

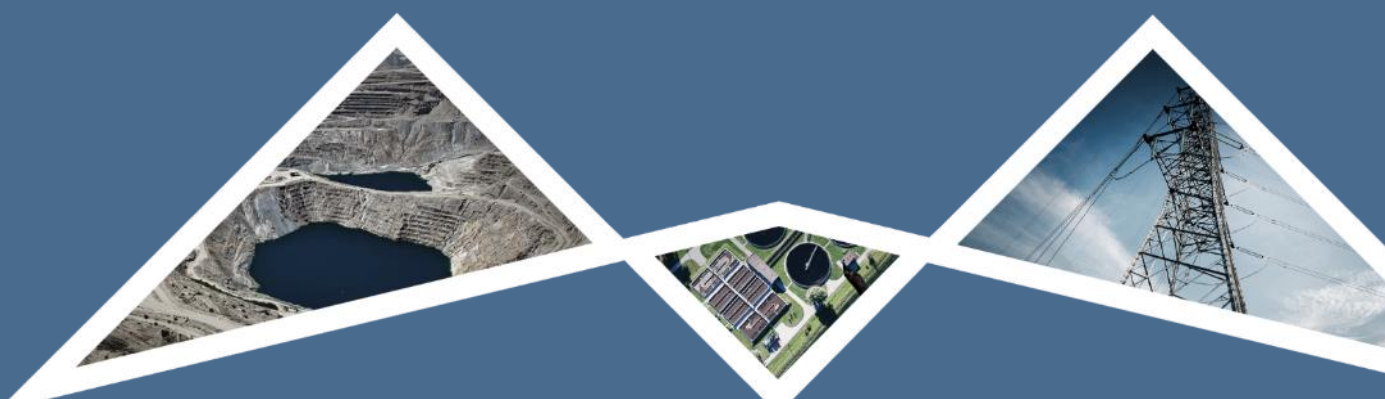


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T 011 789 7170 E info@eims.co.za W www.eims.co.za

## BASIC ASSESSMENT REPORT

BLACK MOUNTAIN MINING – KOA SOUTH PROSPECTING RIGHT  
PROJECT





#### DOCUMENT DETAILS

**EIMS REFERENCE:** 1304-7

**DOCUMENT TITLE:** Basic Assessment Report: Black Mountain Mining Koa South Prospecting Right Project

#### DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
<b>COMPILED:</b>	Sikhumbuzo Mahlangu		2020/04/16
<b>CHECKED:</b>	GP Kriel		2020/05/01
<b>AUTHORIZED:</b>	Liam Whitlow		2020/05/01

#### REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
<b>2020/05/01</b>	ORIGINAL DOCUMENT	Basic Assessment Report and Environmental Management Programme



## **BASIC ASSESSMENT REPORT**

**and**

## **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

**PREPARED BY:**



**NAME OF APPLICANT: Black Mountain Mining (Pty) Ltd**

**TEL NO: +27 54 983 9287**

**FAX NO: +27 54 983 9247**

**EMAIL: AJohnson@vedantaresources.co.za**

**POSTAL ADDRESS: Private Bag X01, Aggeneys, 8893**

**PHYSICAL ADDRESS: 1 Penge Road, Aggeneys, 8893, South Africa**

**FILE REFERENCE NUMBER SAMRAD: NC30/5/1/1/2/12541PR**



## IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of Section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of Section 17(1)(c) the Competent Authority must check whether the application has taken into account any minimum requirements applicable to instructions or guidance provided by the Competent Authority to the submission of applications.

**It is therefore the instruction that** the prescribed reports required in respect of application for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

**It is furthermore an instruction that** the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information requested herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the report, in order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

## OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process-

- a) Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- b) Identify the alternatives considered, including the activity, location, and technology alternatives;
- c) Describe the need and desirability of the proposed alternatives;
- d) Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and the technology alternatives on these aspects to determine:
  - i. The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - ii. The degree to which these impacts-
    - aa) Can be reversed;
    - bb) May cause irreplaceable loss of resources; and
    - cc) Can be managed, avoided or mitigated;
- e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to –
  - i. Identify and motivate a preferred site, activity and technology alternative;
  - ii. Identify suitable measures to manage, avoid or mitigate identified impacts; and
  - iii. Identify residual risks that need to be managed and monitored.



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## ABBREVIATIONS

AMSL : Above Mean Sea Level



BAR	: Basic Assessment Report
BID	: Background Information Document
BGL	: Below Ground Level
DMR	: Department of Mineral Resources <sup>1</sup>
DWS	: Department of Water and Sanitation <sup>2</sup>
EA	: Environmental Authorisation
EAP	: Environmental Assessment Practitioner
EIA	: Environmental Impact Assessment
EIMS	: Environmental Impact Management Services
EMPR	: Environmental Management Programme
GIS	: Geographic Information System
I&AP	: Interest and Affected Party
MPRDA	: Mineral and Petroleum Resources Development Act
NEMA	: National Environmental Management Act
NEMWA	: National Environmental Management Waste Act
NWA	: National Water Act
PPP	: Public Participation Process
MRA	: Mining Right Application
MWP	: Mining Works Programme
SAMRAD	: South African Mineral Resources Administration System
SKA	: Square Kilometre Array

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<sup>1</sup> This Ministry was recently renamed as Department of Mineral Resources and Energy (DMRE). All reference in this report to DMR should be read synonymously with DMRE.

<sup>2</sup> This Ministry was recently renamed as Department of Human Settlements Water and Sanitation (DHSWS). All reference in this report to DWS should be read synonymously with DHSWS.



# **PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT**

## **1 INTRODUCTION**

Black Mountain Mining (Pty) Ltd (the Applicant) has submitted an application for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) and an Application for Environmental Authorisation in terms of Chapter 4 of GNR 982 promulgated under the National Environmental Management Act (Act 107 of 1998) (NEMA) to prospect for ferrous & base metals (Copper Ore, Iron Ore, Zinc Ore, Lead Ore, Manganese Ore, Nickel and Molybdenum) and all associated metals and minerals, precious metals (Gold Ore, Silver Ore) and all associated metals and minerals.

The proposed project that will aim to ascertain if economically viable mineral deposits exist within the application area. In order to undertake prospecting activities, Black Mountain Mining will require a Prospecting Right in terms of the Mineral and Petroleum Resources Development Act (MPRDA, Act No.28 of 2002). The Applicant is also required to obtain an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998) which involves the submission of a Basic Assessment Report (BAR). Environmental Impact Management Services (Pty) Ltd (EIMS) have been appointed by Black Mountain Mining to compile the BAR (this report) in support of the Prospecting Right application submitted by EIMS on behalf of Black Mountain Mining, which in turn will be submitted to the DMR for adjudication.

This BAR has been designed to meet the requirements for a BAR and Environmental Management Programme (EMPR) as stipulated in the 2014 EIA Regulations promulgated under the NEMA. The adjudicating authority for this Application will be the Department of Mineral Resources (DMR), and this report has been compiled in accordance with the applicable DMR guidelines and reporting template.

Koa South covers an area of 9234 hectares. The area is located approximately 77.3 kilometres South West of Prieska and 166 km North-West of De Aar, Pixley Ka Seme District in the Northern Cape Province.

A Prospecting Work Programme (PWP) has been developed by the applicant to include both non-invasive and invasive prospecting activities. The target geological formation of the PWP is the Areachap Group.

The Prospecting Right Application and Application for Environmental Authorisation was submitted to the DMR via the South African Mineral Resources Administration (SAMRAD) on 27 January 2020. The DMR accepted the Application for Environmental Authorisation on 21 February 2020 and the Prospecting Right Application on 17 July 2020. The DMR has granted an extension of the timeframes for submission of the final BAR to be within 90 days from the receipt of the Prospecting Right Application in terms of Regulation 3(7) of the EIA Regulations, 2014, as amended. It should further be noted that the EIA timeframes were also extended by the national lockdown period instituted in terms of the Disaster Management Act (Act No. 57 of 2002).

The BAR (this report) will be made available to Interested and Affected Parties (I&AP's) for comment from 28 July 2020. All comments received during this period will be included in the BAR submitted to the DMR for adjudication.



## 1.1 REPORT STRUCTURE

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

Environmental Regulation	Description	Section in Report
<b>NEMA EIA Regulations, 2014</b>		
<b>Appendix 1(3)(a):</b>	Details of – <ul style="list-style-type: none"> <li>(i) The EAP who prepared the report; and</li> <li>(ii) The expertise of the EAP, including a curriculum vitae;</li> </ul>	Section 1.2 Section 1.3
<b>Appendix 1(3)(b):</b>	The location of the activity, including: <ul style="list-style-type: none"> <li>(i) The 21 digit Surveyor General code of each cadastral land parcel;</li> <li>(ii) Where available, the physical address and farm name; and</li> <li>(iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</li> </ul>	Section 1.4
<b>Appendix 1(3)(c):</b>	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is – <ul style="list-style-type: none"> <li>(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;</li> <li>(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;</li> </ul>	Section 1.4, 1.5
<b>Appendix 1(3)(d):</b>	A description of the scope of the proposed activity, including – <ul style="list-style-type: none"> <li>(i) All listed and specified activities triggered and being applied for; and</li> <li>(ii) A description of the activities to be undertaken including associated structures and infrastructure;</li> </ul>	Section 2



Environmental Regulation	Description	Section in Report
<b>Appendix 1(3)(e):</b>	A description of the policy and legislative context within which the development is proposed including – <ul style="list-style-type: none"> <li>(i) An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and</li> <li>(ii) How the proposed activity complies with and responds to the legislation and policy context plans, guidelines, tools frameworks, and instruments;</li> </ul>	Section 3
<b>Appendix 1(3)(f):</b>	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
<b>Appendix 1(3)(g):</b>	A motivation for the preferred site, activity and technology alternative;	Section 5
<b>Appendix 1(3)(h):</b>	A full description of the process followed to reach the proposed alternative within the site, including: <ul style="list-style-type: none"> <li>(i) Details of all the alternatives considered;</li> <li>(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</li> <li>(iii) 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;</li> <li>(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage, and cultural aspects;</li> <li>(v) 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 these impacts –               <ul style="list-style-type: none"> <li>(aa) Can be reversed;</li> <li>(bb) May cause irreplaceable loss of resources; and</li> <li>(cc) Can be avoided, managed or mitigated;</li> </ul> </li> </ul>	Section 6 Section 6.1 Section 6.2 Section 6.3 Section 6.4 Section 6.5 Section 6.6 Section 6.7 Section 6.8



Environmental Regulation	Description	Section in Report
	<ul style="list-style-type: none"> <li>(vi) 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;</li> <li>(vii) 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 geographical, physical, biological social, economic, heritage and cultural aspects;</li> <li>(viii) The possible mitigation measures that could be applied and level of residual risk;</li> <li>(ix) The outcome of the site selection matrix;</li> <li>(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</li> <li>(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity;</li> </ul>	
<p><b>Appendix 1(3)(i):</b></p>	<p>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 –</p> <ul style="list-style-type: none"> <li>(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and</li> <li>(ii) 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;</li> </ul>	<p>Section 6.5</p> <p>Section 6.6</p> <p>Section 6.7</p> <p>Section 6.8</p> <p>Section 7</p>
<p><b>Appendix 1(3)(j):</b></p>	<p>An assessment of each identified potentially significant impact and risk, including –</p> <ul style="list-style-type: none"> <li>(i) Cumulative impacts;</li> <li>(ii) The nature, significance and consequence of the impact and risk;</li> <li>(iii) The extent and duration of the impact and risk;</li> <li>(iv) The probability of the impact and risk occurring;</li> <li>(v) The degree to which the impact and risk can be reversed;</li> <li>(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</li> </ul>	<p>Section 8</p>



