1 Store	3	-	EOC_REQ_1305
2.	F2130-0201	MRS Phase 2 Store	3	-	EOC_REQ_1305
3.	F2130-0301	VMS Recording	9	-	EOC_REQ_1302
4.	F2130-0401	MRS LAB	42	2	EOC_REQ_1303 EOC_REQ_1304 EOC_REQ_1306
5.	F2130-0501	BMS Lab	30	2	EOC_REQ_1066 EOC_REQ_1071 EOC_REQ_1261 EOC_REQ_1262
6.	F2130-0601	SARAO Instrumentation & Electrical Workshop	36	-	EOC_REQ_1320 EOC_REQ_1325
7.	F2130-0701	SARAO MV Electrical Workshop	20	-	EOC_REQ_1326 EOC_REQ_1331

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
8.	F2130-0801	SARAO Store Room	174	-	EOC_REQ_1349
9.	F2130-0901	SARAO Store Room Office	10	1	EOC_REQ_1246
10.	F2130-1001	Court Yard with Pergola	52	-	-
11.	F2130-1101	Female Water Closet	7	-	-
12.	F2130-1201	Disabled Water Closet	3	-	-
13.	F2130-1301	Male Water Closet	7	-	-
14.	F2130-1401	Kitchen	8	-	-
15.	F2130-1501	Chief Security Officer Office	15	1	EOC_REQ_1246 EOC_REQ_1301
16.	F2130-1601	SANParks Office	16	1	EOC_REQ_1263 EOC_REQ_1265
17.	F2130-1701	SANParks Open Plan Office	20	4	EOC_REQ_1263 EOC_REQ_1265
18.	F2130-1801	SARAO Planning Office	17	3	EOC_REQ_1332 EOC_REQ_1333

5.5.1.6 EOC Old Farmhouse Building



Figure 5-8: EOC Old Farmhouse Layout

Table 5-8: EOC Workshop Building – Accommodation Schedule

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
1.	F2120-0101	Calibration Room / Sever Room 2	16	1	EOC_REQ_1275 EOC_REQ_1277
2.	F2120-0201	PPE Store	29	1	EOC_REQ_1271 EOC_REQ_1272
3.	F2120-0301	Shared Kitchen & Recreational Area	40	-	EOC_REQ_1279 EOC_REQ_1300
4.	F2120-0401	Health & Safety Managers office	14	1	EOC_REQ_1268
5.	F2120-0501	SARAO Environmental Shared Office	18	3	EOC_REQ_1267
6.	F2120-0601	QA Open Plan Office	19	3	EOC_REQ_1270
7.	F2120-0701	H&S Open Plan Office	21	6	EOC_REQ_1269
8.	F2120-0801	Male Water Closet	3	-	EOC_REQ_1280

#	Room Identification Number	Room name	Room Area (m ²)	Staff per Room	Notes/Requirement
9.	F2120-0901	Female Water Closet	4	-	EOC_REQ_1280
10.	F2120-1001	Reception & Waiting Area	18	-	EOC_REQ_1297 EOC_REQ_1298
11.	F2120-1101	Emergency Room	16	-	EOC_REQ_1286 EOC_REQ_1287
12.	F2120-1211	Examination Room 1 (Nurses Office 1)	15	1	EOC_REQ_1281 EOC_REQ_1285
13.	F2120-1341	Examination Room 1 (Examination Area 1)			
14.	F2120-1271	Examination Room 1 (Spirometer Area)	2	-	EOC_REQ_1293
15.	F2120-1311	Examination Room 2 (Nurses Office 2)	17	1	EOC_REQ_1281 EOC_REQ_1285
16.	F2120-1341	Examination Room 2 (Examination Area 2)			
17.	F2120-1371	Examination Room 2 (Medical Waste)	3	-	EOC_REQ_1296
18.	F2120-1401	Pharmacy Store	6	-	EOC_REQ_1291 EOC_REQ_1292
19.	F2120-1501	Medical Store	5	-	EOC_REQ_1288 EOC_REQ_1290
20.	F2120-1601	Hearing Examination Room	7	-	EOC_REQ_1294 EOC_REQ_1295
21.	F2120-1701	Water Closet	3	-	
22.	F2120-1801	Documentation Room / Sever Room 1	12	-	EOC_REQ_1283

5.5.1.7 Telecoms Mast

The proposed Telecom Mast will entail a 2.2m x 2.2m base, 112W HD galvanised steel cable gantry supported by 50dia galvanised steel supports, with a 75dia Optex sleeve for FO & and power cable feed from the admin centre, an additional 2.5m x

2.5m plinth and equipment container of 2.1 x 1.8 x 2.1h with A/C (alternating current).

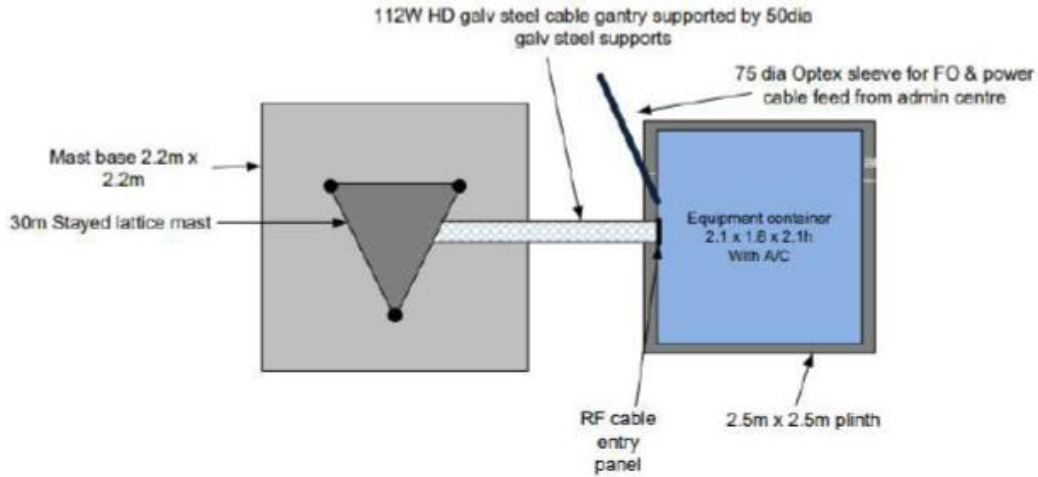


Figure 5-9: Proposed Mast Layout

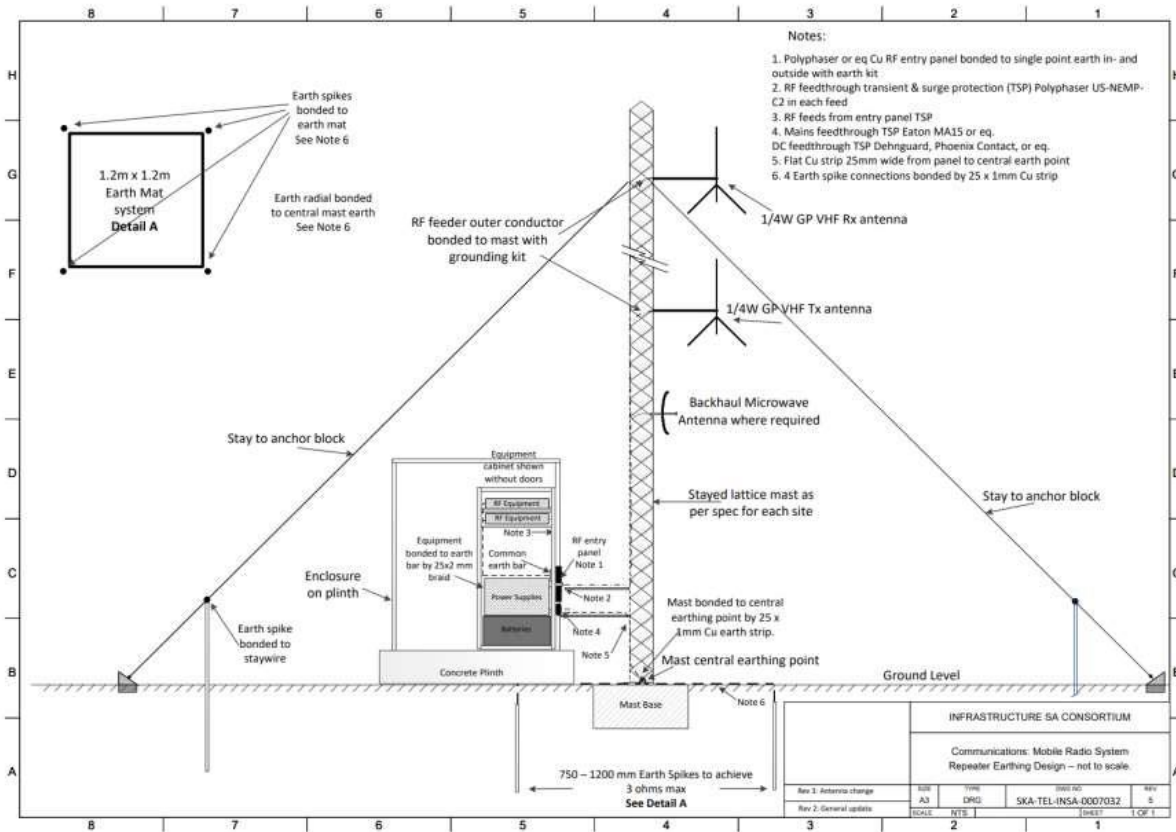


Figure 5-10: Proposed Mast

5.5.1.8 Hydrogen Intensity and Real Time Analysis eXperiment (HIRAX) Prototype

It is planned that 1024 small radio telescopes will be installed on the SKA Site – Swartfontein farm as part of the Hydrogen Intensity and Real Time Analysis

eXperiment (HIRAX). The design, installation, commissioning and operation of the system is expected to take eight years.

A two-element prototype will be designed and built at Klerefontein Support Base before construction begins. The prototype will comprise two 6m diameter dishes. The dishes will be connected through trenched fibre and power cabling to a container approximately 20m away from the prototype dishes. The container will be 3x6m in size ($\pm 18\text{m}^2$) and will store processing equipment.

5.5.1.9 Radio Frequency Interference (RFI) Chamber

The Karoo Measurement Facility will consist of a modular building for environmental protection that will contain a reverberation chamber (RVC) and an equipment chamber, that are both shielded rooms made up of steel modular panels. In order to measure radiation from the equipment and workstations, an RCV is used. The modular building will cover an area of 150 m^2 , and the weight is unknown, but the shielded rooms alone will weigh about 8 – 9 tons on an area of 61 m^2 .

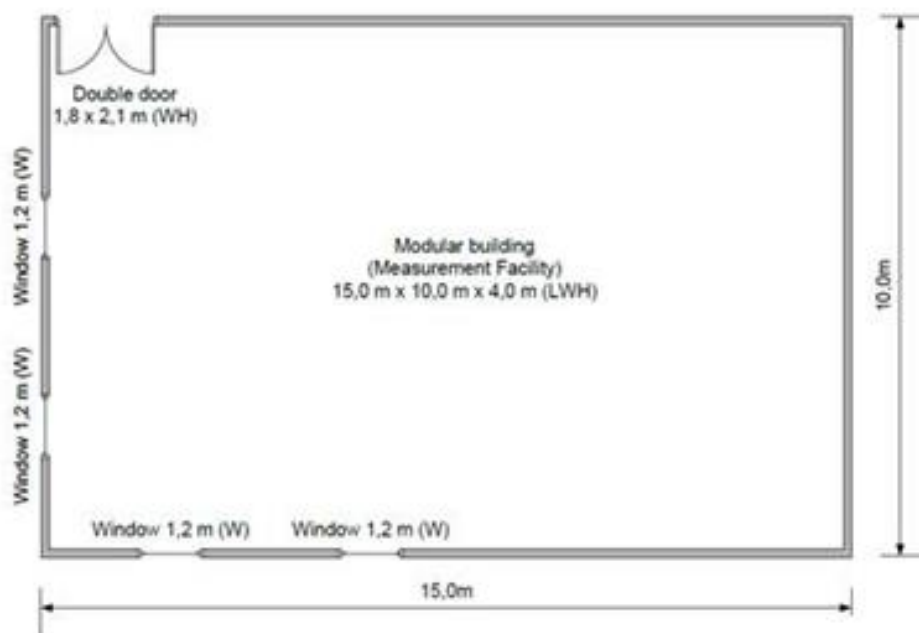


Figure 5-11: Floor Plan

5.5.2 OTHER ALTERNATIVES

There are no other options for the proposed project as the current designs meet the standard and requirements of the site area.

5.5.3 NO-GO ALTERNATIVES

As this project is classified as a SIP16 project it is therefore important to the economic and social climate of this country. The new additions to the existing support base will add to the efficiency required to operate the SKA1_MID project.

Therefore, a No-go alternative will mean that the SKA Support Base will remain the same which is not preferred.

5.5.4 **SITE ACCESS**

The site can be accessed from the R63 coming from Carnarvon. There is a service road that is used to access SKA SA Klerefontein Support Base and the farms (Rooidam Cottage and Konka Guest Farm) along the route. Klerefontein farm is located along this service road, hence it will be used to access the site.

6 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the existing biophysical and social environment that could potentially be affected by the proposed project.

6.1 LAND USE AND CHARACTER OF THE SURROUNDING AREA

The land use on the study site consists of the activities associated with the existing SKA Klerefontein Support Base facility. This land use makes provision for office buildings, workshop area and associated infrastructure. Areas along the Die Leegte River are used for the planting of agricultural crops under irrigation by the Klerefontein Agricultural Research Centre falling under the Northern Cape Department of Agriculture.

6.2 CLIMATE, TEMPERATURE AND RAINFALL

The Northern Cape Province comprises four (4) climatic zones, these include a hot desert climate, cold semi-arid climate, cold desert climate, this is according to Koppen-Geiger climate classification. The study area falls within a semi-arid region with very little summer rainfall. The area experiences typically desert like conditions with extreme temperature occurrences between day/night as well as summer/winter. Summers are typically hot and dry, whereas winters are icy and dry with dew and frost being typical during the night.