Environmental Regulation	Description	Section in Report
	(vii) The degree to which the impact and risk can be mitigated;	
<b>Appendix 1(3)(k):</b>	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 9
<b>Appendix 1(3)(l):</b>	An environmental impact statement which contains – (i) A summary of the key findings of the environmental impact assessment; (ii) 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 (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 10
<b>Appendix 1(3)(m):</b>	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR;	Section 11
<b>Appendix 1(3)(n):</b>	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;	Section 12
<b>Appendix 1(3)(o):</b>	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
<b>Appendix 1(3)(p):</b>	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 14
<b>Appendix 1(3)(q):</b>	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 15



Environmental Regulation	Description	Section in Report
<b>Appendix 1(3)(r):</b>	An undertaking under oath or affirmation by the EAP in relation to: <ul style="list-style-type: none"> <li>(i) The correctness of the information provided in the reports;</li> <li>(ii) The inclusion of comments and inputs from stakeholders and I&amp;Ps;</li> <li>(iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and</li> <li>(iv) 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;</li> </ul>	Section 27
<b>Appendix 1(3)(s):</b>	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 17
<b>Appendix 1(3)(t):</b>	Any specific information that may be required by the competent authority; and	Section 18
<b>Appendix 1(3)(u):</b>	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Section 19
<b>Appendix 4(1)(1)(a):</b>	Details of – <ul style="list-style-type: none"> <li>(i) The EAP who prepared the EMPR; and</li> <li>(ii) The expertise of that EAP to prepare an EMPR, including a curriculum vitae;</li> </ul>	Section 1
<b>Appendix 4(1)(1)(b):</b>	A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description;	Section 2
<b>Appendix 4(1)(1)(c):</b>	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 1.5 Section 10.2
<b>Appendix 4(1)(1)(d):</b>	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – <ul style="list-style-type: none"> <li>(i) Planning and design;</li> </ul>	Section 7 Section 8 Section 11





Environmental Regulation	Description	Section in Report
	<ul style="list-style-type: none"> <li>(ii) Pre-construction activities;</li> <li>(iii) Construction activities;</li> <li>(iv) Rehabilitation of the environment after construction and where applicable post closure; and</li> <li>(v) Where relevant, operation activities;</li> </ul>	
<b>Appendix 4(1)(1)(f):</b>	<p>A description of proposed impact management actions, identifying the manner in which the impact management contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to –</p> <ul style="list-style-type: none"> <li>(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>(ii) Comply with any prescribed environmental management standards or practices;</li> <li>(iii) Comply with any applicable provisions of the ac regarding closure, where applicable; and</li> <li>(iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</li> </ul>	Section 11, 21
<b>Appendix 4(1)(1)(g):</b>	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
<b>Appendix 4(1)(1)(h):</b>	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
<b>Appendix 4(1)(1)(i):</b>	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 23
<b>Appendix 4(1)(1)(j):</b>	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 21.5
<b>Appendix 4(1)(1)(k):</b>	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 23



Environmental Regulation	Description	Section in Report
<b>Appendix 4(1)(1)(l):</b>	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 23
<b>Appendix 4(1)(1)(m):</b>	An environmental awareness plan describing the manner in which – <ul style="list-style-type: none"><li>(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and</li><li>(ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and</li></ul>	Section 25
<b>Appendix 4(1)(1)(n):</b>	Any specific information that may be required by the competent authority.	Section 18



## 1.2 DETAILS OF THE EAP

EIMS was appointed by the Applicant as the Environmental Assessment Practitioner (EAP) to compile this report. The contact details of the EIMS consultant who compiled the report are as follows:

Table 2: EAP Details

Name of Practitioner	Mr Sikhumbuzo Mahlangu
Tel No.:	011 789 7170
Fax No.:	086 571 9047
E-mail:	sk@eims.co.za

## 1.3 EXPERTISE OF THE EAP

### 1.3.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations, 2014, an independent Environmental Assessment Practitioner (EAP), must be appointed by the applicant to manage the application. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- 1) Objective and independent;
- 2) Has expertise in conducting EIA's;
- 3) Comply with the NEMA, the Regulations and all other applicable legislation;
- 4) Takes into account all relevant factors relating to the application; and
- 5) Provides full disclosure to the applicant and the relevant environmental authority.

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the BAR process and the compilation of this report are attached as Appendix A.

### 1.3.2 SUMMARY OF EAP'S PAST EXPERIENCE

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 25 years' experience in conducting EIAs, including many EIA's for mines and mining related projects.

Mr. Mahlangu is a Registered Professional Natural Scientist (Reg. no 400429/13) with the South African Council for Natural and Scientific Professions (SACNASP) and holds a BSc. Master's degree in Zoology (Aquatic Health) from the University of Johannesburg. He is an aquatic and research scientist with 3 years' experience, and almost 10 years' experience as an environmental scientist. He has also completed an advanced course on Tools for Wetland Assessment. His expertise lies mainly in environmental management, auditing, monitoring, surface and ground water quality assessments, biomonitoring, wetland assessments and reporting. Mr. Mahlangu has played a vital role in providing advice on general environmental management issues on site to projects such as Transnet New Multi Product Pipeline (NMPP) and the Eskom Kusile Power Station Construction Project among others. He has also been involved on numerous projects in the energy, mining and infrastructure development sectors. He has also played a role in assisting and advising various contractors and clients on the practical implementation of Water Use Licences, Environmental Management Plans and conditions of Environmental Authorisations.

## 1.4 LOCATION OF THE OVERALL ACTIVITY

The table below provides details on the properties that fall within the Prospecting Right/ Environmental Authorisation Application Area.



Table 3: Locality Details

<b>Farm Name (s)</b>	Please refer to Table 4 below.
<b>Application Area (Ha)</b>	The area is approximately 9234 ha (Nine Thousand Two Hundred and Thirty-Four hectares)
<b>Magisterial District</b>	Prieska
<b>Distance and direction from nearest town</b>	The area is located approximately 77 km South-West of Prieska and 166 km North-West of De Aar, Pixley Ka Seme District in the Northern Cape Province.
<b>21 digit Surveyor General Code for each Portion</b>	Please refer to Table 4 below.



Table 4: Properties within the Application Area

Nr.	Registered Land Description	Magisterial District	Extent (Ha)	Title Deed/Diagram Deed	SG Code
1	Farm Kalkfontein A 131 Portion 1	PRIESKA RD	3077.1598	T22269/1964	C06000000000013100001
2	Farm Kalkfontein A 131 Portion 2	PRIESKA RD	3104.5824	T79240/2008CTN	C06000000000013100002
3	Farm Roode Draai 134 Portion 3	PRIESKA RD	1288.4974	T15836/1988	C06000000000013400003
4	Farm Roode Draai 134 Portion 4	PRIESKA RD	1763.9044	T25926/1985	C06000000000013400004
	<b>TOTAL AREA (HA)</b>		<b>9234.1442</b>		

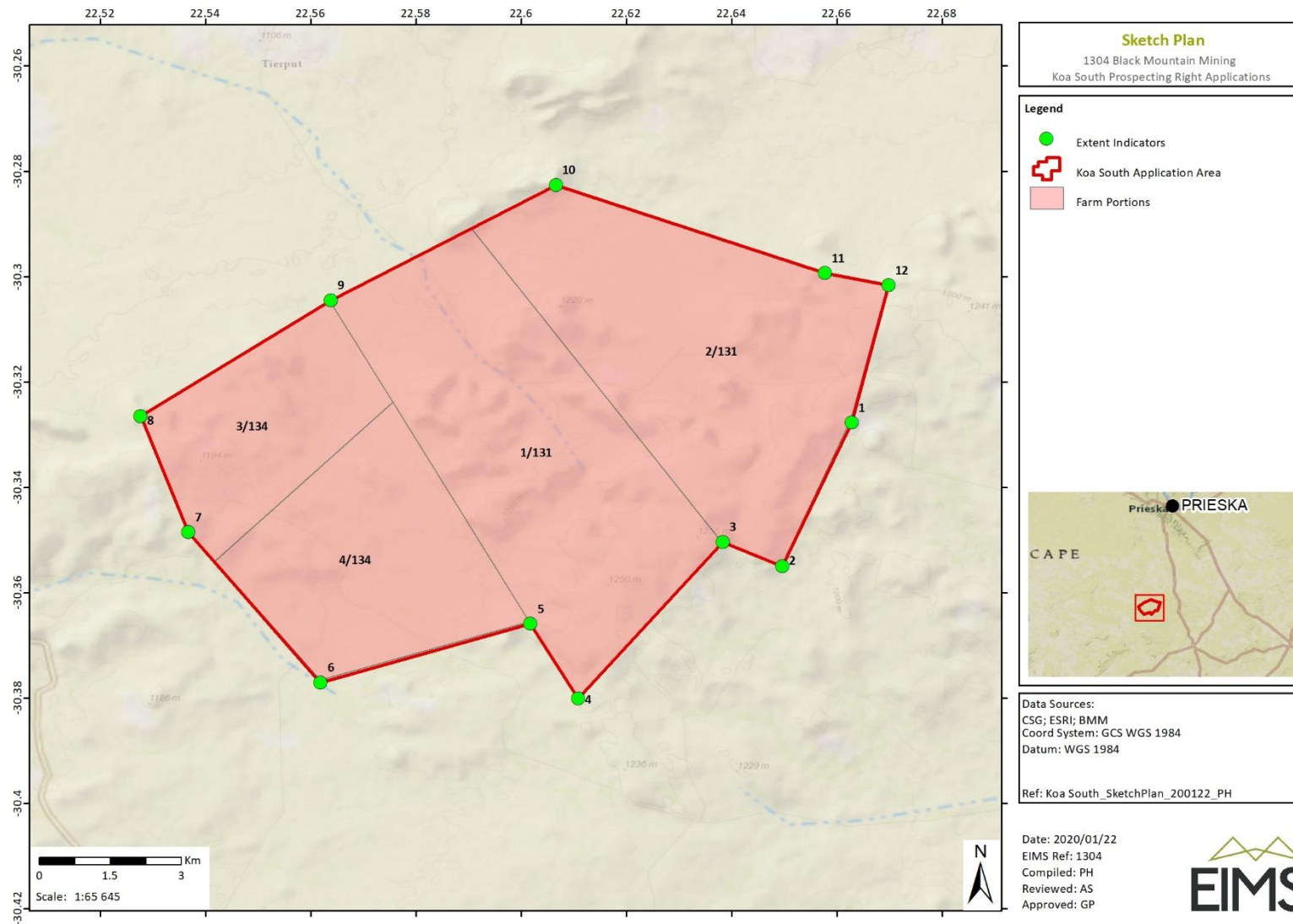
The prospecting right/EA application boundary is described by the following coordinates.

Table 5: Application Area Boundary Coordinates

Point ID	Y Coordinate	X Coordinate
1	-30.327715	22.662804
2	-30.355	22.649613
3	-30.350368	22.638305
4	-30.380119	22.610828
5	-30.365907	22.601785
6	-30.377085	22.56188
7	-30.348545	22.536765
8	-30.326499	22.527615
9	-30.304491	22.563809
10	-30.282583	22.606591
11	-30.299325	22.657703
12	-30.301653	22.669847



## 1.5 LOCALITY MAP





## 2 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

Both non-invasive and invasive prospecting activities will be undertaken as part of the proposed Prospecting Work Programme (PWP). The application will follow a phased approach, where the prospecting work program is divided into several sequential phases.

Figure 1 above depicts the proposed prospecting area, the proposed areas of interest within the application area will be defined within the course of prospecting activities. It is anticipated that the invasive program will consist of 10 boreholes with a footprint of approximately 300 m<sup>2</sup> each. Vegetation will be cleared at the borehole locations within the application area. Minor access tracks will be created to access the proposed borehole sites where there are no existing roads. The total length of the access routes is anticipated to be 5 000 m and the approximate width is 3 m.