Carnarvon is the town within close proximity to the study area. The area is a semi-arid region and receives about 170mm of rain per year (Mean annual precipitation). The wettest months in Carnarvon are January and February, where the average annual lowest temperature in this area is 0.9°C. The average annual highest temperature in Carnarvon is 35.4°C.

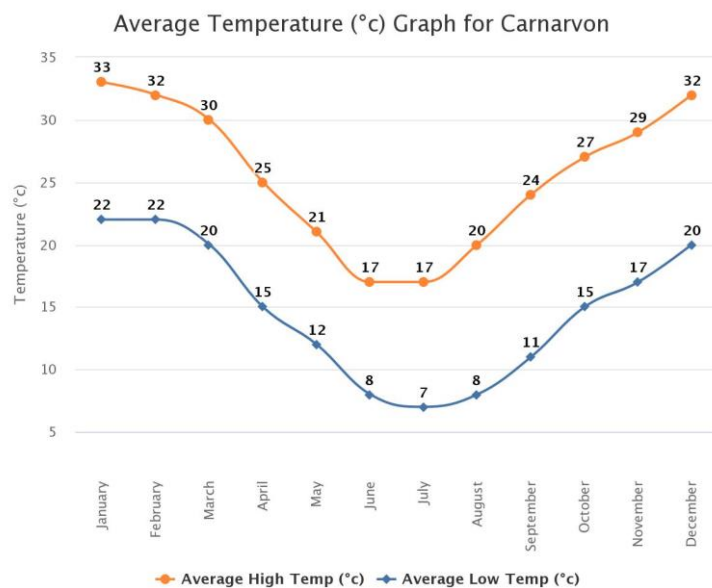


Figure 6-1: Average temperature for Carnarvon

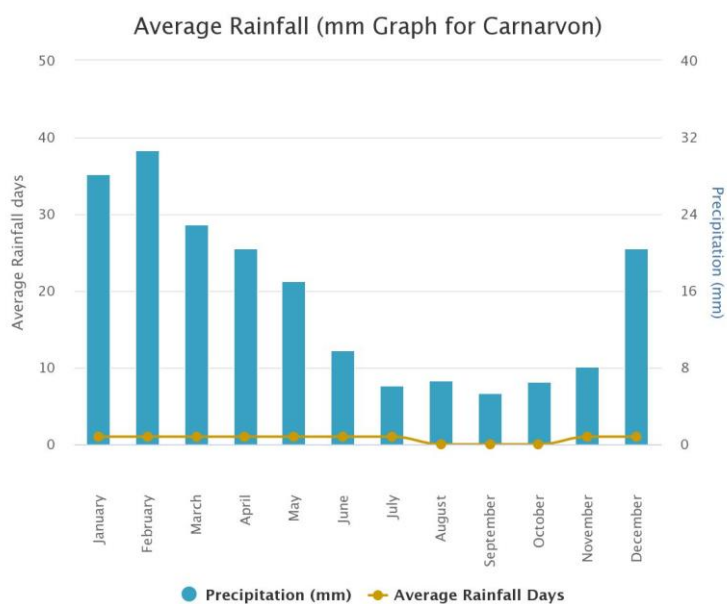


Figure 6-2: Average rainfall (mm) for Carnarvon

6.3 GEOLOGY AND TOPOGRAPHY

The Nama Karoo is underlain by a 3000 m-thick succession of sedimentary rocks. At depth is the Cape Supergroup, which is of marine origin, and above this lies the Dwyka tillites, deposited 400 – 300 million years ago (mya), and then the Karoo Supergroup, which includes the Ecca and Beaufort Groups, deposited in an inland sea 300 – 180 mya (Mucina *et al.*, 2006). Igneous activity approximately 180 mya led to the intrusion of dolerite sills and dykes into Karoo sediments. The strata of the Nama Karoo remained relatively horizontal, in comparison with the intense folding that occurred further south and that led to the Cape Fold Mountains of the Fynbos and Succulent Karoo biomes. As a result, the Karoo is flat to gently undulating, with boulder outcrops and flat-topped mesas. There are numerous drainage lines across this flat landscape, draining water off slopes, and more slowly across plains or basins. Due to the low gradient of most of the terrain, these drainage lines proliferate, sometimes with a number of lines running more or less in parallel across the plains, creating a wash effect (e.g. MacDonald, 2008). Drainage patterns are also fairly dynamic due to the lack of gradient, as a small obstruction to flow (plant roots, rocks, burrows etc.) can change the way water moves across the flat surface. In many instances, water flows into flat endorheic pans. Soils tend to be silty clay-loams, with high lime content.

On geological Landscape and Palaeontological sensitivities, the geological context of the regional study area is associated with sediments of the Karoo Supergroup of Early to Middle Permian age. Formation of the Ecca Group were laid down within or on the margins of a very extensive inland sea or lake on the southwestern Gondwana. The Ecca Group includes the following fossils of both fauna and flora:

- Aquatic Fauna: Temnospondyl amphibians, Palaeoniscoid fish, non-marine bivalves, and Phyllopod crustaceans;
- Flora: Petrified wood, rarer leaves of Glossopteris, Horsetail stems, plant rootlet horizons; and
- Trace Fossils: Tetrapod trackways, burrows, and coprolites. Arthropod trackways and burrows, “worm” burrows, fish fin trails.

6.4 HYDROLOGY

6.4.1 STORMWATER MANAGEMENT

The proposed site is undeveloped, other than the existing infrastructure, so there is the utmost importance to minimize impacts to the environment, and, if erosion occurs, to install gabions or hay bales to prevent further erosion.

The site is 8.5ha large and contains some existing infrastructure, along with some roads that cross drainage lines east and west of the proposed site, Other than that, there are no developments, even on the portion owned by the Department of Agriculture.

There is existing infrastructure southwest of the proposed SARAO Klerefontein Support Base. However, it is assumed that there are no existing stormwater systems available on that development site to influence the 8.5 ha area.

In terms of *SANRAL Drainage Manual* (2013) the area is rural, with low traffic volumes providing access to individual farms and is therefore considered a Class 5 area so stormwater management infrastructure should be sized for the 1 in 20-year recurrence interval.

6.5 BIODIVERSITY AND TERRESTRIAL ECOSYSTEM

6.5.1 VEGETATION TYPE

The proposed study area is located in the Western Upper Karoo (NKu1) vegetation type as classified by Mucina and Rutherford (2006). This classification has been accepted in the classification by the South African National Biodiversity Institute (SANBI) classification (2018). This vegetation type is largely located in the Northern Cape Province with a small portion occurring in the north-western corner of the Western Cape. It extends from the plains around the Fish River and the upper reaches of the Renoster River in the west as far as Fraserburg and Carnarvon in the east. The vegetation type occurs at altitudes ranging between 1 000m to 1 500m above sea level.

A desktop study that was conducted using the DFFE online Screening Tool, this desktop study indicated that the animal species theme is considered to be of “high sensitivity” with the vegetation species theme, being of “low sensitivity” and the Terrestrial Biodiversity Theme of “very high sensitivity”. The summary of sensitivity features is identified in the table below.

Table 6-1: Sensitivity features identified for the animal and vegetation themes

SENSITIVITY THEME	FEATURE	SENSITIVITY
Terrestrial biodiversity theme	Presence of Critical Biodiversity Area 1	Very High

The Northern Cape Biodiversity Area Map has indicated that the entire study site is in a CBA, which has been reflected in the “very high” sensitivity theme in the DFFE Screening Tool output. A terrestrial assessment was conducted to verify this and the results has been detailed in Section 6.10.4.

6.6 HERITAGE AND PALAENTOLOGICAL

The site for development is in the Carnarvon / Waterford formation (green: moderately sensitive) and very close to the grey (no fossils) area of Jurassic dolerite. Figure 6-3 present the palaeontological sensitivity of the study area. Sediments of this age do not have a large variety of vertebrates because they had not yet evolved (only some amphibians and fish). In the southern part of the basin the Waterford Formation comprises alternating very fine-grained lithofeldspathic sandstones and mudrock or clastic rhythmite units. These sediments represent fairly shallow water accumulations with deformation and dewatering features.



Figure 6-3: SAHRIS palaeosensitivity map for the site for the proposed Klerefontein upgrade shown within the yellow oval. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

In South Africa, the Stone Age sequence spans more than two million years (mya). The sequence is composed of three broad phases, with subphases and techno-complexes exhibiting regional variations in characteristics and time scales. These include the following:

- The Earlier Stone Age (ESA), from more than 2 million years ago (mya) to approximately 200 000 years ago (kya);
- The Middle Stone Age (MSA), between 300 and 20 kya; and
- The Later Stone Age (LSA) between approximately 40 kya and 1840 AD

Table 6-2: South Africa Overview of the Stone Age sequence

PERIOD	TECHNO-COMPLEX	DATES	ALSO KNOWN AS (INCLUDING REGIONAL VARIANTS)
Earlier Stone Age >200 kya	Oldowan	>2 – 1.5 Mya	-
	Acheulean	1.5 Mya – 300 kya	
Middle Stone Age >20 - <300 kya	ESA-MSA transition	600 - >200 kya	Fauresmith, Sangoan
	Early MSA	300 – 130 kya	-
	Klasies River	130 – 105 kya	MSA I at Klasies River, MSA 2a generally (Pietersburg)
	Mossel Bay	105 – 77 kya	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Pre-Still Bay	96 – 72 kya	-
	Still Bay	77 – 70 kya	
	Howieson’s Poort	66 – 58 kya	
	Sibudu	58 – 45 kya	Late MSA / post-Howieson’s Poort or MSA III at Klasies and MSA 3 generally
Final MSA	40 – 20 kya	MSA IV at Klasies River, MSA 4 generally	
Later Stone Age <40 kya	Early LSA	40 – 18 kya	Late Pleistocene microlithic
	Robberg	18 – 12 kya	
	Oakhurst	7 – 1 kya	Terminal Pleistocene / early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Wilton	8 – 4 kya	Holocene microlithic
	Final LSA	4 – 0.1 kya	Post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Ceramic Final LSA	<2 kya	Ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)

Within the Northern Cape, ESA lithic may include long blades, cores, and low incidence of formal tools such as hand-axes and cleavers. Considering the raw material and morphology of lithics from this period in the Northern Cape, they will be moderate to heavily weathered where identified. The MSA is broadly defined by blades and points produced from good quality raw material, and the use bone tools, ochre, beads and pendants also occur in this period. In the Karoo, associated lithics occur widely over the landscape and can be considered as “background” scatter in that geological, rather than human action condition the fine-scale distribution. In the Northern Cape, lithics are often associated with the pans dispersed throughout the landscape.

The LSA dates from approximately 40 kya to the historical period. Ethnographically, this period correlates to habitation of the landscape by:

- *Bona fide* hunter-gatherer groups, i.e. the San; and
- Southerly migration of pastoralists, i.e. Khoekhoe into the region from ~2 kya

The Lithics associated with the LSA are specialised and bone tools are found within the assemblages. LSA sites commonly contain diagnostic artefacts, such as microlithic scrapers and segments. In this region of the Northern Cape, the LSA is commonly represented by expression of the Final LSA dating to ~4 – 0.1 kya and the latest LSA techno-complex, Ceramic Final LSA dating from ~<2 kya.

Researchers attribute the aforementioned LSA archaeological signatures as tangible markers of /Xam and Khoekhoe ethno-historical groups' occupation and use of the landscape. The /Xam hunter-gatherer group occupied the landscape concentrated between present day Kenhardt and Carnarvon as the most western and eastern boundaries respectively. Within the regional context, the Khoekhoe were represented by the Korana. The Korana have also been referred to as the Koranner, Corana, Koranna and the Kora. Initially there were two main groups, however, quarrels over water and grazing rights, or the ownership of women or livestock usually caused divisions, resulting in many splinter groups whose names were not recorded or forgotten over time.

6.7 VISUAL AND LANDSCAPE

The proposed project is located in the karoo area of the Arid Northern Cape Province. The region features rolling mountains, vast plains, and distinctively shaped hills commonly called Karoo koppies. Karoo koppies are small, dome-shaped hills made up of layers of rock that have been eroded over time. In most cases, koppies are made of sandstone, limestone, or shale, and are often covered in loose soil and fragments of rock. As landmarks or reference points, they are an iconic part of the Karoo landscape. As a result of the harsh conditions in the semi-arid region, the koppies are also home to a variety of plants and animals.

A key factor in the location of the Meerkat / SKA is the remoteness of the locality, with much of the areas to the north being arid and sparse in settlement. This lack

of man-made modifications does add to the natural landscape heritage, and with the SKA structure, has the potential to become a significant landscape attraction.

6.8 SOCIO-ECONOMIC ASPECTS

6.8.1 SOCIO-ECONOMIC ENVIRONMENT

Kareeberg Municipality covers an area of 17 702km². The Kareeberg Municipality is the western most local municipality within the district of Pixley ka Seme Municipality in the Northern Cape, its main town is Carnarvon which is located in the southern segment of the municipal area. The town serves as a large sheep and game farming community and is well known for its unique corbelled houses built by the early trekboers from around 1811 to the latter part of the 19th century. 73,6% of Kareeberg households use electricity for lighting.

6.8.2 EDUCATION

According to Stats SA data, in terms of education in Kareeberg Municipality, of those aged 20 years and older, 7,2% have completed primary school, 32,1% have some secondary education, 17,5% have completed matric and 5,7% have some form of higher education. Of the mentioned age group, 18,0% have no form of schooling.

Table 6-3: Educational Level for Carnarvon

GROUP	PERCENTAGE
No Schooling	16,7%
Some Primary	18,7%
Completed Primary	6%
Some Secondary	33,2%
Matric	18,9%
Higher Education	6,5%

6.8.3 LEVEL OF EMPLOYMENT

There are 3 810 people that are economically active (employed or unemployed but looking for work), and of these, 25% are unemployed. Of the 1 631 economically active youth (15–34 years) in the area, 32,1% are unemployed.

Table 6-4: Kareeberg Municipality employment data (aged 15-64)

EMPLOYMENT STATUS	NUMBER
Employed	2858
Unemployed	952
Discouraged Work Seeker	458

Not Economically active	3029
-------------------------	------

6.8.4 ACCESS TO SERVICES

6.8.4.1 Access to Water

There are 11 673 households in the municipality, with an average household size of 3,4 persons per household. Of the households, 41,5% have access to piped water either in their dwelling or in the yard.