At the end of each phase there will be a brief period of compiling and evaluating results. The results will not only determine whether prospecting proceeds, but also the manner in which it will go forward. The applicant will only action the next phase of prospecting, once satisfied with the results obtained in the previous phases. In addition, smaller, non-core parts of the prospecting work program will be undertaken, if warranted. A description of the planned invasive and non-invasive activities is detailed below.

### 2.1 DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

These activities do not disturb the land where prospecting will take place e.g. aerial photography, desktop studies, aeromagnetic surveys, etc.

#### Phase 1: Desktop study

- Compilation of historical prospecting data;
- Analysis of existing data and maps to further understand prospecting area structure & geology; and
- Initial targeting and ranking of prospective areas

#### Phase 2: Regional Airborne Geophysical Survey

- Airborne Gravity survey at 1 km flight line spacing;
- Airborne Magnetics and Radiometrics at 100 m flight line spacing; and
- Airborne EM at 200m flight line spacing.

#### Phase 3: Semi-Regional Geophysical Survey (ground based)

The field mapping will be focused on potentially prospective areas (Areachap Group rocks) to improve understanding of the structure & geology in order to define targets for ground-based geophysics as well as to be able to interpret geophysical results. Geological mapping will be on a scale suitable for the observed geological variability and will be conducted by an in-house well-trained and highly experienced geologist. During the geological field mapping activity soil and litho-sampling along with analysis (XRF & or assaying) may be conducted to determine prospective horizons.

The primary ground-based geophysical technique that will be employed will be time-domain electromagnetics (TDEM) utilizing a new state-of-the-art SQUID electromagnetic sensor. Existing airborne EM and aeromagnetic coverage will guide the ground follow-up strategy. Additional techniques, such as controlled source audio magnetotellurics (CSAMT) and direct current resistivity / induced polarization, might be employed over prospective targets. Please refer to Section 6 of the PWP for further details on these methods. No bulk sampling work is to be carried out during this prospecting program.



Initial prospecting will be carried out by the company itself, utilizing its own in-house geologists to conduct and oversee the work. Drilling will be outsourced to a local drilling company.

## **2.2 DESCRIPTION OF PLANNED INVASIVE ACTIVITIES**

These activities result in land disturbances e.g. sampling, drilling, etc.

### **a) Drilling**

The targeting of all drilling activities will be dependent on the results obtained during the preceding phases of prospecting, namely the geological mapping and geophysical surveying.

Diamond drilling will be of the standard HQ or NQ size. Down hole surveys will be done every 50m in each hole. Core will be marked, logged, photographed and sampled according to the standard of the applicants logging and sampling procedures.

Down the hole geophysical surveying will take place upon completion of the exploratory boreholes along with Ground EM surveys to determine positions of conductors.

Rehabilitation of drill sites will be done according to an approved Environmental Management Programme.

Percussion Rotary Air Blast (RAB) drilling may be carried out for pre-collaring of diamond drill boreholes or for obtaining samples if significant depth of cover is encountered over particular targets.

### **b) Assaying**

Rock chip / soil samples will be sent to a laboratory of the applicant's choice to be crushed, split, pulverized and assayed. Samples from core will be split using a core cutter before being sent to the laboratory for analysis.

### **c) Metallurgical Test Work**

Metallurgical test work would start during phase 7 of the prospecting work programme. These tests will be done by and in consultation with a preferred and accredited laboratory of the applicant's choice.

#### Phase 4: Boreholes

The initial planned invasive prospecting activities will consist of diamond drill boreholes drilled to appropriate depths to target any anomalies identified during Phases 2 & 3 of the non-invasive portion of the prospecting work plan. The work will consist of:

- Access and drill site preparation
- Diamond core drilling
- Sampling and assaying
- Quality assurance and quality control programs
- Down hole geophysics
- Rehabilitation of drill sites
- Recording & Integration of data

#### Phase 7: Boreholes

This phase of boreholes would determine the continuity of mineralization & potential deposit size. The work will consist of:

- Access and drill site preparation
- Widely spaced diamond drilling and analyses to confirm grade / tonnage potential





- Sampling and assaying
- Quality assurance and quality control programs
- Metallurgical test work
- Rehabilitation of drill sites
- Recording & Integration of data

#### Phase 8: Boreholes

This phase of boreholes would provide enough information to be able to calculate an inferred resource. The work would consist of:

- Access and drill site preparation
- Close spaced infill diamond drilling and analyses to determine actual grade / tonnage
- Sampling and assaying
- Quality assurance and quality control programs
- Metallurgical test work
- Geotechnical drilling program
- Rehabilitation of drill sites
- Recording & Integration of data

### **2.3 DESCRIPTION OF PRE/FEASIBILITY STUDIES**

Activities in this section includes but are not limited to: initial, geological modelling, resource determination, possible future funding models, etc.

#### Phase 5: Compilation, interpretation and modelling of data

This phase will focus on compiling all the data gathered to date along with 3D modelling of any mineralized intersections. Any positively mineralized targets will be ranked. Should Phase 5 confirm mineralization with economic potential, then that target will advance to Phase 6.

#### Phase 9: Desktop Pre-Feasibility Study

This phase is designed to utilize the inferred resource to determine and would include:

- Closely spaced diamond drilling (Phase 8)
- 3D-modelling of the mineralized ore body
- Resource estimation
- A risk assessment to calculate if a full feasibility study is warranted
- Risk assessment studies



Table 6: Timeframes each of the proposed activities

Phase	Activity	Year 1	Year 2	Year 3	Year 4	Year 5
Phase 1 (Month 0-6)	<b><u>Non-Invasive Prospecting</u></b> Desktop Study: Literature Survey / Review / acquisition of data	X				
Phase 2 (Month 6-12)	<b><u>Non-Invasive Prospecting</u></b> Regional Airborne Geophysical Survey	X				
Phase 3 (Month 12-24)	<b><u>Non-Invasive Prospecting</u></b> Ground Geophysical Survey and Geological Field Mapping		X			
Phase 4 (Month 24-34)	<b><u>Invasive Prospecting</u></b> Exploration Boreholes			X		
Phase 5 (Month 34-36)	<b><u>Non-Invasive Prospecting</u></b> Compilation, interpretation and modeling of data			X		
Phase 6 (Month 36-42)	<b><u>Non-Invasive Prospecting</u></b> Detailed Ground Geophysical Survey on individual positively mineralized targets to define possible extent				X	
Phase 7 (Month 42-48)	<b><u>Invasive Prospecting</u></b> Boreholes to confirm continuity of mineralization & potential deposit size				X	
Phase 8 (Month 48-60)	<b><u>Invasive Prospecting</u></b> Resource definition drilling					X
Phase 9 (Month 54-60)	<b><u>Non-Invasive Prospecting</u></b> Analytical Desktop Pre-Feasibility Study					X



## 2.4 LISTED AND SPECIFIED ACTIVITIES

Name of Activity	Aerial extent of the Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Activities directly related to prospecting of a mineral resource, including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks.	9234.1442 Ha	X	GNR 983 Activity 20	N/A
Desktop Study: Literature Survey / Review / acquisition of data	N/A	N/A	N/A	N/A
Regional Airborne Geophysical Surveys	9234.1442 Ha	N/A	N/A	N/A
Ground Geophysical Surveys and Geological Field Mapping	9234.1442 Ha	N/A	N/A	N/A
Target Exploration Boreholes: 10 drill sites, each site covering a total area of 300 m <sup>2</sup>	3000 m <sup>2</sup> (0.3 ha)	X	GNR 983 Activity 20 GNR 985 Activity 12 g ii	N/A
Data Compilation	N/A	N/A	N/A	N/A
Detailed Ground Geophysical Surveys	9234.1442 Ha	N/A	N/A	
Environmental Screening by ECO	9234.1442 Ha	N/A	N/A	N/A
Ablutions - Chemical Toilets	5 m <sup>2</sup>	N/A	N/A	N/A
Temporary Fuel storage	5 m <sup>2</sup> less than 80 cubic metres	N/A	N/A	N/A
Sample storage (Existing BMM exploration office. No new infrastructure to be constructed)	N/A	N/A	N/A	N/A
Access Route (Mostly existing roads to be utilised. Access tracks will be made where there are no existing routes.) Approximate total length : 5000 m Approximate width: 3m)	15000 m <sup>2</sup> (1.5 ha)	X	GNR 985 Activity 12 g ii	N/A
Temporary general waste storage (General/domestic waste - Wheelie bin)	1m <sup>2</sup> less than 100 cubic metres	N/A	N/A	N/A
Temporary hazardous waste storage (Hazardous waste – Sealed Wheelie bin)	1m <sup>2</sup> less than 30 cubic metres	N/A	N/A	N/A
Compilation of geological plans	N/A	N/A	N/A	N/A



Name of Activity	Aerial extent of the Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Undertake rehabilitation of drill sites as per the rehabilitation plan (Drill sites + Access tracks)	18000 m <sup>2</sup> (1.8 ha)	N/A	N/A	N/A
Monitoring of rehabilitation efforts	18000 m <sup>2</sup> (1.8 ha)	N/A	N/A	N/A

### 3 POLICY AND LEGISLATIVE CONTEXT

Applicable Legislation and Guidelines	Reference Where Applied  (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
<p><b>National Environmental Management Act (No. 107 of 1998) (NEMA):</b></p> <p><b>GNR 983 Activity 20: Activities directly related to prospecting of a mineral resource, including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks.</b></p>	<p>This entire report is prepared as part of the Application for Environmental Authorisation under the NEMA.</p>	<p>In terms of the National Environmental Management Act an Application for Environmental Authorisation subject to a Basic Assessment Process has been applied for.</p>
<p><b>Minerals and Petroleum Resources Development Act (No.28 of 2002) (MPRDA)</b></p> <p><b>In support of the Prospecting Right Application submitted by Black Mountain Mining, the applicant is required to conduct a NEMA BAR</b></p>	<p>This entire report is prepared as part of the Environmental Authorisation application under the MPRDA and NEMA.</p>	<p>In terms of the Mineral and Petroleum Resources Development Act a Prospecting Right Application has been submitted.</p>



Applicable Legislation and Guidelines	Reference Where Applied (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
process in terms of Section 5A and Chapter 16 of the MPRDA.		
<b>National Water Act (No. 36 of 1998) (NWA):</b>  <b>Water may not be used without prior authorisation by the DWS. Section 21 of the NWA water uses for which authorisation is required.</b>	Section 21 of this report provides detail on applicable water uses.	It is noted that the application area is within 500m of a watercourse, however, due to the fact that invasive prospecting will only be done at a later stage (after year 2), the initial phases will not require a water use licence and thus the water use licence will only be applied for once the non-invasive prospecting areas have been finalised. Proof of submission of the application will be provided once available.
<b>The National Environmental Management: Biodiversity Act (Act No. 10 of 2004 – NEMBA)</b>  <b>Section 57 and 87</b>	Regulations published under NEMBA provides a list of protected species (flora and fauna), according to the Act (GN R. 151 dated 23 February 2007, as amended in GN R. 1187 dated 14 December 2007) which require a permit in order to be disturbed or destroyed	No applications have been submitted in terms of the National Environmental Management: Biodiversity Act. Mitigation measures relating to the management of alien invasive plants are included in Part B: EMPr of this report.
<b>National Environmental Management: Waste Act (No. 59 of 2008) and</b>	Waste generation associated with prospecting activities	Waste from the prospecting activities will not trigger a listed activity in terms of GN 921, Category A, B or C, hence no Waste Management Licence will be applied for.
<b>National Heritage Resources Act (No. 25 of 1999) and Regulations</b>	Section 6.4 description of the cultural and heritage landscape	A specialist has been appointed to undertake Heritage (including Archaeological and Palaeontological) Desktop studies for the proposed prospecting activities. The results of