Table 6-5: Kareeberg Municipality source of water

SOURCE OF WATER	PERCENTAGE
Regional/Local water scheme (operated by municipality or other water services provider)	71,3%
Borehole	24,1%
Spring	0,1%
Rain water tank	0,6%
Dam/Pool/Stagnant water	0.8%
River/Stream	0%
Water vendor	0,3%
Water tanker	2,5%
Other	0,4%

6.8.4.2 Access to Sanitation

Table 6-6: Kareeberg Municipality toilet facilities

TOILET FACILITY	PERCENTAGE
None	9,6%
Flush toilet (connected to sewerage system)	55,6%
Flush toilet (with septic tank)	12,8%
Chemical toilet	0,2%
Pit toilet with ventilation	14,1%
Pit toilet without ventilation	4,3%
Buckets toilet	2,9%
Other	0,4%

6.8.5 THE ECONOMY AND EMPLOYMENT

Table 6-7: Kareeberg Municipality average household income

INCOME	PERCENTAGE
None income	8,7%
R1 - R4,800	3,8%
R4,801 - R9,600	6%
R9,601 - R19,600	24,4%
R19,601 - R38,200	24,3%
R38,201 - R76,400	13,4%
R76,401 - R153,800	9,5%
R153,801 - R307,600	5,9%
R307,601 - R614,400	2,9%
R614,001 - R1,228,800	0,6%
R1,228,801 - R2,457,600	0,3%
R2,457,601+	0,2%

6.8.6 SOCIO-ECONOMY VALUE OF THE ACTIVITY

Anticipated CAPEX (Capital Expenditure) value of the project on completion?	R140 million
What is the expected annual turnover to be generated by or as a result of the project?	Cost of operations and personnel support
Number of new skilled employment opportunities created in the construction phase of the project.	TBD
Number of new skilled employment opportunities created in the operational phase of the project.	TBD
Number of new un-skilled employment opportunities created in the construction phase of the project	TDB
Number of new un-skilled employment opportunities created in the operational phase of the project?	TDB
What is the expected value of the employment opportunities during the operational and construction phase?	TBD

6.8.7 PLANNING CONSIDERATIONS

Systematic conservation planning is a globally recognized practice which identifies priorities for biodiversity conservation and informs legislation to facilitate the long-term conservation of identified biodiversity.

6.8.7.1 National Conservation Level

The National Environmental Management: Biodiversity Act (Act 10 of 2004) lists Threatened or Protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected. The main purpose of listing Threatened Ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of Threatened ecosystems.

Threatened terrestrial ecosystems have been delineated based on the following:

- The South African Vegetation Map.
- Priority areas identified in a provincial systematic biodiversity plan.
- High irreplaceability forest patches and clusters.

There are four main types of implications of listed ecosystems on development:

- Planning related implications, linked to the requirement in NEMBA for listed ecosystems to be taken into account in municipal IDPs and SDFs.
- Environmental authorisation implications, especially in terms of NEMA and EIA regulations.
- Proactive management implications, in terms of NEMBA.
- Monitoring and reporting implications, in terms of NEMBA.

6.8.7.2 Provincial Conservation Level

Loss of biodiversity results in ecosystem degradation and subsequent loss of important ecological services. Anthropogenic developments are a driving force that exerts pressure on the natural habitat and biological diversity.

Sensitivity of the area was assessed through the interrogation of biodiversity databases. The primary aim of this conservation plan is to ensure that representative biodiversity samples are conserved to ensure that subsequent conservation targets are achieved. Areas are categorized based on the site's ecological sensitivity, biological functioning and conservation significance. Classification of sites within this plan makes reference to the following:

Irreplaceable CBA: Areas that are critical for meeting conservation targets and are required to ensure the persistence of viable populations of species and the

functionality of ecosystems. Therefore, the site has an irreplaceable conservation value with no alternative sites available.

Optimal CBA: Areas identified through systematic conservation planning which represent the ideal localities out of a larger selection of available planning units that are optimally located to meet conservation targets.

Ecological Support Areas (ESAs): Areas that sustain and support the ecological functioning of the associated CBAs. These areas are not (in all cases) pristine but rather functional systems.

6.9 NEED AND DESIRABILITY

The proposed development is required as it will greatly boost local employment and means more cash in hand for the community and close proximately business. The community of Carnarvon will have opportunity of being employed, permanently and temporary by this development. Kareeberg Municipality IDP has noted that the proposed SKA project will contribute towards, infrastructure, local jobs, hospitality and tourism opportunities, entrepreneurship, business development, education and training, therefore there is a need for this development to take place.

Based on the assessment conducted for ecology and heritage, it is the opinion of the specialists that the proposed activities and development footprint shall not compromise biodiversity patterns and processes or fragment landscape and ecological connectivity of the area.

Please refer to Appendix K for more detailed Need and Desirability section.

6.10 SPECIALIST STUDIES FINDINGS

The following specialist studies have been completed and incorporated in this BAR:

Table 6-8: Specialist Studies Undertaken

REPORT	ORGANISATION/AUTHOR	DATE	APPENDIX
Aquatic Assessment	GCS	31/05/2023	G1
Agricultural Assessment	Index (Pty) Ltd	03/04/2023	G4
Heritage Assessment	Digby Wells Environmental	16/05/2023	G2
Hydrology Report	GCS	11/03/2022	G6
Terrestrial Assessment	GCS	31/05/2023	G3
Visual Impact Assessment	VRM Africa	28/07/2023	G5

6.10.1 AQUATIC

Based on the aquatic assessment, neither NFEPA nor the SANBI wetland databases indicated the presence of any wetland within the study area. Also, no wetlands

were identified in the Northern Cape LUDS database. These desktop assessment findings were confirmed by the site assessment confirmed that no areas on site can be classified as wetlands.

The 1:50 000 topographical map (Konka) was used to determine the presence of any watercourses in the study area. The presence of several watercourses that drain the area in an easterly and southerly direction are present. All these watercourses formed tributaries of the larger Die Leegte River to the south of the site. The site assessment confirmed the presence of these watercourses and served to refine their extent further. The area was assessed by walking the ill-defined channels where they were visible and tracking the routes with a handheld GPS.

This provided an exact indication of the location and extent of the watercourses that are present in the study area. It must be noted that all these drainage lines (with the exception of the Die Leegte River) all have poorly defined channels and are very small, seasonal watercourses that will only flow for a very short period of time (5 – 10 days) after a significant rainfall event.



Figure 6-4: Watercourses (shown in blue) as identified and delineated during the site assessment

The area has no clear riparian vegetation present along these channels as a result of the very limited periods of flow in the channels which prevents this vegetation from developing. The beds of the channels consist of sandy material with smaller rocks which have washed from the geology of the catchment.

Despite the poorly defined channels that did not have water flow, the Present Ecological State of these watercourses could not be determined. According to the impacts they have had on the small catchment where they occur, hydrological and geomorphological drivers have been significantly altered, resulting in a Class E classification (seriously modified). There are no wetland features that were identified within the study area.



Figure 6-5: Poorly defined watercourse channel within the study site

The Die Leegte River has a well-defined river channel, which have been altered historically to make provision for the irrigation activities downstream, along its banks. This watercourse passes under the provincial road through a culvert before entering the study area and has several (two in number) dams immediately upstream of this crossing point. The watercourse has been dammed up within the study site by two weirs, the first of which is non-functional at the moment, while the second weir forms part of the flood irrigation system being used downstream.



Figure 6-6: The non-functional weir in the Die Leegte River, upstream of the existing SKA Klerefontein Facility



Figure 6-7: Functional weir in the Die Leegte River

6.10.2 AGRICULTURAL

Based on the Agricultural Compliance statement the present land uses of the proposed study area are illustrated in Figure 6-8 and Figure 6-9 below. They also indicate that the land is vacant and that there is no cultivated land on the site.



Figure 6-8: Present land uses (2023)

The study area is located on Ecca shale, with soil that has little pedological development. The Agricultural specialist stated that the proposed development is of Low to Medium sensitivity for agriculture and will therefore have no impact on the agricultural production capability of the land in its current state.

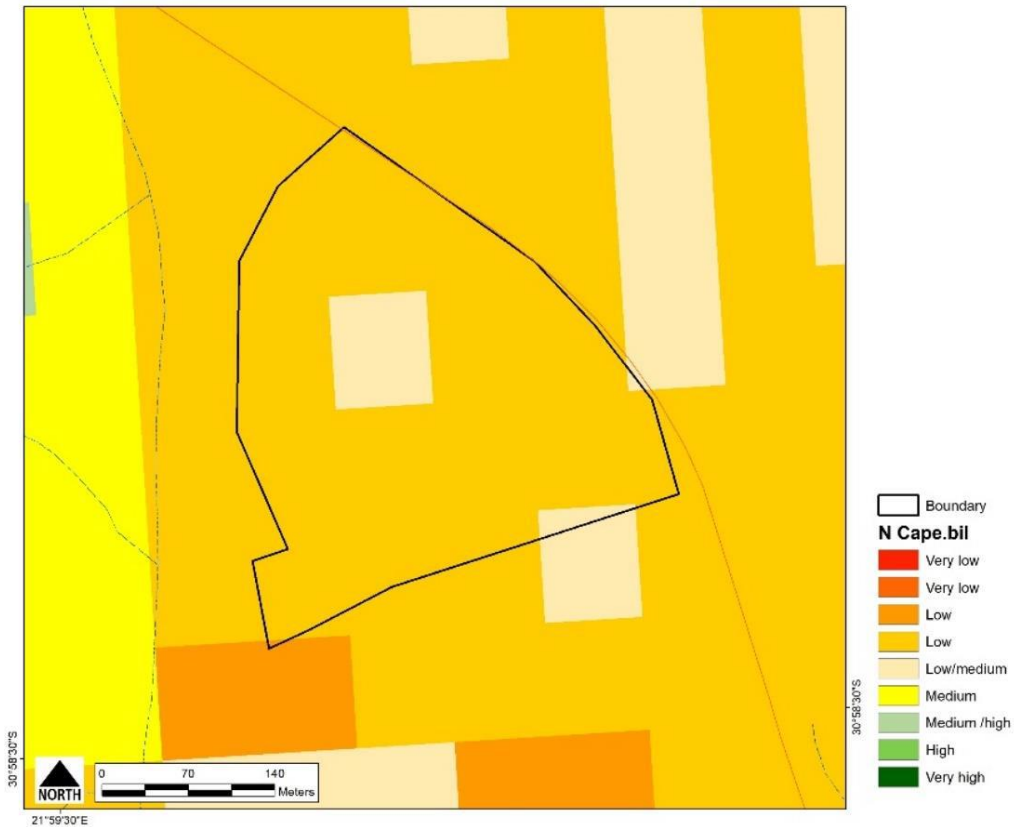


Figure 6-9: Agricultural potential (DALRRD)

The study further outlined that the development will not affect farming in any way and that there were no gaps in knowledge or data during the assessment. Therefore, the site is not regarded as high potential cropping land that should be protected for farming purposes.

6.10.3 HERITAGE AND PALAEOLOGY

The Heritage Practitioners assessed the proposed study area on the 30 and 31 January 2023. On the 14 February 2023, both Practitioners undertook a pre-disturbance survey of the Project area, this was to visually record the current state of the cultural landscape, and record a representative sample of the visible, tangible heritage resources present within the development footprint area, site-specific study area and greater study area. Identified heritage resources were recorded as waypoints using a handheld GPS device. These heritage resources were also recorded through written notes and photographs.

On existing environment, it was stated by the specialist that the natural vegetation of the site-specific study area has been disturbed in varying degrees by human activities. The environment was disturbed through anthropogenic and animal activities, these were related to the establishment and operation of the various farming-related structures including, but not limited to, the farmhouse, animal pens and windmills. These activities have been ongoing potentially since 1880.

Most of the existing historical structures are being reused as office space, workshops for mechanical and electrical work and as storage or lay down areas. Gravel and tar roads and parking areas, security / access control structure, stormwater management infrastructure and other ancillary infrastructure have been established within this werf.

There are two (2) categories of heritage resources that were identified during the pre-disturbance survey.