Applicable Legislation and Guidelines	Reference Where Applied  (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
		these studies will determine whether any permits will be required.
<b>National Environmental Management: Air Quality Act (No. 39 of 2004) and National Dust Control Regulations (2013)</b>	Generation of dust during prospecting activities	Mitigation measures relating to the management of dust impacts are included Part B: EMPr of this report.
<b>SANS 10103 (Noise Regulations)</b>	Noise impacts during prospecting	Mitigation measures relating to the management of noise impacts are included Part B: EMPr of this report.
<b>National Forests Act (No. 84 of 1998) and Regulations</b>	Section 6.4 Description of the receiving environment. Removal of protected trees during site clearance for prospecting	Department of Forestry and Fisheries (DAFF) permit will be required to remove, cut or destroy any protected tree species should any be identified within the application area.
<b>Occupational Health and Safety Act (No. 85 of 1993)</b>	General duties of employers to their employees	Mitigation measures ensuring the health and safety of employees are included Part B: EMPr of this report.
<b>Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision provided by a mine, January 2005</b>	Financial provision associated with the prospecting activity	Financial provision for the rehabilitation or management of negative environmental impacts associated with the prospecting activity.
<b>Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations – No R1147, 20 November 2015</b>	Financial provision associated with the prospecting activity	Financial provision for the rehabilitation or management of negative environmental impacts associated with the prospecting activity.
<b>Mining and Biodiversity Guidelines 2013</b>	Section 6.4 Description of the receiving environment	Specialists have been appointed to undertake studies to determine if the



Applicable Legislation and Guidelines	Reference Where Applied  (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
<p>CBA's are terrestrial (land) and aquatic (water) features (e.g. vleis, rivers and estuaries) in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning in the long term (which is particularly important in the face of climate change). The desired management objective for CBA's is for them to remain in a natural or near-natural, i.e. to prevent further loss or degradation of natural habitat in these areas. Therefore, CBA's are biodiversity request priority that must be afforded special attention in assessing and evaluating impacts of prospecting or mining.</p> <p>Although CBA's have been identified at a very fine spatial scale in some provinces (Gauteng, Western Cape, Kwazulu Natal), other areas they have been identified more at a broader scale (Eastern Cape, Northwest, Limpopo and the Namakwa district of the Northern Cape). All CBA's require field verification, but this is particularly the case for broad scale CBA's where it is only in the intact areas of the CBA that mining should be prohibited.</p> <p>Over time, CBA's will be identified in the Free State, and remaining areas of the Northern Cape, and may be</p>	<p>Section 6.5 Impacts and risks identified</p> <p>Section 6.8 Possible mitigation measures</p>	<p>application are falls within any CBA's and recommend mitigation measures where applicable.</p>



Applicable Legislation and Guidelines	Reference Where Applied  (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
identified at a finer scale in additional provinces.		
<b>The Northern Cape Biodiversity Sector Plan</b>	The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.	The identification of Critical Biodiversity Areas for the Northern Cape was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated. The prospecting area falls almost completely in an area classified as an ONA (Figure 8), with only a small portion of the prospecting area being classified as ESA.
<b>Astronomy Geographic Advantage Act (Act No 21 of 2007)</b>	Section 6.3 Summary of Issues Raised by I&APs  Section 6.4 Description of the receiving environment  Section 6.5 Impacts and risks identified  Section 6.8 Possible mitigation measures	The application area falls within the Karoo Central Astronomy Advantage Area 1. It is understood that there are limitations on the radio frequencies and activities within this area, that could affect the SKA activities. Contact has been made with the SKA in order to confirm what limitations will be imposed on the proposed prospecting activities that fall within Astronomy Advantage areas. The SKA has indicated that the prospecting with the Astronomy advantage Areas is unlikely to be a fatal flaw. BMM





<b>Applicable Legislation and Guidelines</b>	<b>Reference Where Applied</b>  (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	<b>How does this Development Comply with and Respond to the Legislation and Policy Context</b>
		confirmed that they will employ typical time-domain electromagnetic (TEM) surveys during exploration, which transmit at frequencies well below the MHz range. Certain techniques such as Ground Penetrating Radar (GPR) could fall within the specified ranges. These techniques are not routinely used in minerals exploration as these high frequency waves only penetrate to a couple of meters below surface. BMM has no intention of employing GPR on these new tenements. The SKA has been added as a Key Interested and Affected Party (IAP) in the public participation process and will be provided an opportunity to provide comment on the basic assessment process.



## 4 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

Located 113km north-east of Springbok, Black Mountain mine boasts of an annual production of c.30kt of zinc in concentrate, c.50kt of lead in concentrate, c.3kt of copper in concentrate and c.50 tonnes of silver. Black Mountain's underground operations mine a polymetallic orebody, producing concentrates from a sequential flotation plant. With Broken Hill Deeps and Swartberg ore bodies, Black Mountain has considerable potential for mine expansion. However, the expansion will only be made once project feasibility has been proved. Black Mountain mine is a trackless, mechanised underground mine of intermediate depth. The primary mining method is Cut & Fill.

Mining is an important economic sector, accounting for 21.3% of total employment (2007) in the Northern Cape. Black Mountain mine has more than 1500 employees, of whom almost 80% are local (from the Namaqualand and Bushmanland regions of the Northern Cape).

Black Mountain is also the largest private employer in this region of the Northern Cape and has been a stable employer for the last three decades, with potential to continue providing significant employment for another twenty years. The well-established infrastructure available at the dedicated mining town of Aggeneys is a significant advantage. It is predicted that the life of Black Mountain mine will last until 2020 and beyond. Thus, the mine will remain profitable and an important economic driver in the region for many years to come.

### Gamsberg Mine

Gamsberg is one of the largest zinc deposits in the world (although discovered more than 40 years ago) and was held undeveloped by its various owners before Vedanta acquired it from Anglo American in 2011. It has a reserve and resource of more than 214Mt and an estimated life of mine (LoM) of 30+ years. Gamsberg's development forms part of Vedanta's long-term commitment to the development of the Northern Cape. Phase 1 of this investment, which is worth US\$400 million, is now complete.

In Phase 1 – which has a LoM of 13 years – four-million tonnes a year of ore will be produced from Gamsberg's open pit and 250,000t/y of concentrate from its concentrator plant.

Phase 2 – an investment of a further US\$350 to US\$400 million – would see ore mined increase to 8mtpa and production of zinc-in-concentrate to 450,000 tonnes and in a modular fashion ultimately, to 600,000tpa.

When Gamsberg is fully developed with its future phases of growth, it will be one of the world's top 5 zinc mines. The project's current reserve and resource is 214Mt with a grade of between 6% and 6.5% zinc.

## 5 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The application area has been selected as the preferred site based its proximity to existing mining activities and the geological formations in the area. The currently available historical geological information does not allow for the potential identification of economically viable resources, therefore invasive prospecting activities have been included in the PWP.

Some of the techniques employed in the non-invasive prospecting activities will include a literature survey, field reconnaissance/mapping, and geophysical survey of the geology, outcrops. Some of the invasive prospective activities include prospecting boreholes, boreholes to confirm continuity of mineralization & potential deposit size and resource definition drilling.

Consultation with affected landowners and adjacent landowners will be conducted in order to keep them informed about the proposed prospecting activities as well as to capture any comments and concerns they may have regarding the prospecting activity.

It should be noted that the exact locations of the boreholes have not been identified at this stage. The location of these boreholes will be dependent on the findings of the non-invasive prospecting activities. Once the proposed target areas for the boreholes have been identified during the phases as set out in Table 6 above, these areas will be investigated and will be subject to the conditions of this document.



## **6 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE**

This section describes the specific site area and the location of site features, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

### **6.1 DETAILS OF DEVELOPMENT FOOTPRINT ALTERNATIVES**

The development footprint is expected to be a fraction of the application area size, which is estimated to be 9234.1442 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected is located approximately 75 kilometres South of the town of Prieska and 375 kilometres South East of the town of Aggeneys, and the Aggeneys - Gamsberg base metal mines. Black Mountain Mining at Aggeneys is currently the only operating mine in the District. The meta-sedimentary sequences underlying the Cenozoic cover are of mid-Proterozoic age and correlated to the Bushmanland Sequence which hosts the zinc – copper – lead – silver deposits that are currently being exploited at the Black Mountain Mine. As such no assessment of alternative development scenarios was conducted.

#### **6.1.1 PROPERTY**

The Prospecting Right application area is located approximately 75 kilometres South of the town of Prieska and 375 kilometres South East of the town of Aggeneys, near the Black Mountain - Gamsberg base metal mines. The terrain consists of plains and low hills and the south-eastern parts of the Koa South Area are the highest with altitudes in the order of 1 240 m amsl. The area then drops towards the northwest to elevations around 1 080 m amsl. From the elevations it is clear that the area is sloping towards the northwest. A salt pan is located in the central parts of the application area at altitude 1 200 m amsl. The terrain is underlain by Cenozoic and Karoo-aged sediments overlying Namaquan granitic gneiss and meta-sediments.

These metamorphosed sedimentary rocks consist of white to blue quartzite, biotite - sillimanite schist and poorly developed iron formations. These rocks correlate to the metasedimentary sequence hosting the zinc – copper – lead – silver deposits at Aggeneys and Gamsberg. The inferred tectono-stratigraphic setting of the prospecting area is therefore considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Aggeneys and Gamsberg Mines. As such no assessment of alternative properties were assessed.

#### **6.1.2 TYPE OF ACTIVITY**

Due to the unavailability of extensive historical borehole datasets, invasive prospecting activities such as drilling as well as non-invasive activities will be conducted during prospecting. No bulk sampling work is to be carried out during this prospecting program.

#### **6.1.3 DESIGN OR LAYOUT**

Specific areas within the application area will be identified for invasive prospecting activities (e.g. drilling) in order to minimize land destruction during prospecting. The extent of the invasive activities is estimated to be a 3000 m<sup>2</sup> (0.3 ha), which is only a fraction of the application area illustrated in Figure 1.

It should be noted that specific areas have been identified as highly sensitive in terms of the surface environmental features. As such, the main alternative (only alternative assessed further in this document) for this project will be the avoidance (no-go areas) of the invasive prospecting activities within these areas. For remaining areas, mitigation measures have been recommended as per the sections below and these should be adhered to. Please refer to Section 10.2 below for a detailed composite map showing the areas of high sensitivity.

#### **6.1.4 TECHNOLOGY ALTERNATIVES**

The technologies listed in the PWP have been selected as they are proven effective in the determination of resource viability within the proposed prospecting area. Some of the techniques employed in the non-invasive



prospecting will include a literature survey, field reconnaissance/mapping, and geophysical survey of the geology, outcrops. Invasive technology alternatives have also been considered. It is hereby noted that the different phases and timeframes of the prospecting herein envisaged are, by their nature, dependent on the results obtained during the preceding phases of such prospecting. The proposals set out in the PWP are therefore made on the basis that results obtained during the preceding phases may necessitate reasonable changes and adaptations to such proposals, which will be reported as prescribed.

### 6.1.5 OPERATIONAL ASPECTS

Operational aspects that have been considered for the effective implementation of the PWP include financial arrangements, appropriate equipment available, and technical skills available. Financing of the proposed work plan will be sourced from the Black Mountain Mine Prospecting budget, the current budget for financial year 2019 / 2020 is R177,000,000 of which some R30,000,000 is earmarked for greenfields prospecting. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mine plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations. Details of the equipment available are included in Table 7 below. Black Mountain Mining has ensured that technical personnel are available to execute the prospecting work program.

Table 7: Appropriate equipment available

Resources
1 x Toyota Land Cruiser, other 4x4 vehicles as required
Exploration office at Black Mountain Mine (Aggeney's) & in Johannesburg
Core cutter and sample processing and storage facilities
Full accommodation and support services at Black Mountain Mine
3 x GPS units, 2 x Geological compasses, 2 x Satellite phones, Handheld radios, 1 x Camera, 1 x Niton handheld XRF analyser
6 x Laptops with ArcMap 10.2, Geosoft, Micromine V12 and Datamine Studio 3. A0-scanner, plotter and printer. Data storage server in Johannesburg
Hand tools for excavating trenches, pits and for sampling
Soil sampling equipment including sieves of various mesh sizes
Geophysical equipment for carrying out ground electro-magnetic, magnetic and gravity surveys. Magnetic and gravity equipment is available on contract as required
Air drills for RAB drilling and Reverse circulation drilling are available on contract as budgeted for
Diamond drill rigs, water and fuel bowsers and other support equipment needed for core drilling are available on contract as budgeted for.
1 X generator per camp
Caravans to host personnel in the field and serve as a mobile office.

### 6.1.6 OPTION OF NOT IMPLEMENTING

If the prospecting right is not granted, the potential to identify viable mineral resources could be lost. Historical prospecting and mining activities have taken place in the vicinity of the proposed prospecting right area and as such the proposed prospecting activities represent a continuation of surrounding land uses. Additionally, it allows for marginal land impacted on by historical prospecting and mining activities to be re-introduced into the economy.

## 6.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS TO BE FOLLOWED

### 6.2.1 PUBLIC PARTICIPATION METHODOLOGY

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant I&AP's are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study.



The legal landowners and other pre-identified key I&AP's were sent an initial notification letter on the 23<sup>rd</sup> of March 2020, disseminated via email and registered mail. I&AP's were provided an initial registration period to register for the proposed project. Subsequent notifications will be sent as I&APs were identified. All pre-identified and registered I&APs will be notified of the availability of the BAR for review and comment. All comments received during this period will be included in this BAR submitted to the Commenting Authority. A full description of the Public Participation Process will be included in the Comments and Responses Report which is attached as an Appendix to this report (Appendix B). Results of the consultation are to be summarised in the Consultation Report attached as Appendix B4.

## **6.2.2 IDENTIFICATION OF I&AP'S**

An initial I&AP list was compiled using WinDeed searches to determine the contact details of the registered landowners of the project affected land parcels; and by consultations with the local farmers union and the local municipalities, as well as the distribution of notification documentation in person on site. The I&AP database was compiled containing the following categories of stakeholders:

- Host Communities;
- Landowners;
- Traditional Authority;
- Land Claimants;
- Lawful Land Occupier;
- Department of Land Affairs;
- Any other person (including adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting operation;
- Local Municipality;
- The relevant Government Departments, agencies and institutions responsible for various aspects of the environment and for infrastructure which may be affected by the proposed project.
- Agricultural Sector;
- Organised Business;
- Other organisations, clubs, communities, and unions; and
- Various NGO's.

## **6.2.3 LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED**

The following authorities have been identified and notified of the proposed Koa South Prospecting Right Application:

- Kareeberg Local Municipality;
- Pixley Ka Seme District Municipality;
- Department of Mineral Resources and Energy;
- Northern Cape Department of Environment and Nature Conservation (DENC): Springbok;
- Department of Human Settlement, Water and Sanitation (DHSWS);
- Northern Cape Department of Agriculture;
- Northern Cape Department of Rural Development and Land Reform;
- Northern Cape Department of Roads Transport and Public Works;
- South African Heritage Resources Agency (SAHRA).



#### **6.2.4 LIST OF KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED**

The following key stakeholders have been identified and notified of the proposed Koa South Prospecting Right Application:

- Agrimark Kenhardt
- SKA South Africa
- Botanical Society
- Succulent Society of South Africa
- South African Radio Astronomy Observatory
- Conservation South Africa (CSA);
- Endangered Wildlife Trust;
- Environmental Monitoring Group;
- Eskom;
- SANBI;
- South African National Roads Agency Limited (SANRAL);
- South African Tourism;
- Wildlife and Environment Society of South Africa (WESSA) (Northern Cape Regional Office); and
- Vosburg agri.

#### **6.2.5 LIST OF SURROUNDING SURFACE RIGHTS HOLDERS/LANDOWNERS IDENTIFIED**

The following surrounding surface rights holders/landowners of the area under application have been identified of the proposed Koa South Prospecting Right application:

- Goussard Christiaan Rudolph Trustees,
- Fairview Trust
- Elforado Trust
- Koos Vermeulen Boerdery Trust
- Christiaan Meyer
- Bruinpunt Boerdery Pty Ltd
- Cornelius Frans Vermeulen
- Koos Vermeulen Boerdery Trust
- Francois Jacobus Borman
- TA Hugo Testamentere Trust

The I&AP database is included in Section 29.2

#### **6.2.6 NOTIFICATION OF I&AP'S**

All I&AP's were notified of the proposed Prospecting Right Application via the following methods:

- 1) Registered letters, emails and faxes;
- 2) Background Information Document;
- 3) Questionnaires;



- 4) Placement of ten (English and Afrikaans) A2 Correx Site Notices in various locations on the site;
- 5) Placement of a newspaper advert in the Noordwester Oewenuus on 20 March 2020;
- 6) Placement of a Provincial Government Gazette Notice on 23 March 2020.

Please also refer to Appendix B for proof of notification sent to I&APs and for proof of correspondence with I&APs.

**Description of the Information Provided to the Community, Landowners and I&AP's**

Notification documents sent to all pre-identified I&AP's included the following information:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised;
- The duration of the activity;
- Sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land);
- The purpose of the proposed project;
- The prospecting methods to be used;
- Details of the affected properties (including parent farm and portion);
- Details of the MPRDA and NEMA Regulations that must be adhered to;
- The minerals being prospected for;
- Date by which comment, concerns and objections must be forwarded through to EIMS; and
- Contact details of the Environmental Assessment Practitioner (EAP).

In addition, a questionnaire was included in the registered letters, emails and facsimiles sent and requested the following information from I&AP's:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site, to make written proposals as to how and to what standard the impacts on site can be remedied;



- To mitigate the potential impacts on their socio-economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied;
- Details of the landowner and information on lawful occupiers;
- Details of any communities existing within the area;
- Details of any Tribal Authorities within the area;
- Details of any other I&AP's that need to be notified;
- Details on any land developments proposed;
- Details of any perceived impacts to the environment that should be considered in the BAR; and
- Any specific comments, concerns or objections to the proposed prospecting operation.

I&AP's were provided an initial call to register period, to register as I&AP's for the proposed project. All registered I&AP's will be notified of the availability of the BAR which will be available for 30 days from 28 July 2020, for review and comment. Comments obtained during the BAR process and the responses of the EAP will be included in the Final BAR.

### **6.3 SUMMARY OF ISSUES RAISED BY I&AP'S**

Any comments received during the PPP will be included in this report and summarised in Appendix B: Public Participation for submission to the DMR. Please refer to the I&AP database in Appendix B for a full list of registered interested and affected parties as well as the consultation report.





## **6.4 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES**

### **6.4.1 SOCIO-ECONOMIC CONTEXT**

The proposed Koa South Prospecting Project will be situated on several farm portions as detailed on Table 4. The area is located approximately 77.3 km South-West of Prieska and 166 km North-West of De Aar. The application area falls within the Kareeberg Local Municipality (LM), within the Pixley Ka Seme District Municipality in the Northern Cape Province.

The Kareeberg Local Municipality is a Category B municipality situated within the Pixley Ka Seme District in the Northern Cape Province. It is bordered by the ZF Mgcawu District and Siyathemba in the north, Ubuntu in the south, Emthanjeni in the east, and the Namakwa District in the west. It is the second-largest municipality of the eight that make up the district, accounting for 17% of its geographical area. The name originates from a mountain range in the region, the Karee Mountains.

According to the 2011 Census, Kareeberg Local Municipality has a total population of 11 673 people. Of the households in the area, 33,60% are headed by females. The majority of the population in the municipality are coloured at 85,1%, 4,8% are black African, 9,1% are white, with the other population groups making up the remaining 1%. 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.

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.

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, while 73,6% of households have access to electricity for lighting.

### **6.4.2 TYPE OF ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY**

This section of the report has been compiled with input from various specialists that were appointed to undertake desktop assessments of the application area. The following specialist studies were undertaken:

- Biodiversity Assessment – The Biodiversity Company;
- Geohydrological Assessment – SRK Consulting;
- Heritage and Palaeontological Impact Assessment – PGS Heritage.

#### **6.4.2.1 Topography**

The area is located approximately 77,3 km South-West of the town of Prieska, Northern Cape, South Africa. It covers four farms, over an area of 9 213 ha (92.13 km<sup>2</sup>). Topographically the terrain consists of plains and low hills and the south-eastern parts of the Koa South Area are the highest with altitudes in the order of 1 240 m amsl. The area then drops towards the northwest to elevations around 1 080 m amsl. From the elevations it is clear that the area is sloping towards the northwest. A salt pan is located in the central parts of the application area at altitude 1 200 m amsl (SRK, 2020). As can be seen in Figure 2 below, the average elevation is approximately 1171 m and the average slope is 2.0%.

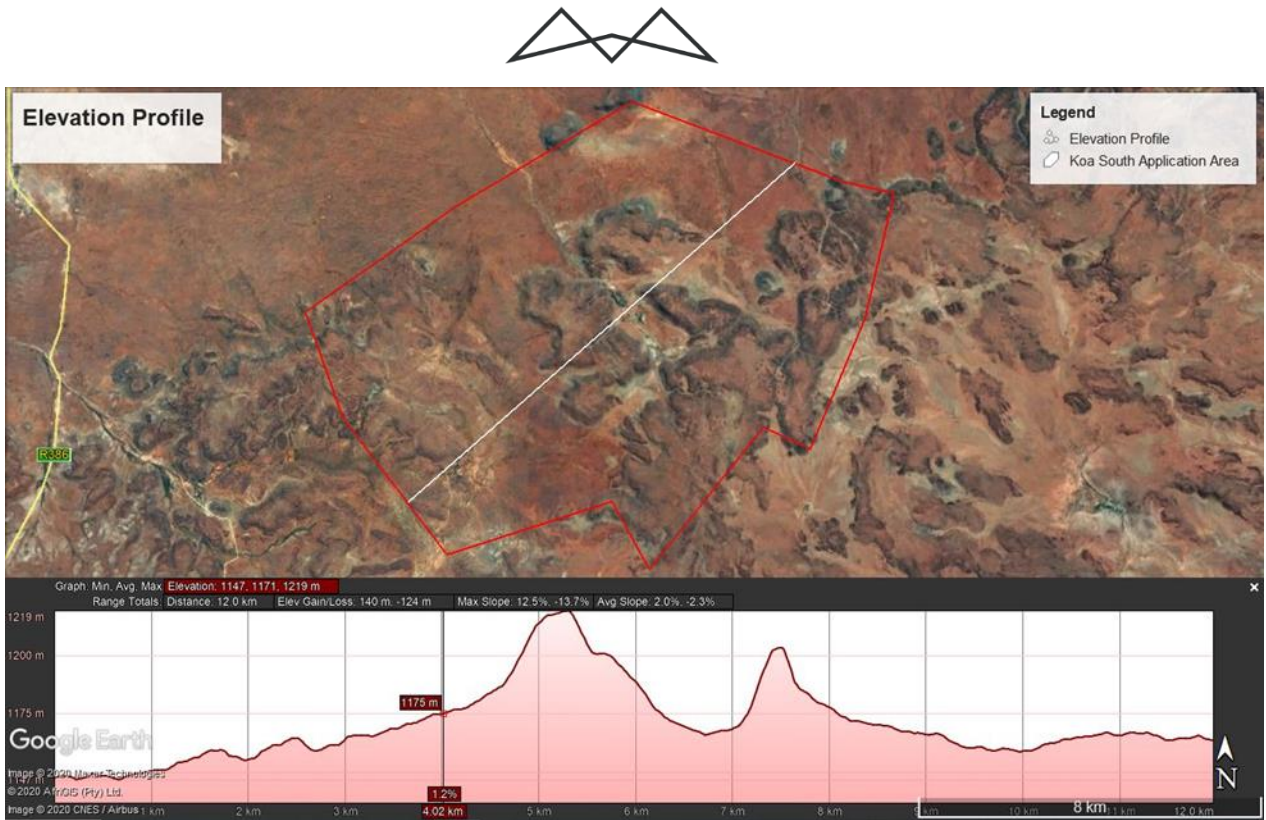


Figure 2: Elevation profile of the proposed sites.