Table 6-9: Heritage Resources identified during the survey

HERITAGE RESOURCE	DESCRIPTION
Isolated archaeological and historical / recent past findspots	<p>During the pre-disturbance survey, individual surface artefacts were observed amongst heavily disturbed areas – these appeared to include dumped stone and sand material. These find spots included:</p> <ul style="list-style-type: none"> • Fragments of European ceramic, fragments of blue glass and a clear glass bottle. These items may be associated with the structures still in use, or may be more modern; and • Stone Age materials including a broken, irregular blade and a flake. Both look fresh, although the flake has a patina and was made of hornfels. <p>These artefacts are likely not in a primary depositional context, given the disturbances observed in this area.</p>
Klerfontein Farmhouse and Werf	<p>The Klerfontein Farmhouse was likely established around 1880 to 1900. The farmhouse would have been established as part of a sheep farm.</p> <p>The werf includes several additional structures, established at different points in time. The werf includes two large animal kraals, a workshop building (dated 1952), a barn and an outhouse. These are described in more detail in the Built Heritage Impact Assessment Report.</p>



Figure 6-10: Isolated Surface Artefacts



Figure 6-11: Existing structures on the Klerefontein Werf

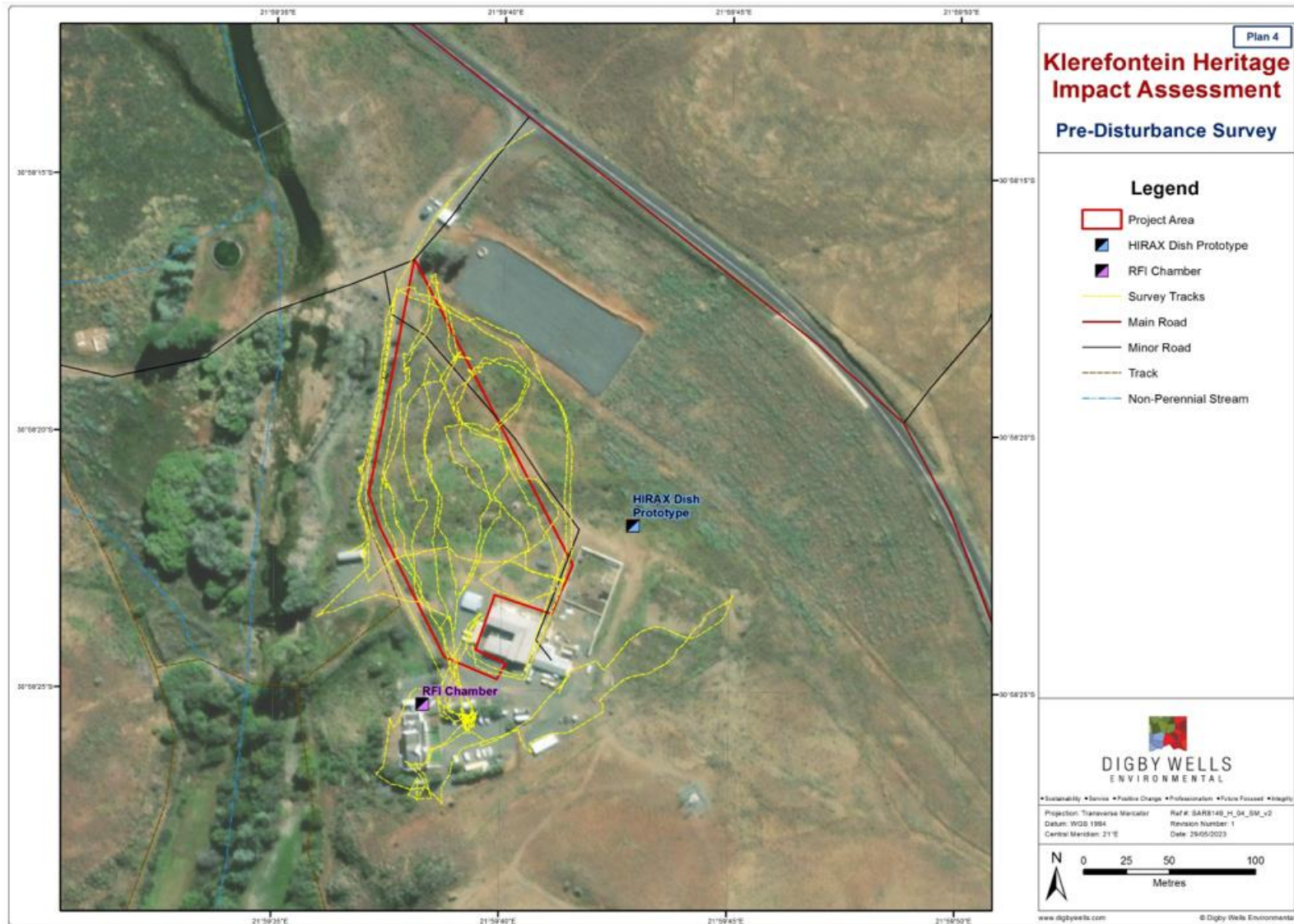


Figure 6-12 Results of the Pre-disturbance Survey

6.10.4 TERRESTRIAL

Based on the desktop study conducted by the Terrestrial Specialist using the DFFE online Screening Tool the following was highlighted.

SENSITIVITY THEME	FEATURE	SENSITIVITY
Terrestrial Biodiversity Theme	Presence of a Critical Biodiversity Area 1	Very High
Animal Species Theme	Aves – <i>Neotis ludwigii</i> Reptilia – <i>Chersobius boulengeri</i>	High Medium
Plant Species Them	No sensitive features	Low

The assessment of these species in the context of site area will be limited to species presence as well as suitable habitat for the species within boundaries of the project site.

The site assessment was conducted on 14 January 2021 and, 7 and 8 October 2021 to verify the findings of the desktop assessment. The site visits were therefore conducted in mid and early summer, however, the seasonality of the assessment is not considered to compromise the findings of the assessment.

6.10.4.1 Vegetation

It was noted that the vegetation within the study site has been severely altered by historic and current anthropogenic impacts. In the past these impacts related to agricultural activities, associated with the Klerefontein farmstead and associated infrastructure. About 70% of the study site has already been physically altered by historic activities, and the remaining 30% of the study site has not been physically disturbed but is considered secondary in nature and of poor biodiversity value. Although the DFFE Screening Tool identifies the site as a Critical Biodiversity Area (CBA1) the site assessment has confirmed that no areas within the study site are considered to contain pristine vegetation.



Figure 6-13: Prickly Pear "orchard" on site



Figure 6-14: Material stockpile area on site

An *Opuntia robusta* (Blue-leaf Prickly Pear) orchard has been planted on the study site, which is the most prominent vegetative feature. The species is alien in nature and if not sufficiently controlled can be invasive. As a result of extreme drought, the "orchard" was likely planted to harvest the green "leaves" for livestock feed and to harvest the fruit for consumption.

The other large area of disturbance is associated with the existing farmstead and associated infrastructure with these areas being devoid of any indigenous vegetation.

The layout provided is largely situated on these two disturbed areas, and as such will not impact on the vegetative biodiversity value of the development footprints.

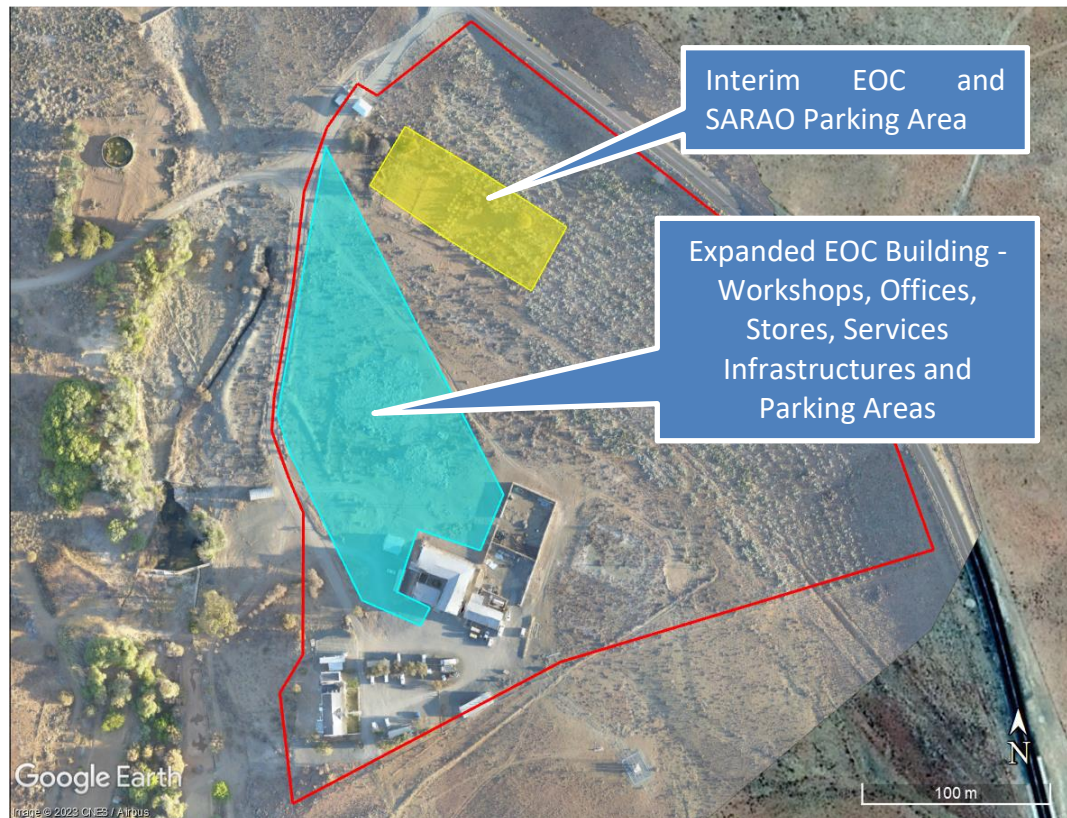


Figure 6-15: Outline of the layout of the proposed Klerefontein Support Base and associated infrastructure

6.10.4.2 Mammals

According to the desktop study, the vulnerable *Felis nigripes* (Black-Footed Cat) might exist on the study area, but due to the lack of suitable habitat, its presence is highly unlikely. Since the study area has not been adequately adapted to its pristine state because of severe alteration, no wild mammals have been observed during the site assessment, and constant human activity on the site dissuade large mammals from visiting.

6.10.4.3 Reptiles

The DFFE Online Screening Assessment has identified the presence of *Chersobius boulengeri* (Karoo Padloper) which is classified as “near threatened”, this species was not present on site during the site visit. This may be due to the lack of suitable habitat from the significant transformation of the site.

No reptiles were observed on site, however, it was pointed out that the presence of common reptiles is likely in the areas to the south of the study site as the rocky habitat will be suitable for some species.

6.10.4.4 Frogs

No frogs were identified during the site assessment. It is probable that these species are associated with the watercourse that runs west of the study site. No suitable habitat is located on the study site if these species are present.

6.10.4.5 Birds

Neotis ludwigii (Ludwig's Bustard) was identified within the site area by the DFFE Screening Tool. This species is classified as endangered as it is threatened by habitat loss due to mining, renewable energy projects, bird strikes, and hunting. Due to disturbances in the habitat and human activities, this species was not seen during the site assessment, and it is unlikely to frequent the site due to human activity and the disturbed habitat.

The outcome of the Site Sensitivity Verification based on the information generated is summarised in Table 6-10 below.

Table 6-10: Outcome of the Site Sensitivity Verification

DFFE SCREENING TOOL THEME	DFFE SCREENING TOOL SENSITIVITY RATING	SITE SENSITIVITY VERIFICATION FINDINGS	DISCUSSION
Terrestrial Biodiversity Theme	Very high sensitivity	Low sensitivity	<p>The screening tool indicates that the property is located within a CBA as identified in the Northern Cape Biodiversity Area Map (2016). The map does not provide any details as to the reasons for the classification, but one can only assume that the classification is based on the pristine nature of the vegetation in the area.</p> <p>The vegetation on the Klerefontein Support Base study site is not pristine as it has undergone historic transformation as outlined in the sections above. Approximately 70% of the study area has been physically transformed with the remaining 30% being considered secondary in nature.</p> <p>Based on the above findings, the sensitivity of the Terrestrial Biodiversity Theme is considered to be of Low Sensitivity.</p>
Animal Theme	High sensitivity	Low sensitivity	<p>The High Sensitivity rating of this theme is based on the possible presence of a single bird species, <i>Neotis ludwigii</i> (Ludwig's Bustard) and a single reptile species, <i>Chersobius boulengeri</i> (Karoo Pad-looper).</p> <p>According to South African Bird Atlas Project 2 (SABAP2) Rarities List (2021), no <i>Neotis ludwigii</i> (Ludwigs Bustard) (ref no. 218) was found within the Northern Cape.</p> <p>Neither of these species are present on the site and no suitable habitat for these species is present on the site as a result of the high levels of historic and current disturbances.</p> <p>As such, the sensitivity of the Animal Theme within the property, is considered to be of Low Sensitivity.</p>
Plant Theme	Low sensitivity	Low sensitivity	<p>Due to the high levels of historic and current disturbances to the vegetation on the study site, the low sensitivity rating of the screening tool can be confirmed.</p>

6.10.5 VISUAL

As reflected in the Table 6-11 below, a viewshed analysis for the site was conducted using an offset value representing the approximate height of the proposed development. Taking atmospheric influences into account at a defined extent where the landscape change would not be clearly visible, the viewshed was also capped at a defined extent.

Table 6-11: Proposed Project Heights Table

PROPOSED ACTIVITY	HEIGHT (M)	MODEL EXTENT	MOTIVATION
Structure	8m to 10m (approx.)	24km	The larger structure of the proposed development could extend the zone of visual influence beyond the background distance zones beyond 12km

Figure 6-16 below depicts the theoretical area where the proposed landscape change could be visible. An atmospheric influence over increasing distance reduces visual clarity over increasing distance, however, the theoretical viewshed excludes vegetation, structural development, and distance from the location. Consequently, the viewshed is rated as having a Localised Visual Extent within the Foreground areas. The Zone of Visual Influence (ZVI) is the area where the proposed landscape change is most likely to be noticed by the casual observer, taking the site visit into account where vegetation, existing development and distance is taken into consideration. This is a subjective appraisal but informed by the viewshed and the other factors mentioned. The ZVI for the proposed development is likely to be three kilometers because of its valley location in relation to the surrounding hills and koppies, which are prominent features of the receiving landscape.

The following aspects were noted by the specialist in favour of the proposed project:

- Positive alignment with local and regional planning.
- The remoteness of the location with few receptors.
- The small ZVI of the proposed landscape change that is contained within the Foreground (3km distance).
- No landscape-based tourism activities taking place within the project ZVI.
- No tourist view corridors or main routes falling within the project ZVI.
- The suitability of the architecture that will not detract from the existing old farmhouse or old walled enclosure.
- Suitable landscape planning for the proposed front vehicle parking area.

The following risks were identified during the site visit that would require mitigation:

- The existing use of overhead flood lighting for security that should not set a precedent for future security lighting as light spillage has the potential to

significantly extend the project ZVI from point source light (Medium risk), and pool lighting (glow over the development site) that could detract from the existing dark sky sense of place.

- The areas around the structure and the large vehicle parking areas could detract from the views from the adjacent road.
- The prickly pear alien invasive species adjacent to the road.