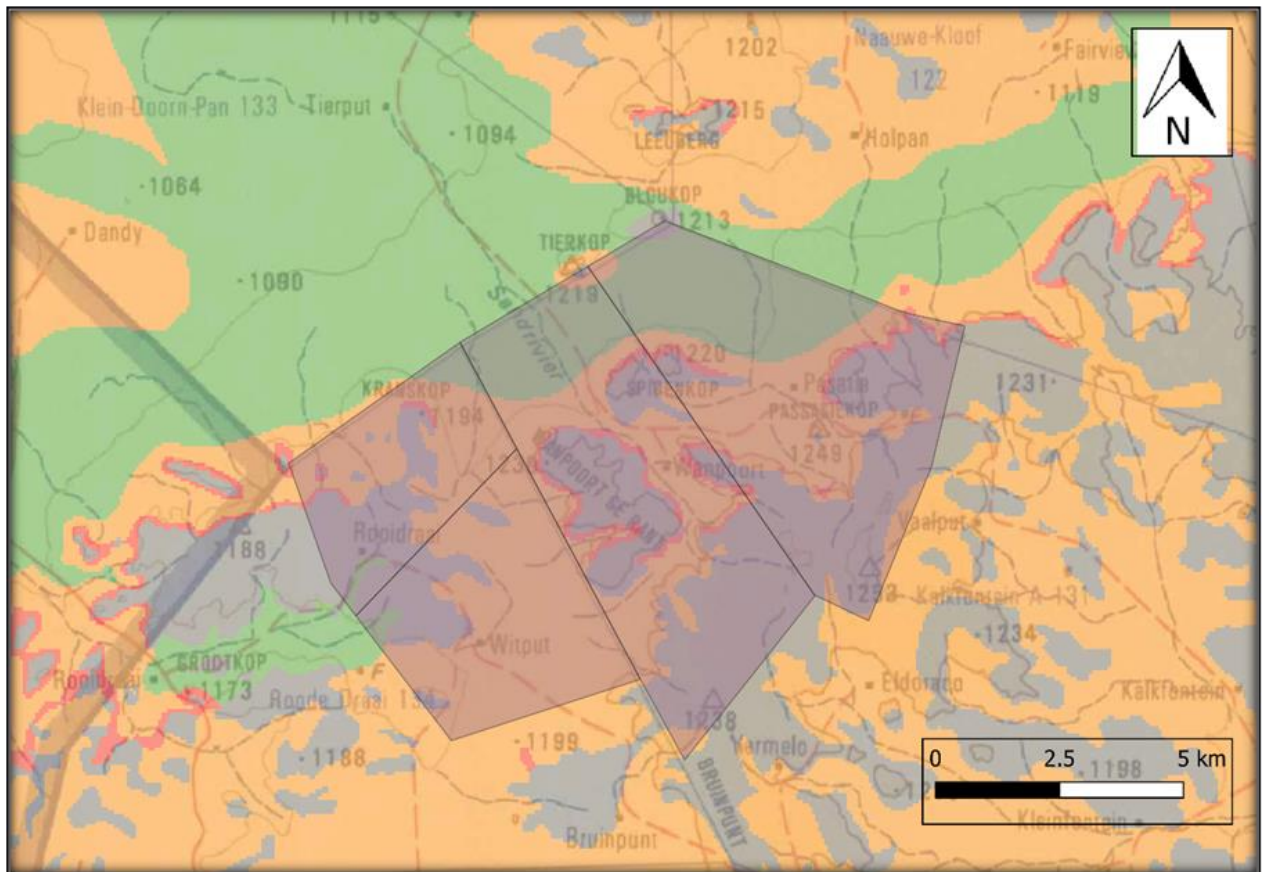


Figure 3: Extract of the 1: 250 000 SAHRIS Palaeosensitivity Map (Koa South Application = Area 7)

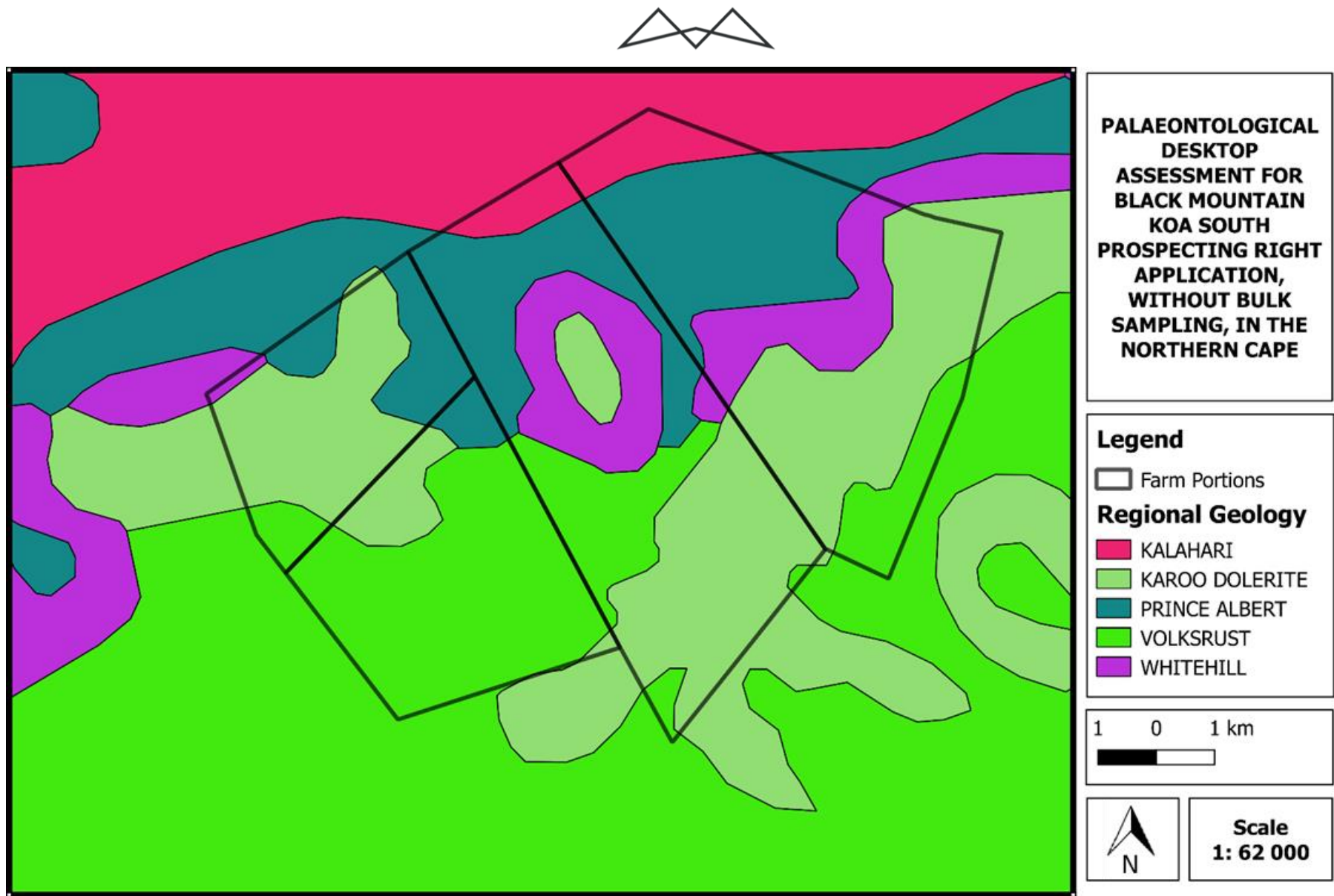


Figure 4: Geology of the application area.

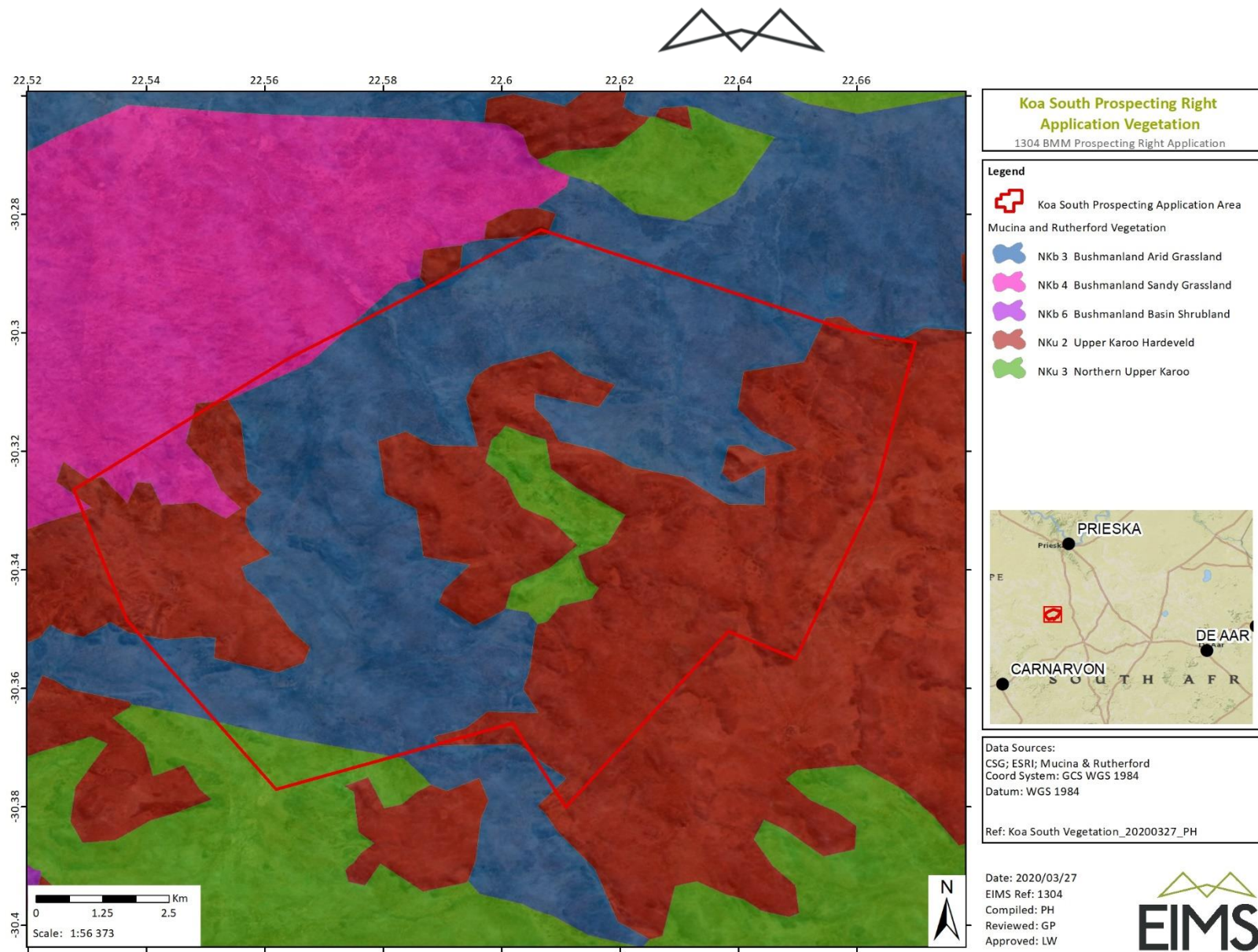


Figure 5: Vegetation types based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2018).

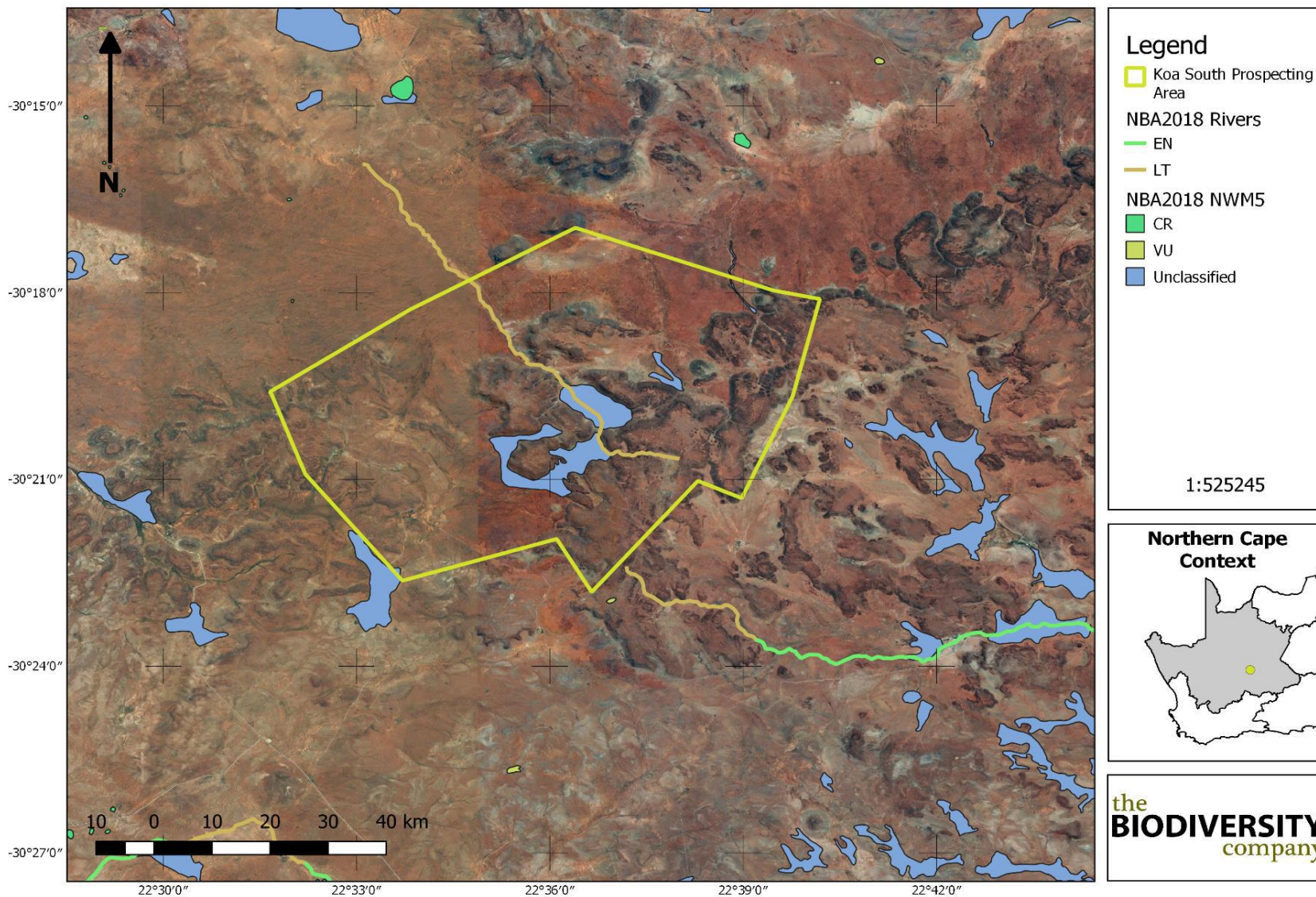


Figure 6: NBA Wetlands and Rivers Threat Status within the application area

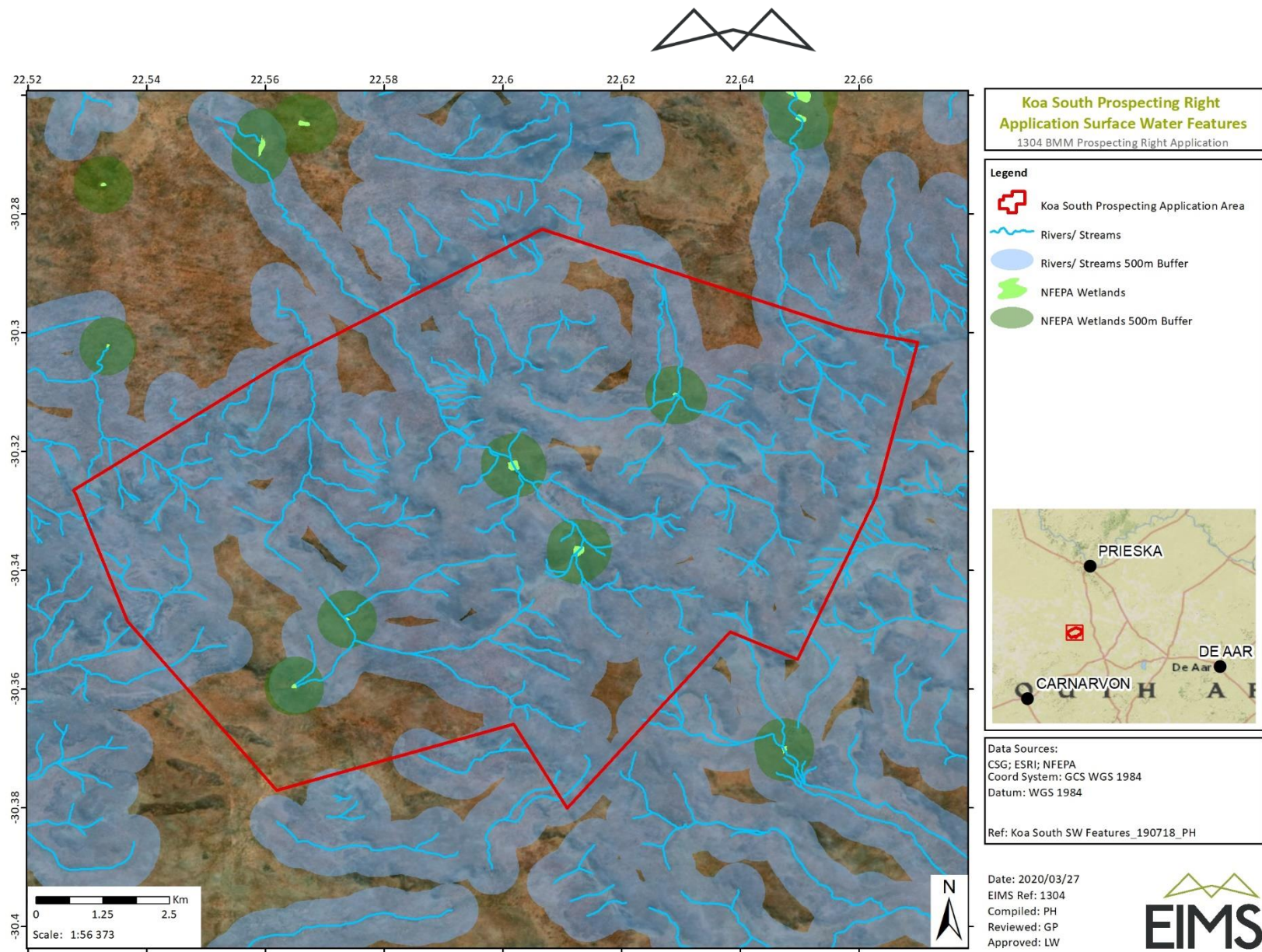


Figure 7: Surface water features in the application area

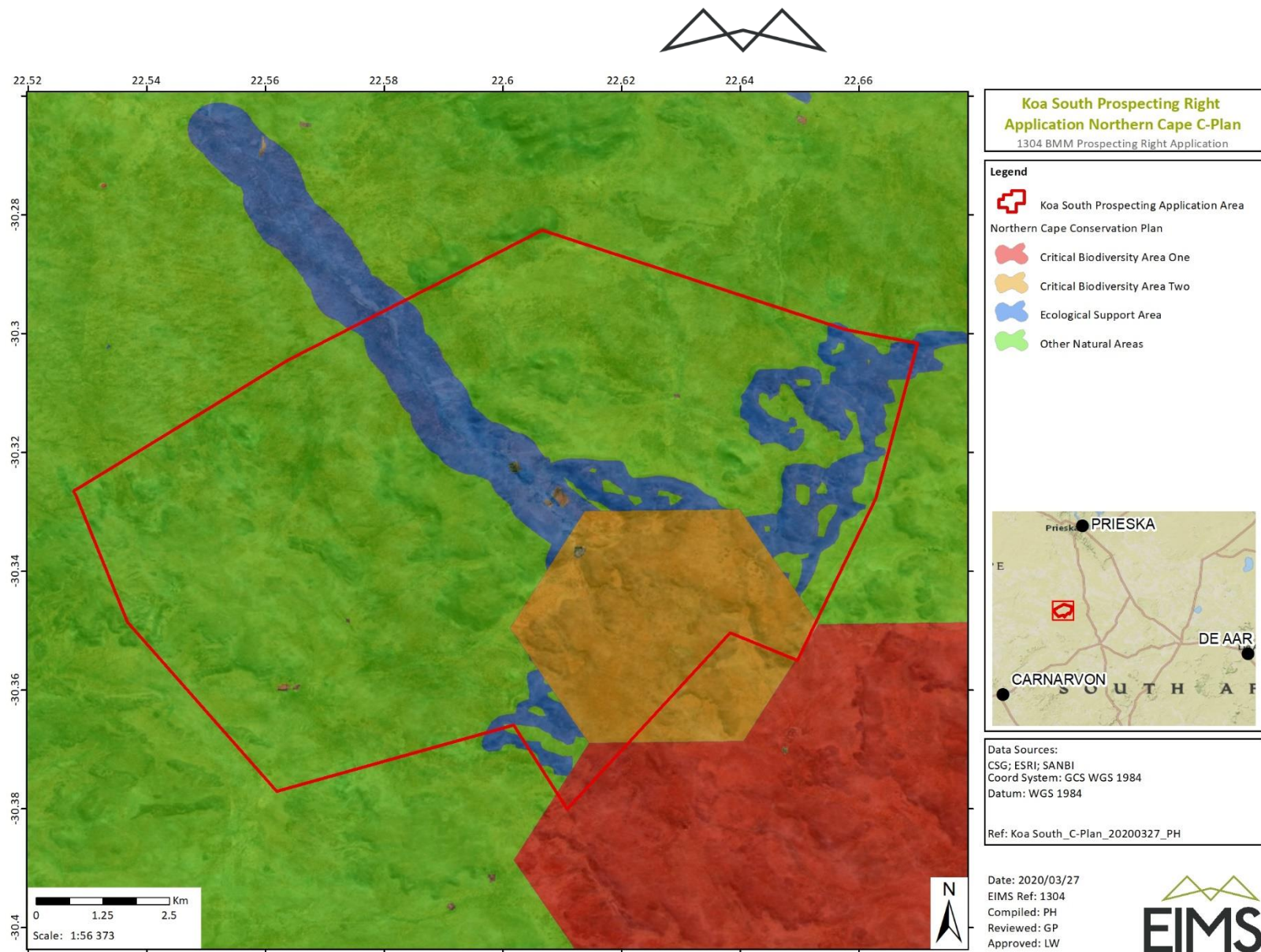