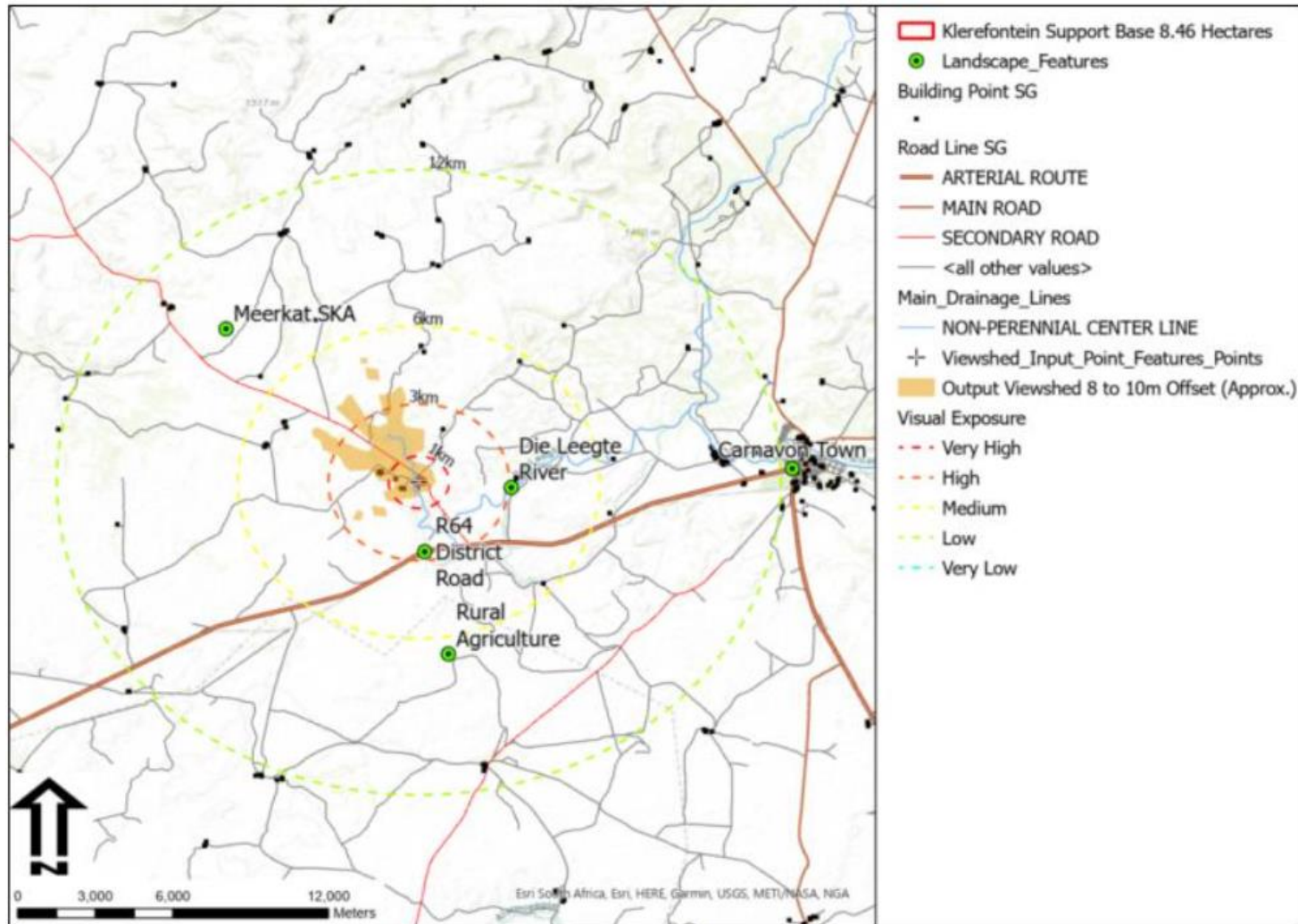


Figure 6-16: Viewshed analysis map of proposed structure

7 PUBLIC PARTICIPATION

The following sections will discuss the approach taken with the public participation process for this application. This has been conducted in accordance with the Environmental Impact Assessment Regulations (EIA), 2014 (as amended) as well as the DFFE's Public Participation Guideline in terms of NEMA EIA Regulations (2017).

7.1 COMPILATION OF A STAKEHOLDER DATABASE

The stakeholder database consists of all registered interested and affected parties, as well as the competent authorities, relevant municipal departments, and the local and district municipalities.

The stakeholder database has been updated and maintained throughout the public participation process.

7.2 METHODS OF PUBLIC PARTICIPATION

The Public Participation period commenced for the 30-day (EA) mandatory period. Background Information Documents (BIDs) were circulated to all I&APs for review and comments. An advert was placed in the **local** Noordwester newspaper, informing the public of the project and how to register as an I&AP to comment and receive updates on the application moving forward. Site notices were also placed at strategic points around the proposed site and neighbouring town (Carnarvon) with the above information. All site notices and adverts have been published in both English and Afrikaans.

7.2.1 NEWSPAPER ADVERTISEMENT

The following is the example of the newspaper advert that was published during public participation phase to notify the local community about the proposed project.

NOTICE OF A BASIC ASSESSMENT PROCESS FOR THE PROPOSED CONSTRUCTION OF THE NEW SKA1 MID ENGINEERING OPERATIONS CENTRE BUILDING (EOC) AT SARAO KAROO SUPPORT BASE IN KLEREFONTEIN FARM.

Notice is hereby given in terms of Regulations published in Government Notice R. 982, Government Gazette No. 38282 of 4 December 2014, as amended by GN R326 under sections 24(5), and 44, of the National Environmental Management Act, 1998 (Act No.107 of 1998), that the South African Radio Astronomy Observatory (SARAO) and National Research Foundation (NRF) propose the construction of the New SKA1 Mid Engineering Operations Centre Building (EOC) at SARAO Karoo Support Base in Klerefontein Farm.

In order to obtain the required Environmental Authorisation a Basic Assessment process must be undertaken in terms of the EIA Regulations, 2014 (as amended in 2017). This process will be conducted to ensure that the environmental impacts that may be associated with the proposed project are taken into consideration. Interested and Affected parties (I&APs) have an opportunity to comment by providing issues of concern and/or suggestions for enhanced benefits and/or alternatives; and to ensure that the competent authority, the Department of Forestry, Fisheries and the Environment (DFFE), has sufficient information to make a decision.

Delta Built Environment Consultants (Pty) Ltd has been appointed as the Independent Environmental Assessment Practitioner to conduct the Basic Assessment process for this project. You are invited to register as an Interested and Affected Party (I&AP) and submit your comments and queries to Delta BEC, Attention: Neelan Maduray at Tel: 071 682 1858; E-mail: neelan.maduray@deltabec.com on or before Friday, 16 June 2023.

KENNISGEWING VAN 'N BASIESE ASSESSERINGSPROSES VIR DIE VOORGESTELDE KONSTRUKSIE VAN DIE NUWE SKA1 MID INGENIEURSWESE BEDRYFSENTRUM GEBOU (EOC) BY SARAO KAROO ONDERSTEUNINGSBASIS TE PLAAS KLEREFONTEIN.

Kennis geskied hiermee ingevolge die Regulasies gepubliseer in Staatskennisgewing R. 982, in Staatskoerant No. 38282 van 4 Desember 2014, soos gewysig deur GN R326, artikels 24(5), en 44, van die Wet op Nasionale Omgewingsbestuur, 1998 (Wet No.107 van 1998), dat die Suid-Afrikaanse Radio Sterrekunde-Sterrewag (SARAO) en die Nasionale Navorsingstigting (NRF) die konstruksie van die Nuwe SKA1 Mid Ingenieurswese Berfyfsentrum Gebou (EOC) by SARAO Karoo-Ondersteuningsbasis op plaas Klerefontein voorstel.

Om die vereiste Omgewings Magtiging te verkry, moet 'n Basiese Asseseringsproses onderneem word ingevolge die Omgewings Impak Bestuur (OIB)-regulasies, 2014 (soos gewysig in 2017). Hierdie proses sal uitgevoer word om te verseker dat die omgewingsimpakte wat met die voorgestelde projek geassosieer kan word, in ag geneem word. Belangstellende en Geaffekteerde Partye (I&AP) het 'n geleentheid om kommentaar te lewer deur kwessies van kommer en/of voorstelle vir verbeterde voordele en/of alternatiewe te verskaf; en om te verseker dat die bevoegde owerheid, die Departement van Bosbou, Visserye en die Omgewing (DFFE), genoeg inligting het om 'n ingeligte besluit te neem.

Delta Built Environment Consultants (Edms) Bpk. is aangestel as die Onafhanklike Omgewings Impak Praktisyn om die Basiese Asseseringsproses vir hierdie projek uit te voer. Hiermee word u uitgenooi om as 'n Belangstellende en Geaffekteerde Party (I&AP) te registreer en u kommentaar en navrae te rig aan Delta BEC, Aandag: Neelan Maduray by Tel: 071 682 1858; E-pos: neelan.maduray@deltabec.com voor of op Vrydag, 16 Junie 2023.

Figure 7-1: illustrates the proof of publication of the advert in the Noordwester in red.

BLADSY TWEE
NOORDWESTER / OEWERNUUS / MESSENGER
VRYDAG 12 MEI 2023



HER IS HULLE
MARCOLENE Nel, Raymond Nel, Henny Parker en Franco Wiegje bestuur nou almal hulle eie 'n deel van die aanspreklike Sky Factor winkel. Altesaam nou swaart rust al bedryfjag deur.

MUISHONDE KON NIE BYKOM, DIE MUSKELJAATKAT WEL

Japie se hele duiweboerdery word in een nag uitgeroei

Georgie Louw
Met serfloop van tyd dink 'n mens aan jou kinders. Die best 'n mens wonder: Sien jy dié wat gebore het, jou beswaaringe, steeds deur die ee was 'n kind, of sien 'n mens dié van deur die ee van 'n oorer erfel in die wat 'n oorerhou 'n goetsentien die weerga was wat werklik gebore het?

Jak sal nooit negatt haerel poging my oer- aangewand het om vir my duiwe te kry. Op 'n dag het my pa na die doring na 'n oer gegada. Hy het duiwe gehad. Die probleem was net die die ryrens as duiwe was. Die oer hou had in die wolkop toe.

Waar die meeste duiwe vutdang gebore het, was die nie oerhou die Op 'n dag was die apertel wou deur. Daar was 'n grontje hoerls op die plan. Die koo is op sy ry staan gemak en die oep kant in was kullentel toegewerk. Die koo is op die kant van 'n kersse staansmaak sodat die kant oor die euse gemak.

CALNET FIBRE
FRANCO VOYAGE in die deur van die kantoor van Calnet Fibre is die gadele was lui by Henny Parker hulle. Die deur was in Franco staan in mooi op die toek van die winkel en is saker nou vir die eerste keer in twee jaar weder in gebruik.

NUWE ROLO'S
MARCOLENE NEL in die oer van Parker se winkel was sy nou hure Foto 'n Franse winkel bestel. Hulle het daarheen verhuul van die posaal waar Jammie aere was.

LOST OR DESTROYED DEED
NOTICE IS HEREBY GIVEN IN TERMS OF REGULATION 88 OF THE DEEDS REGISTRATION ACT, 1937 OF THE INTENTION TO APPLY FOR THE ISSUING OF A CERTIFIED COPY OF DEED OF TRANSFER NUMBER T32091/2013 issued by ABANGCROSS LABOUR SERVICES CC in favor of THE TRUSTEES OF THE YOM FAMILY TRUST in respect of certain THE FARM BERSIDA NUMBER 37, SITUATED IN THE KAROO HOODLAND MUNICIPALITY, DIVISION SOUTHERLAND PROVINCE OF THE NORTHERN CAPE which has been lost or destroyed.

All interested persons having objection of issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at KIMBERLEY within two weeks from the date of the publication of this notice.

Date: 01
This 09-day of May 2023
APPLICANT: VAN DER MERWE & ROBERTSON INC
ADDRESS: P O BOX 7461, DURBANVILLE, 7981
EMAIL ADDRESS: info@vandrmerwe.co.za

VIËR BESIGHEDE OP EEN PERSEEL

Parker se hoek is amper 'n 'mall'

CALVENIA – Op die een hoek van Stiglingstraat en Kerkerstraat is al vir vier geslagte die perseel waar die Parker familie het winkel het.

Dié is eerskik een van die meeste vermaaklike persele in die dorp. Sedert die terugkom van W'la Parker het sy man Henry daarmee aangegaan. Hy is veel 'n laer van die ry van glas wat by was weg doen.

Marlene het Raaiosaal Nidam met sy ANI Supplies by hulle 'n spoor gefaar waar by Automotive verwe en Quick dry maatsel verkoop. Hy het ook die ligte agardoop op die dorp en werk.

Bevestigingsregerie skerp en skoon en vermaaklik ook.

Ondanks het Marlene Nel van Rob's Furniturewinkel ook daarmee gefaal van die perseel was laer as winkel perseel wat verwees was.

Calnet Fibre wat sedert verwee jaar bedryfjag was in die dorp met die aere van vermaaklike en kanteer in ook in 'n deel van die winkel geest sodat hul klerre met hul in aangeving kom kom. Hul het hulle word by 027 904 0070.

Dié is nou swaer bedryfjag deur in die Parker winkel en deur woud grontpanderye verwe in Calvenia se Mall. – Nel

<p>NOTICE OF A BASIC ASSESSMENT PROCESS FOR THE PROPOSED CONSTRUCTION OF THE NEW SKAI MID ENGINEERING OPERATIONS CENTRE BUILDING (EOC) AT SARAO KAROO SUPPORT BASE IN KLEREFONTEIN FARM.</p> <p>Notice is hereby given in terms of Regulations published in Government Gazette R. 882, Government Gazette No. 38092 of 04 December 2014, as amended by DR 1026 under sections 24(5) and 44, of the National Environmental Management Act, 1998 (Act No. 107 of 1998) that the South African Radio Astronomy Observatory (SARAO) and National Research Foundation (NRF) propose the construction of the New SKAI Mid Engineering Operations Centre Building (EOC) at SARAO Karoo Support Base in Klerfontein Farm.</p> <p>In order to obtain the required Environmental Authorisation a Basic Assessment process must be undertaken in terms of the EIA Regulations, 2014 (as amended in 2017). The process will be conducted to ensure that the environmental impacts that may be associated with the proposed project are taken into consideration. Interested and Affected Parties (I&APs) have an opportunity to comment by providing issues of concern and/or suggestions for enhanced baseline data for assessment; and to ensure that the competent authority, the Department of Forestry, Fisheries and the Environment (DFFE), has sufficient information to make a decision.</p> <p>Delta Built Environment Consultants (Pty) Ltd has been appointed as the Independent Environmental Assessment Practitioner to conduct the Basic Assessment process for this project. You are invited to register as an Interested and Affected Party (I&AP) and submit your comments and queries to Delta BEIC, Attention: Neelke Mackay at Tel: 071 682 8058. E-mail: neelke@deltaenvironmental.com on or before Friday, 23 June 2023.</p>	<p>KENNEMING VAN 'N BASISSE ASSESSERINGSPROSES VIR DIE VOORGESTELDE KONSTRUKSIE VAN DIE NUWE SKAI MID INGENIEURSWERK BEDRYFENTRUM GEBOU (EOC) BY SARAO KAROO ONDERSTUNINGSBRAS IN KLEREFONTEIN PLAAS.</p> <p>Kennis gegee dat beswaer ingevolge die Regulasie gepubliseer in Staatskoerant R. 882 in Staatskoerant No. 38092 van Die Desember 2014, soos gewysig deur DR 1026 in wagnote 24(5) en 44, van die Wet op Nasionale Omgewingsake, 1998 (Wet No. 107 van 1998), dat die Suid-Afrikaanse Radio Astronomie Observasie (SARAO) en Nasionale Navorsingstigting (NRF) die konstruksie van die Nuwe SKAI Mid Ingenieurswerk Bedryfentrum Gebou (EOC) by SARAO Karoo-onderstuningsbrase op Klerfontein-plate voorstel.</p> <p>Om die vereiste Omgewingskeuring te verkry, moet 'n Basiese Assesseringsproses onderneem word ingevolge die Omgewingskeuring Regulasie (SARAO) (2014) (soos gewysig in 2017). Hierdie proses sal uitgevoer word om te verseker dat die omgewingsake met die voorgestelde projek geassesseer kan word, in ag geneem word. Betroegtepartiede en Gearkteerde Partee (I&AP) het 'n geleentheid om kommentaar te lewer deur kommentaar te verskaf en/of voorstelle vir verbeterde reëls en/of alternatiewe te verskaf, soos om te verseker dat die basiese owerhoed, die Omgewingskeuring Departement van Bosbou, Vissery en die Omgewingskeuring (DFFE), genoeg inligting het om 'n besluit te neem.</p> <p>Delta Built Environment Consultants (Edms.) Bpk. is aangewys as die Onafhanklike Omgewingskeuringpraktisjyn om die Basiese Assesseringsproses vir hierdie projek uit te voer. U word uitgenooi om as 'n Gearkteerde Partee of Gearkteerde Partee (I&AP) te registreer en 'n kommentaar en/of voorstelle te stuur aan Delta BEIC, Aandag: Neelke Mackay by Tel: 071 682 8058. E-pos: neelke@deltaenvironmental.com voor of op Vrydag, 23 Junie 2023.</p>
--	---

Figure 7-1: Proof of Publication

7.2.2 SITE NOTICE

The following is an example of a site notice that will be placed on site to notify the public about the proposed project.



<p>NOTICE OF A BASIC ASSESSMENT PROCESS FOR THE PROPOSED CONSTRUCTION OF THE NEW SKA1 MID ENGINEERING OPERATIONS CENTRE BUILDING (EOC) AT SARAO KAROO SUPPORT BASE IN KLEREFONTEIN FARM.</p>	<p>KENNISGEWING VAN 'N BASIESE ASSESSERINGSPROSES VIR DIE VOORGESTELDE KONSTRUKSIE VAN DIE NUWE SKA1 MID INGENIEURSWESE BEDRYFSENTRUM GEBOU (EOC) BY SARAO KAROO ONDERSTEUNINGSBASIS TE PLAAS KLEREFONTEIN.</p>
<p>Notice is hereby given in terms of Regulations published in Government Notice R. 982, Government Gazette No. 38282 of 4 December 2014, as amended by GN R326 under sections 24(5), and 44, of the National Environmental Management Act, 1998 (Act No.107 of 1998), that the South African Radio Astronomy Observatory (SARAO) and National Research Foundation (NRF) propose the construction of the New SKA1 Mid Engineering Operations Centre Building (EOC) at SARAO Karoo Support Base in Klerefontein Farm.</p> <p>In order to obtain the required Environmental Authorisation a Basic Assessment process must be undertaken in terms of the EIA Regulations, 2014 (as amended in 2017). This process will be conducted to ensure that the environmental impacts that may be associated with the proposed project are taken into consideration. Interested and Affected parties (I&APs) have an opportunity to comment by providing issues of concern and/or suggestions for enhanced benefits and/or alternatives; and to ensure that the competent authority, the Department of Forestry, Fisheries and the Environment (DFFE), has sufficient information to make a decision.</p> <p>Delta Built Environment Consultants (Pty) Ltd has been appointed as the Independent Environmental Assessment Practitioner to conduct the Basic Assessment process for this project. You are invited to register as an Interested and Affected Party (I&AP) and submit your comments and queries to Delta BEC, Attention: Neelan Maduray at Tel: 071 682 1858; E-mail: neelan.maduray@deltabec.com on or before Friday, 16 June 2023.</p>	<p>Kennis geskied hiermee ingevolge die Regulasies gepubliseer in Staatskennisgewing R. 982, in Staatskoerant No. 38282 van 4 Desember 2014, soos gewysig deur GN R326, artikels 24(5), en 44, van die Wet op Nasionale Omgewingsbestuur, 1998 (Wet No.107 van 1998), dat die Suid-Afrikaanse Radio Sterrekunde-Sterrewag (SARAO) en die Nasionale Navorsingstigting (NRF) die konstruksie van die Nuwe SKA1 Mid Ingenieurswese Berfyfentrum Gebou (EOC) by SARAO Karoo-Ondersteuningsbasis op plaas Klerefontein voorstel.</p> <p>Om die vereiste Omgewings Magtiging te verkry, moet 'n Basiese Asseseringsproses onderneem word ingevolge die Omgewings Impak Bestuur (OIB)-regulasies, 2014 (soos gewysig in 2017). Hierdie proses sal uitgevoer word om te verseker dat die omgewingsimpakte wat met die voorgestelde projek geassosieer kan word, in ag geneem word. Belangstellende en Geaffekteerde Partye (I&AP) het 'n geleentheid om kommentaar te lewer deur kwessies van kommer en/of voorstelle vir verbeterde voordele en/of alternatiewe te verskaf; en om te verseker dat die bevoegde owerheid, die Departement van Bosbou, Visserye en die Omgewing (DFFE), genoeg inligting het om 'n ingeligte besluit te neem.</p> <p>Delta Built Environment Consultants (Edms) Bpk. is aangestel as die Onafhanklike Omgewings Impak Praktisyn om die Basiese Asseseringsproses vir hierdie projek uit te voer. Hiermee word u uitgenooi om as 'n Belangstellende en Geaffekteerde Party (I&AP) te registreer en u kommentaar en navrae te rig aan Delta BEC, Aandag: Neelan Maduray by Tel: 071 682 1858; E-pos: neelan.maduray@deltabec.com voor of op Vrydag, 16 Junie 2023.</p>

7.2.3 SITE PHOTOGRAPHS

The figures below illustrate the site notices that were strategically placed within the town of Carnarvon and within the site area to inform the public of the proposed project.



Figure 7-2: Site Notice 1

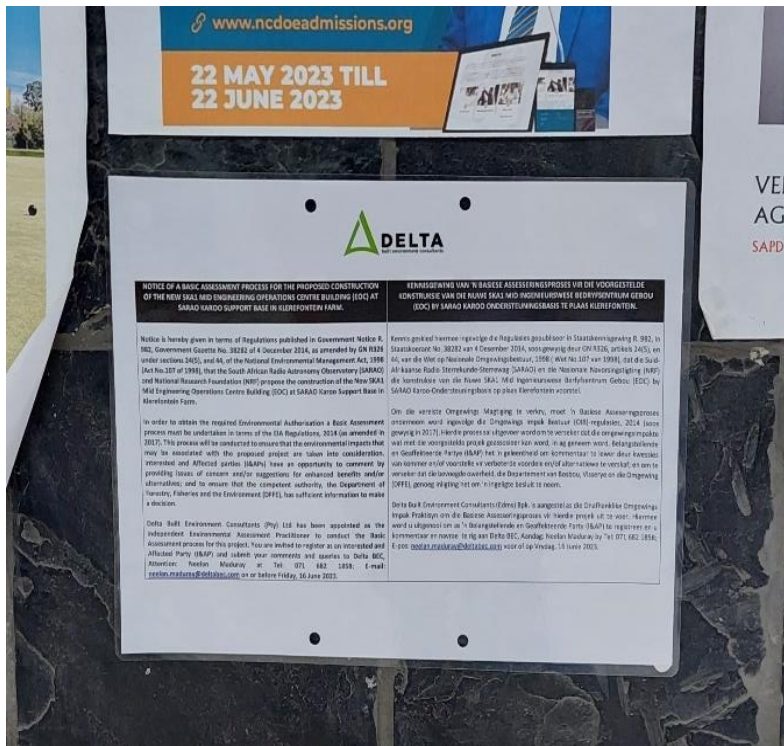


Figure 7-3: Site Notice 2

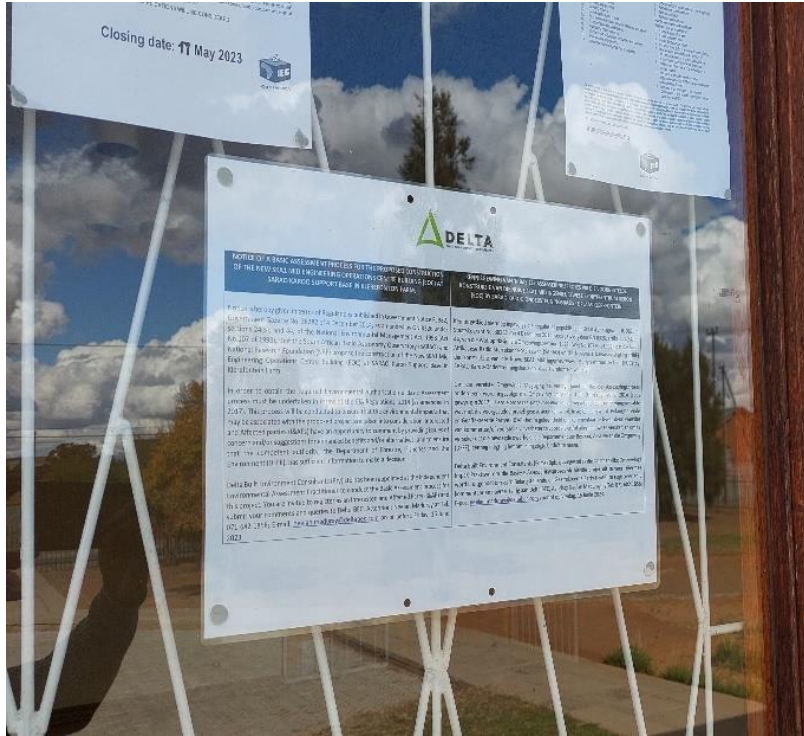


Figure 7-4: Site Notice 3



Figure 7-5: Site Notice 4



Figure 7-6: Site Notice 5

Table 7-1: Site notice locations

SITE NOTICE	COORDINATES	LOCATION DESCRIPTION
Site Notice 1	30°58'8.66"S 22° 7'38.90"E	SARAO SKA Information Centre
Site Notice 2	30°58'1.49"S 22° 7'39.04"E	SPAR
Site Notice 3	30°57'27.79"S 22° 7'38.44"E	Kareeberg Library
Site Notice 4	30°58'10.22"S 22° 7'39.43"E	Carnarvon Public Library
Site Notice 5	30°58'10.3 S 22°07'39.2 E	SARAO SKA Klerefontein Base

7.2.4 PUBLIC MEETINGS

A public participation meeting for the proposed construction of the New Klerefontein Engineering Operation Centre (EOC) Building was held on 18th May 2023 at Carnarvon Hoerskool. The meeting was organised by SARAO team where Delta BEC representatives presented the proposed project to the community in their preferred language (Afrikaans).



Figure 7-7: Delta BEC representative presenting to the community



Figure 7-8: Community attendees at Carnarvon Hoerskool

7.3 COMMENTS AND RESPONDS REPORT

All comments received on the Draft BAR have been captured in a Comments and Responses table which will be attached to Appendix F2.

8 DESCRIPTION AND ASSESSMENT OF IMPACTS

8.1 RISK ASSESSMENT METHODOLOGY

The impact assessment was conducted as per the conditions set out in the 2014 NEMA Regulations. The scoring assessment was calculated using the following parameters:

8.1.1 NATURE

A description of what causes the effect, what will be affected, and how it will be affected.

8.1.2 PROBABILITY (P)

The occurrence of which describes the likelihood of the impact occurring. Probability is estimated on a scale, and a score assigned:

- 1 - very improbable (probably will not happen)
- 2 - improbable (some possibility, but low likelihood)
- 3 - probable (distinct possibility)
- 4 - highly probable (most likely)
- 5 - definite (impact will occur regardless of any prevention measures)

8.1.3 DURATION RATING (D)

Wherein it is indicated whether:

- 1 - The lifetime of the impact will be of very short duration (0–1 years)
- 2 - The lifetime of the impact will be of short duration (2-5 years)
- 3 - Medium-term (5–15 years)
- 4 - Long term (> 15 years)
- 5 – Permanent

8.1.4 EXTENT RATING (E)

wherein it is indicated whether:

- 1 - Immediate area or site of development
- 2 - Local area
- 3 - Regional
- 4 - National
- 5 - International

8.1.5 MAGNITUDE (M)

Quantified on a scale from 0-10, where a score is assigned:

- 0 - small and will have no effect on the environment
- 2 - minor and will not result in an impact on processes
- 4 - low and will cause a slight impact on processes
- 6 - moderate and will result in processes continuing but in a modified way
- 8 - high (processes are altered to the extent that they temporarily cease)
- 10 - very high and results in complete destruction of patterns and permanent cessation of processes

8.1.6 SIGNIFICANCE (S)

Determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.

- The status, which is described as **positive, negative** or **neutral**.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is determined by combining the criteria in the following formula:

$$S = (E + D + M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are described in Table 8-1 below.

Table 8-1: Significance Weightings

POINTS	SIGNIFICANT WEIGHTING	DISCUSSION
< 30 Points	Low	This impact would not have a direct influence on the decision to develop in the area.
31 – 60 Points	Medium	The impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 Points	High	The impact must have an influence on the decision process to develop in the area.

8.2 IMPACTS IDENTIFIED

8.2.1 CONSTRUCTION

This section presents the quantitative impact assessment of the activities and perceived impacts assumed to occur within the construction phase of the proposed project.

8.2.1.1 Agriculture

There will be no impact on the following activities:

- Loss of high potential land
 - No high potential land was found on the site.
- Loss of agricultural production
 - There is no land cultivated on the property nor any livestock production.
- Loss of agricultural infrastructure
 - There are no fences or farming infrastructure.
- Loss of soil due to erosion
 - Soil loss because of the low rainfall is not expected.
 - Runoff from hard surfaces should be dealt with by a Stormwater Management Plan. This is an engineering function and is normally addressed as part of the project design.

Impact and mitigation during construction:

- Security during construction: Mend fences when they are breached in order to protect livestock.
- Make the contact details of the main contractors available to surrounding landowners and attend to any problems expeditiously.
- Hazardous substances should be safely disposed of or stored to minimise any impact on animals and water resources.

8.2.1.2 Heritage

Table 8-2: Interactions and Impacts of Construction Phase Activities

INTERACTION	IMPACT
Clearing of vegetation.	Direct negative impacts to isolated surface artefacts and the Klerefontein kraal and outhouse are possible.
Construction of proposed Infrastructure.	Additionally, the Project may indirectly impact all structures of the Klerefontein Werf and the significance of the Werf as a whole.

Table 8-3: Summary of the Potential Direct Impact to the Klerefontein Kraal

IMPACT DESCRIPTION: INDIRECT IMPACT TO HERITAGE RESOURCE OF MEDIUM SIGNIFICANCE				
DIMENSION	RATING	MOTIVATION		
PRE-MITIGATION				
Duration	Permanent (7)	Damage to or destruction of Klerefontein Kraal will be permanent and cannot be reversed.	Consequence: Slightly detrimental (-9)	Significance: Minor negative (-54)
Extent	Very limited (1)	This potential impact will affect this specific heritage resource.		
Intensity x type of impact	Moderately high - negative (-4)	Damage to or destruction of this heritage resource would be considered a major change to a heritage resource of low significance.		
Probability	Highly probable (6)	Given the proposed Project layout and infrastructure, this impact is very likely to occur.		
MITIGATION:				
<p>Digby Wells recommends that SARAO amend the proposed location and layout of the generator and diesel storage facility as the proposed configuration will block off access to this resource. SARAO is currently investigating additional options.</p> <p>Additionally, earthworks near the kraal must be avoided to prevent direct impact or the build-up of material against the stone walls. Digby Wells recommends SARAO implements a 30 m no-go buffer zone around this resource.</p> <p>Digby Wells assumes that the infrastructure redesign is feasible and preferred. The <i>in-situ</i> conservation of this this heritage resource is considered in the post-mitigation scenario.</p>				
POST-MITIGATION				
Duration	Beyond project life (6)	Should the CMP be implemented, the benefits will last beyond the Project lifetime.	Consequence: Moderately beneficial (11)	Significance: Minor positive (55)
Extent	Local (3)	The implementation of the CMP will affect most of the identified heritage resources.		
Intensity x type of impact	Low - positive (2)	The implementation of the CMP will be considered a minor change to a heritage resource of medium significance.		

IMPACT DESCRIPTION: INDIRECT IMPACT TO HERITAGE RESOURCE OF MEDIUM SIGNIFICANCE			
DIMENSION	RATING	MOTIVATION	
Probability	Likely (5)	Should the CMP be implemented, it is likely that the benefits will be realised.	

Table 8-4: Summary of the Potential Indirect Impact to the Klerefontein Werf

IMPACT DESCRIPTION: INDIRECT IMPACT TO HERITAGE RESOURCE OF MEDIUM SIGNIFICANCE			
DIMENSION	RATING	MOTIVATION	
PRE-MITIGATION			
Duration	Permanent (7)	The loss of the sense of place, historical setting and cultural significance will be permanent and cannot be reversed.	Consequence: Highly detrimental (-15) Significance: Moderate – negative (-75)
Extent	Municipal Area (4)	Given the significance of this structure, this impact will affect the broader cultural landscape.	
Intensity x type of impact	Moderately high - negative (-4)	The loss of the sense of place, historical setting and cultural significance would be considered a major change to a heritage resource of medium significance.	
Probability	Likely (5)	Given the proposed Project layout and infrastructure, this impact may occur.	

MITIGATION:

The landscaping, historical layering and the development of the site must remain legible following the establishment of the Project infrastructure. To achieve this, the historic structures and landscaping must retain their historic architectural language, materiality and identity. The new infrastructure must be contemporary in their architectural language to allow for easy identification as a new historic layer in the development of the Klerefontein property. New infrastructure must highlight the identified heritage buildings and be sympathetic to the existing context and cultural significance. All existing significant historical trees and landscaping must be protected during construction activities to ensure they are not damaged. Where trees are missing, Digby Wells recommends planting new ones.

Digby Wells recommends that SARAO investigate alternative locations for the proposed radio mast so that this infrastructure does not form part of the backdrop of the Klerefontein farmhouse. SARAO is investigating other options.

MayatHart has developed a Project-specific Conservation Management Plan (CMP) which must be implemented by SARAO. This is considered in the post-mitigation scenario.

POST-MITIGATION

IMPACT DESCRIPTION: INDIRECT IMPACT TO HERITAGE RESOURCE OF MEDIUM SIGNIFICANCE				
DIMENSION	RATING	MOTIVATION		
Duration	Beyond project life (6)	Should the CMP be implemented, the benefits will last beyond the Project lifetime.	Consequence: Moderately beneficial (11)	Significance: Minor - positive (55)
Extent	Local (3)	The implementation of the CMP will affect most of the identified heritage resources.		
Intensity x type of impact	Low - positive (2)	The implementation of the CMP will be considered a minor change to a heritage resource of medium significance.		
Probability	Likely (5)	Should the CMP be implemented, it is likely that the benefits will be realised.		

8.2.1.3 Terrestrial

Table 8-5: Loss of indigenous vegetation associated with the development during the construction phase

CRITERIA	DESCRIPTION	
IMPACT	Loss of indigenous vegetation	
NATURE	Even though the vegetation on the study site is considered to be severely degraded, the vegetation meets the definition of “indigenous vegetation” as per the NEMA EIA Regulations (2014), as amended.	
MITIGATION AND MANAGEMENT MEASURES	<p>The areas that will require the clearance of vegetation must be limited to as small a footprint within the construction site as possible.</p> <p>The footprint must be surveyed and clearly demarcated to ensure that the area to be cleared will be limited to the area required. No operations must be allowed outside of the demarcated areas.</p> <p>The areas that have been cleared of vegetation during the implementation of the project must be revegetated with grasses that occur naturally in the area.</p>	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	2 Short term (2- 5year)
MAGNITUDE	4 Low	6 Moderate
PROBABILITY	5 Definite	2 Improbable
SIGNIFICANCE	35 MEDIUM (-)	18 LOW (+)

Table 8-6: Spreading of AIPS during the construction phase

CRITERIA	DESCRIPTION
IMPACT	Spreading of alien invasive plant species.
NATURE	Alien invasive plant species are already present in the study area. As such, the clearance of areas for construction will result in bare areas into which these species can spread.
MITIGATION AND MANAGEMENT MEASURES	<p>The disturbance of the vegetative cover during the construction phase of the development will provide an opportunity for the establishment of alien invasive species on these areas.</p> <p>To prevent this from happening, an Alien Invasive Management Plan must be implemented for the duration of the construction phase of the development. This plan must make provision for the following:</p>

	<ul style="list-style-type: none"> • The construction footprint must be clearly survey and demarcated before any construction of the components of the development is to commence. • This must be done to ensure that areas to be cleared are limited to only the areas that are necessary. • The cleared areas must be regularly monitored for the establishment of alien plant species. These must be cleared when they appear. • Identification and eradication methodologies of any alien plant species that establish on the site. • The rehabilitation of these cleared areas must commence as soon as practically possible after construction activities have ceased. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	2 Short term (2- 5year)
MAGNITUDE	4 Low	6 Moderate
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	21 LOW (-)	7 LOW (-)

Table 8-7: Contamination of the area by petrochemical spillages associated with the development

CRITERIA	DESCRIPTION	
IMPACT	Contamination of the area by petrochemical spillages.	
NATURE	The presence of plant and equipment on the construction site that make use of petrochemical substances to operation pose a risk of contamination to the terrestrial biodiversity on the study site.	
MITIGATION AND MANAGEMENT MEASURES	<ul style="list-style-type: none"> • All plant and equipment that make use of petrochemical substances must be checked for leakages on a daily basis before operations commence. • All plants and equipment that are found to be leaking must be removed from the site and only returned once the leakages have been addressed. • If any petrochemical substances are stored on the site, this storage must be done on an impermeable surface in a bunded area that makes provision for 110% of volume of the substances that are stored. • All refueling of plant and equipment must be conducted over a drip-tray. • If any plant or equipment is to be parked on the site, these must be parked within the demarcated construction footprint that has been cleared. • If any spillages from plant or equipment occur, the spill must be contained immediately, the contaminated soils must be collected and bagged in impermeable bags and stored on site to be removed and disposed of by a registered service provider. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	2 Short term (2-5years)
MAGNITUDE	8 High	8 High
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	33 MEDIUM NEGATIVE (-)	11 LOW (-)

Table 8-8: Construction waste impacts associated with the development

CRITERIA	DESCRIPTION	
IMPACT	Contamination of the area by construction waste.	
NATURE	The construction activities will generate an amount of construction waste (wood off-cuts, waste concrete, waste cement, etc.) on the site.	
MITIGATION AND MANAGEMENT MEASURES	<ul style="list-style-type: none"> • Skips must be made available on-site into which all construction waste can be discarded. • All construction waste must be cleared from the site on a daily basis and placed in these skips. • The capacity of these skips must be monitored on a daily basis to ensure that a replacement skip can be arranged on the same day as the filled skips are removed. • The disposal of the content of these skips must be done at a municipal landfill site. • No dumping of construction waste on open areas on the property will be allowed. • The burying of construction waste on the development site will not be allowed. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	1 Immediate (>1year)
MAGNITUDE	8 High	8 High
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	33 MEDIUM NEGATIVE (-)	10 LOW (-)

Table 8-9: Domestic waste impacts associated with the development during construction phase

CRITERIA	DESCRIPTION	
IMPACT	Contamination of the area by domestic waste.	
NATURE	The presence of a labour force associated with the construction will generate an amount of domestic waste (food wrapping, plastic bottles, etc.) on the site.	
MITIGATION AND MANAGEMENT MEASURES	<ul style="list-style-type: none"> • A designated eating area must be established within the construction site. • Covered domestic waste bins must be present at the eating area to receive all the domestic waste generated by the labour. • The capacity of these domestic waste bins must be monitored on a daily basis to ensure that they are emptied timeously. • The domestic waste from these waste bins must be removed off site and disposed of at a municipal landfill site on a weekly basis or more regularly if the bins fill up quicker. • The burying and burning of domestic waste on site will not be allowed. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	1 Immediate (>1year)
MAGNITUDE	6 Moderate	6 Moderate
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	24 LOW NEGATIVE (-)	8 LOW (-)

Table 8-10: Leaking portable toilet facilities impacts associated with the development

CRITERIA	DESCRIPTION
IMPACT	Contamination of the area as a result of leaking portable toilet facilities.
NATURE	Portable toilet facilities will be present to service the labour associated with the construction. These toilets will pose a risk of leakages and spillages which may impact on the terrestrial biodiversity on the site.
MITIGATION AND MANAGEMENT MEASURES	<ul style="list-style-type: none"> • Only portable chemical toilets with a sealed reservoir will be allowed on site. • All portable chemical toilets must be located further than 30m away from the delineated edges of the buffers around the riparian and wetland edges. • The capacity of the reservoirs in the portable chemical toilets must be monitored on a daily basis to ensure that they can be serviced timeously. • All removal of the collected sewage waste from the portable chemical toilets must be conducted by a registered service

	provider for disposal at a municipal wastewater treatment facility. <ul style="list-style-type: none"> No onsite disposal of sewage will be allowed. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	2 Short term (2-5years)	1 Immediate (>1year)
MAGNITUDE	8 High	8 High
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	33 MEDIUM NEGATIVE (-)	11 LOW (-)

8.2.2 No-Go IMPACT

Table 8-11: No-go impacts associated with the development

CRITERIA	DESCRIPTION	
IMPACT	Vegetation	
NATURE	The current impacts on the terrestrial biodiversity as a result of the historic and current disturbances will persist	
MITIGATION AND MANAGEMENT MEASURES	None, as the no-go option reflects the <i>status quo</i> .	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	5 Permanent	5 Permanent
MAGNITUDE	0 Small	0 Small
PROBABILITY	5 Definite	5 Definite
SIGNIFICANCE	30 LOW NEUTRAL	30 LOW NEUTRAL

8.2.2.1 Visual

During the site visit, the following risks were identified that need mitigation:

- The existing use of overhead flood lighting for security that should not set a precedent for future security lighting as light spillage has the potential to significantly extend the project ZVI from point source light (Medium risk), and pool lighting (glow over the development site) that could detract from the existing dark sky sense of place.
- The areas around the structure and the large vehicle parking areas could detract from the views from the adjacent road.
- The prickly pear alien invasive species adjacent to the road.

8.2.3 OPERATIONAL

8.2.3.1 Agriculture

Impact and mitigation during operational phase

- Road reserves require normal maintenance. Mitigation is normally not required. However, alien vegetation should be controlled.
- Implement the Environmental Management Programme (EMPr) for the duration of the operations to eliminate potential impacts.

8.2.3.2 Heritage

Table 8-12: Interactions and Impacts of Operational Phase Activities

INTERACTION	IMPACT
Operation of proposed Infrastructure.	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Routine Maintenance Activities.	

8.2.3.3 Terrestrial

Table 8-13: Spreading of alien invasive vegetation during Operational Phase

CRITERIA	DESCRIPTION				
IMPACT	Spreading of alien invasive vegetation				
NATURE	Due to the presence of the alien invasive <i>Opuntia robusta</i> (Blue-leave Prickly Pear) "orchard" on the site, this and other alien invasive species can proliferate into any disturbed as a result of construction activities.				
MITIGATION AND MANAGEMENT MEASURES	<p>Provision must be made for the compilation and implementation of an Alien Invasive Management Plan for the operational phase of the development. This plan must make provision for the following:</p> <ul style="list-style-type: none"> • Regular monitoring of the areas surrounding the construction facilities for the presence of any alien invasive plant species. • If these species are found near the facilities, these must be eradicated in accordance with the methodologies included in the management plan. • The plan must also make provision for the disposal of the removed alien species at a municipal landfill site. • No burning of this plant material will be allowed on site. 				
	<table border="1"> <thead> <tr> <th>Pre-Mitigation</th> <th>Post-Mitigation</th> </tr> </thead> <tbody> <tr> <td>EXTENT</td> <td>1 Site area</td> </tr> </tbody> </table>	Pre-Mitigation	Post-Mitigation	EXTENT	1 Site area
Pre-Mitigation	Post-Mitigation				
EXTENT	1 Site area				

DURATION	3 Medium term (6-15years)	1 Immediate (>1 year)
MAGNITUDE	6 Moderate	2 Minor
PROBABILITY	4 High probable	1 Very Improbable
SIGNIFICANCE	40 MEDIUM (-)	4 LOW (-)

Table 8-14: Contamination by domestic waste impact during the operational phase

CRITERIA	DESCRIPTION	
IMPACT	Contamination by domestic waste generated by the operations.	
NATURE	Domestic waste will be generated by the development.	
MITIGATION AND MANAGEMENT MEASURES	<ul style="list-style-type: none"> The facility must be serviced by covered domestic waste bins for use by the employees at the facility. The capacity of these domestic waste bins must be monitored on a daily basis to ensure that they are emptied timeously. The domestic waste from these waste bins must be removed off site and disposed of at a municipal landfill site on a weekly basis or more regularly if the bins fill up quicker. The burying and burning of domestic waste on site will not be allowed. 	
	Pre-Mitigation	Post-Mitigation
EXTENT	1 Site area	1 Site area
DURATION	5 Permanent	5 Permanent
MAGNITUDE	4 Low	4 Low
PROBABILITY	3 Probable	1 Very Improbable
SIGNIFICANCE	30 MEDIUM (-)	4 LOW (-)

8.2.4 DECOMMISSIONING PHASE

8.2.4.1 Heritage

Table 8-15: Interactions and Impacts of Decommissioning Phase Activities

INTERACTION	IMPACT
Demolition and removal of all infrastructure (incl. transportation off site)	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the location of identified heritage resources in relation to the proposed Project infrastructure.
Rehabilitation (spreading of soil, re-vegetation, and profiling/contouring)	Should any infrastructure intended for demolition increase in age to older than 60 years during the Project lifecycle, the structure must be considered a heritage structure. Any alterations to these structures will be subject to a NHRA Section 34 permit application process

8.3 CUMULATIVE IMPACTS

8.3.1 HERITAGE

This Project in conjunction with other planned developments in line with the strategic development plans for the Northern Cape Province requires consideration to identify the possible in-combination effects of various impacts to known heritage resources.

Table 8-16: Summary of Potential Cumulative Impacts

TYPE	CUMULATIVE IMPACT	DIRECTION OF IMPACT	EXTENT OF IMPACT
Space-crowding	The proposed infrastructure will add to the existing infrastructure associated with activities characterising the area immediately surrounding the proposed Project area and further afield. This installation of this infrastructure will result in a loss of the area within which heritage resources can exist. The proposed Project encroaches onto a werf with historical and cultural significance.	Neutral	Site-specific study area

8.3.2 TERRESTRIAL

Table 8-17: Cumulative impacts associated with the development

NATURE OF IMPACT	IMPACT DESCRIPTION	IMPACT RATING POST MITIGATION
Loss of indigenous vegetation	<p>The vegetation on the proposed development site has undergone significant modifications due to historic and current physical disturbances. However, the vegetation on the development footprint does meet the definition of “indigenous vegetation” in accordance with the National Environmental Management Act (Act No. 107 of 1998): Environmental Impact Assessment Regulations (2014), as amended, the ecological value and importance of this vegetation is very low.</p> <p>As a result of the low ecological value of the current vegetation on the site and the limited impact of the development on this vegetation, the cumulative impact of the loss of indigenous vegetation is considered low.</p>	Low negative
Spread of alien invasive plant species.	<p>Due to the existing presence of alien invasive species within the larger study area, the risk of the spreading of alien invasive species exist.</p> <p>The implementation of an Alien Invasive Management Plan for the operational phase of the development will ensure that the cumulative impact of the spread of alien species will be low.</p>	Low Negative

9 CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSIONS

Based on the outcomes of various assessments that were conducted for the proposed development, it was noted that the construction of the new EOC Building and supporting telecommunications mast, HIRAX prototype and RFI Chamber will not have a significant negative impact on the surrounding environmental features. All identified impacts can be mitigated by the measures outlined in this report as well as the site specific EMP. The implementation of this project is important for the improvement of SARAO SKA Support Base at the Klerefontein farm and to meet future demands of the support base.

9.2 SPECIALIST RECOMMENDATIONS

9.2.1 AGRICULTURE

- The land on which the development is proposed is low potential farming land therefore it is recommended that construction be approved.

9.2.2 AQUATIC

- It is recommended that a biomonitoring event is scheduled for the Die Leegte River at points upstream and downstream of the Klerefontein Support Base. This biomonitoring event must take place during the wet season and must be conducted annually during the construction and operational phase until such time that the results show a stable trend.
- It is recommended that the diversion associated with the watercourse be incorporated in the stormwater management of the site.

9.2.3 HERITAGE

Based on the HIA findings the specialist recommends the following to be implemented prior to commencement of the proposed project.

- SARAO must re-evaluate the location of the proposed radio mast (behind the Klerefontein farmhouse) and the generator and diesel storage facility, which would block access to the Klerefontein Kraal. The potential redesign should consider the inclusion of a 30 m buffer zone around this heritage resource to avoid material building up on these walls.
- SARAO must avoid potential direct impacts to the heritage structures during construction by:
 - Erecting hoarding around the site during construction activities to protect neighbouring heritage structures. This hoarding must be erected 5 m away from the structure to create a construction buffer zone.

- Ensuring access, parking, and holding facilities for large construction vehicles is designed to avoid potential direct impacts to the heritage structures.
- Where intrusive methods such as deep-level compacting or piling are necessary for construction, a responsible person must monitor the heritage structures to ensure they are not damaged.
- Where items of significance are retained from the original buildings, these must be protected during construction.
- A responsible person must monitor and photograph the heritage structures regularly during the construction phase of the project to ensure that these structures are not damaged.
- The landscaping, historical layering and the development of the site must remain legible following the establishment of the project infrastructure. To achieve this, SARAO must implement the following:
 - The historic structures and landscaping must retain their historic architectural language, materiality and identify.
 - The new infrastructure must be contemporary in their architectural language to allow for easy identification as a new historic layer in the development of the Klerefontein property.
 - New infrastructure must highlight the identified heritage buildings and be sympathetic to the existing context and cultural significance.
 - All existing significant historical trees and landscaping must be protected during construction activities to ensure they are not damaged. Where trees are missing, Digby Wells recommends planting new ones.
- The existing Chance Finds Procedure (CFP) for the SKA Project must be applied to the project and implemented during the project lifecycle.
- SARAO must implement the project-specific Conservation Management Plan (CMP) and the recommendations included therein.

9.2.4 TERRESTRIAL

- There are no fatal flaws in terms of the terrestrial biodiversity associated with the implementation of SARAO Klerefontein Support Base project and therefore authorisation should be granted.

9.2.5 VISUAL

The following mitigation measures are recommended for visual and landscape for the proposed construction of the EOC Building:

Table 9-1: Visual mitigation measures

LANDSCAPE ISSUES	MITIGATION	DESCRIPTION
Dark rural night sky	Lights at night mitigation with no overhead flood lights	To ensure that a negative precedent is not set for development in deep rural

		<p>areas where there is a strongly experience dark night sky, light spillage mitigations should be implemented such that light for security and operations at night are localised without compromising security or operational integrity. No overhead flood lighting should be used. Refer to Annexure C for generic best light at night practice</p>
<p>Adjacent road visual intrusion and rural landscape character</p>	<p>Tree planting along the edge of the large vehicle parking area</p>	<p>To reduce visual intrusion as seen from the adjacent road that has potential to be a future tourism route, soften the visual intrusion of the store houses and vehicle parking areas with the planting of 'windrow' trees. These can be poplar as these trees have been incorporated in the local landscape context and would add to not detract from the cultural landscape significance.</p> <ul style="list-style-type: none"> • A two-management plan would need to be set in place to ensure that the trees grow to suitable size. • The mitigation trees would need to be managed under the same landscape management planning for the vehicle parking trees and general landscaping around the structure. • The trees to the east of the large vehicle parking area need to be planted on the same height as the parking (not on top of the cut bank), so that they are initially

		protected from the elements and can be easily watered.
	Removal of the prickly pear vegetation	The prickly pear adjacent to the road that forms the foreground view as seen from the adjacent road should be removed and rehabilitated to nature Nama-Karoo vegetation.
Landscape enhancement	Tourist information area	While not a specific requirement, to better align with the local and regional planning for the greater SKA to be a tourist destination, a tourist information area at the gate would add value to the 'science' as well as provide a low-cost explanation/ information point of the SKA 'cosmic karoo' landscape tourism. A full Astro – Exploratorium is proposed to be built in the town of Carnarvon to address this as part of the SKA project.

9.3 ENVIRONMENTAL IMPACT STATEMENT

Based on all the findings from the specialist studies, it is the EAP's opinion that the proposed construction of the EOC Building and supporting telecommunications mast, HIRAX prototype and RFI Chamber should be granted Environmental Authorisation for the period of 10 years. All proposed mitigation measures for the project (including the relocation of specifically identified components) should be implemented and monitored accordingly by an independent ECO. The impacts of the proposed development were assessed, and it was stated by the specialists that the proposed project poses Low impact on the environment.

It is the EAP's opinion that the proposed project should be granted Environmental Authorisation as there is no fatal flaws.

10 REFERENCES

- Department of Sports, Art and Culture. (2021). *NATIONAL HERITAGE RESOURCES ACT, NO 25 OF 1999*. Cape Town : Government Gazette.
- Department of Environmental Affairs . (2022, 12 10). *screening. environment* . Retrieved from [screening.environment.gov.za:](https://screening.environment.gov.za/)
<https://screening.environment.gov.za/ScreeningToolHelp/index.html?f=intro>
- Department of Environmental Affairs. (2004). *National Environmental Management: Biodiversity Act, (No. 10, 2004)*. Cape Town: Government Gazette.
- Department of Environmental Affairs. (2014). *National Environmental Management Act, 1998 (ACT NO. 107 OF 1998)*. Pretoria : Government Gazette.
- Department of Statistics South Africa. (2022, 11 21). *Stats SA*. Retrieved from [statssa:](https://www.statssa.gov.za/?page_id=993&id=newcastle-municipality)
https://www.statssa.gov.za/?page_id=993&id=newcastle-municipality
- Department of Water Affairs. (1998). *National Water Act (Act No. 36, 1998)*. Cape Town : Government Gazette.
- Digby Wells Environmental . (2023). *Heritage Resources Management Process for the Proposed Upgrades of the Klerefontein Engineering Operations Centre at the Karoo Support Base near Carnarvon, Northern Cape*. Cape Town : NFR.
- Dr Andries Gouws Index. (2023). *ENVIRONMENTAL AUTHORISATION FOR THE DEVELOPMENT AT THE EXPANSION OF THE KLEREFONTEIN SUPPORT BASE IN THE NORTHERN CAPE*. Cape Town : Index (Pty) Ltd .
- GCS . (2023). *AQUATIC BIODIVERSITY COMPLIANCE STATEMENT ASSOCIATED WITH THE SARAO KLEREFONTEIN SUPPORT BASE IN THE NORTHERN CAPE*. Durban : GCS .
- GCS Water and Environmental . (2023). *SITE SENSITIVITY VERIFICATION AND TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT REPORT ASSOCIATED WITH THE SARAO KLEREFONTEIN SUPPORT BASE IN THE NORTHERN CAPE*. Durban : GCS .
- SKA Observatory. (2022). *SKA1 MID ENGINEERING OPERATIONS CENTRE BUILDING (EOC)*. Cape Town : NFR.
- South African Weather Service. (2022, 10 12). *South African Weather Service*. Retrieved from [weathersa:](https://www.weathersa.co.za/) <https://www.weathersa.co.za/>

APPENDIX A: LOCALITY MAP

APPENDIX B: SDP

APPENDIX C: PHOTOGRAPHS

APPENDIX D: BIODIVERSITY OVERLAY MAP

APPENDIX E: OTHER PERMITS AND LICENCES

APPENDIX F: PUBLIC PARTICIPATION

APPENDIX F1: I&AP REGISTER

APPENDIX F2: COMMENTS AND RESPONDS REPORT

APPENDIX F3: PROOF OF PUBLIC PARTICIPATION

APPENDIX F4: NEWSPAPER ADVERT

APPENDIX G: SPECIALIST REPORTS

APPENDIX G1: AQUATIC

APPENDIX G2: HIA

APPENDIX G3: TERRESTRIAL

APPENDIX G4: AGRICULTURAL

APPENDIX G5: VISUAL IMPACT

APPENDIX G6: HYDROLOGY

APPENDIX H: EMPR

APPENDIX I: ADDITIONAL INFORMATION

APPENDIX I1: DFFE SCREENING REPORT

APPENDIX I2: CV OF THE EAP

APPENDIX J: MEETING MINUTES

APPENDIX K: NEED AND DESIRABILITY