Figure 8: Northern Cape Conservation Plan

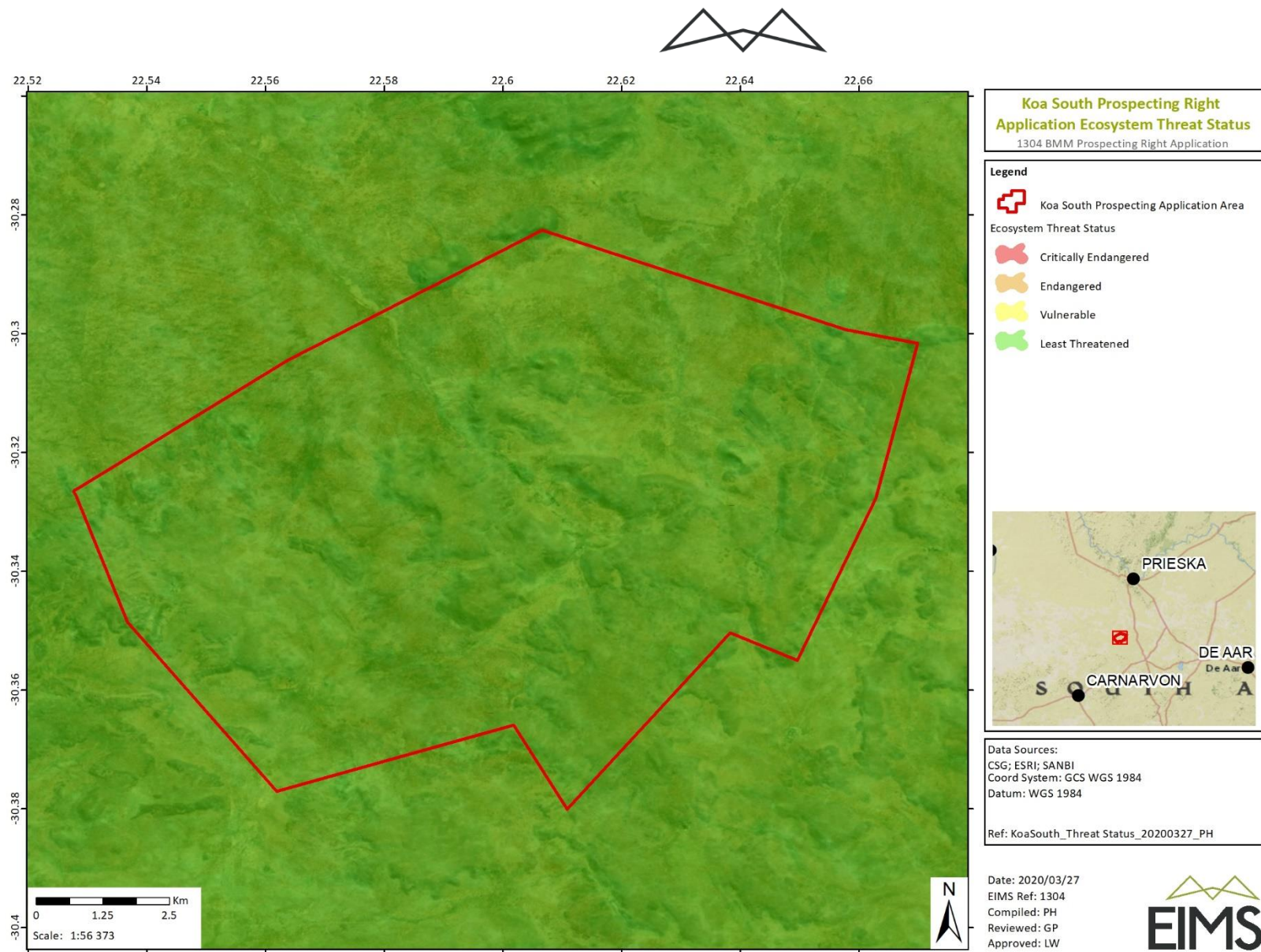


Figure 9: Ecosystem Threat Status



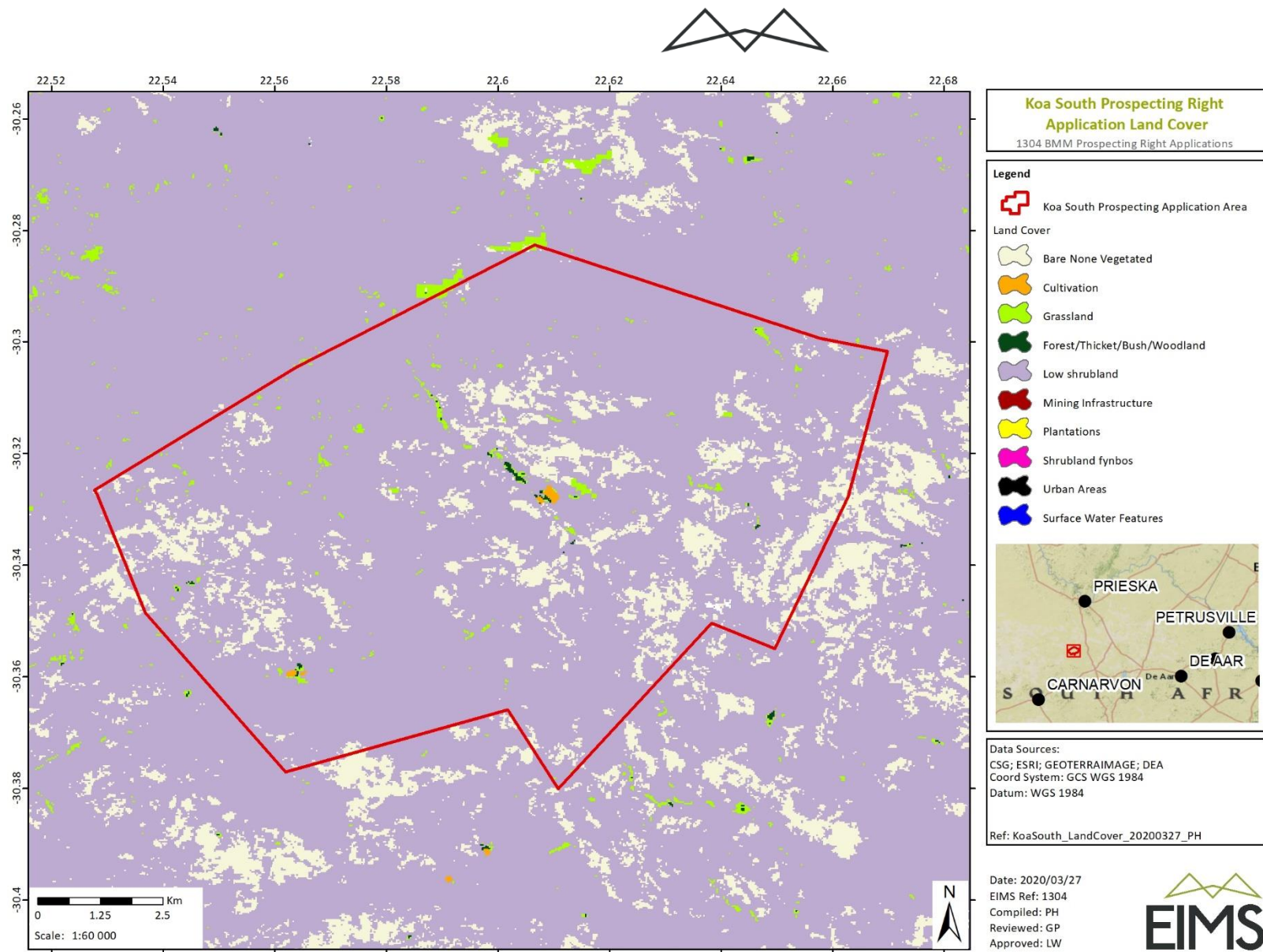


Figure 10: Land Cover

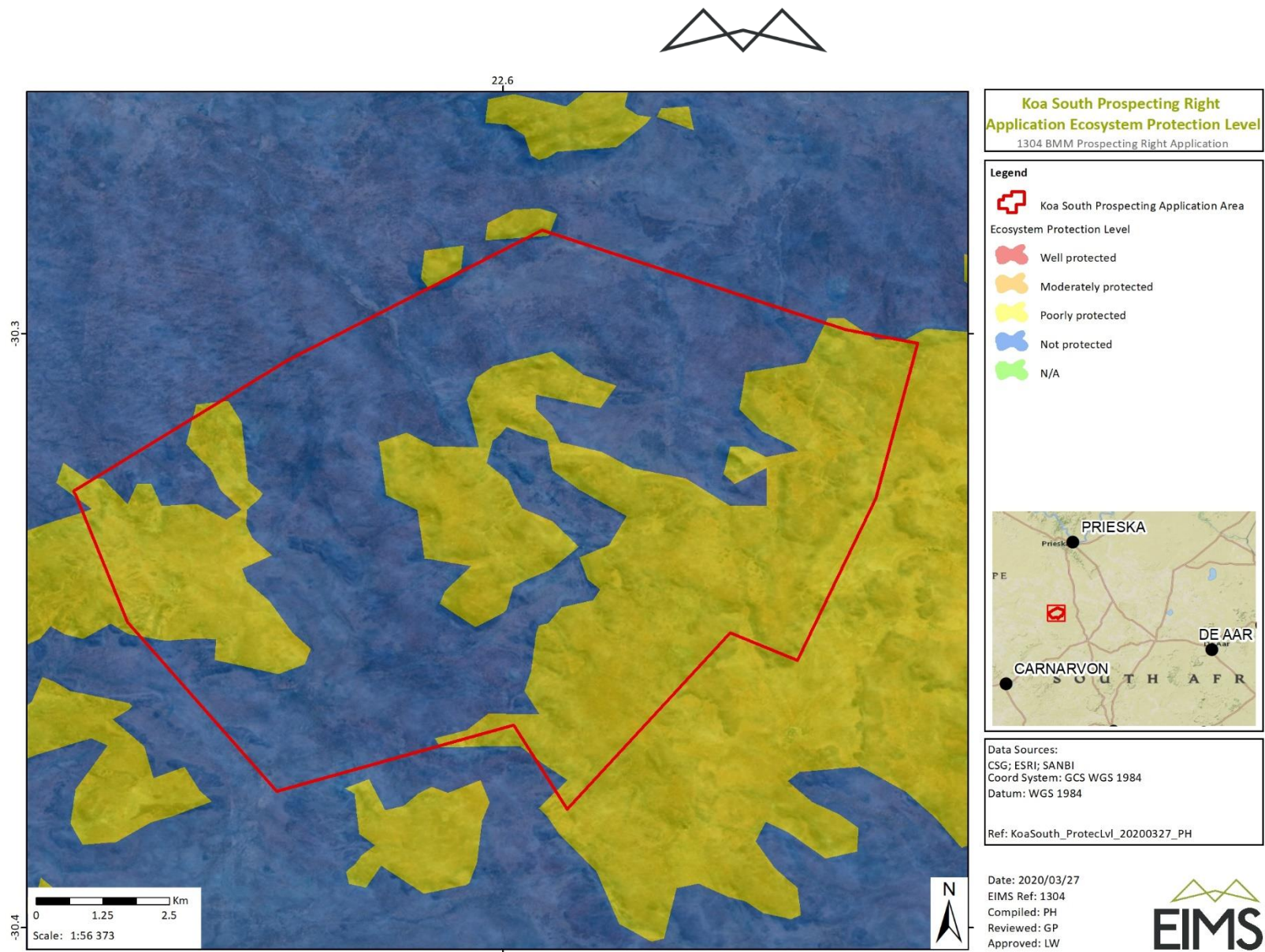


Figure 11: Ecosystem Protection Level

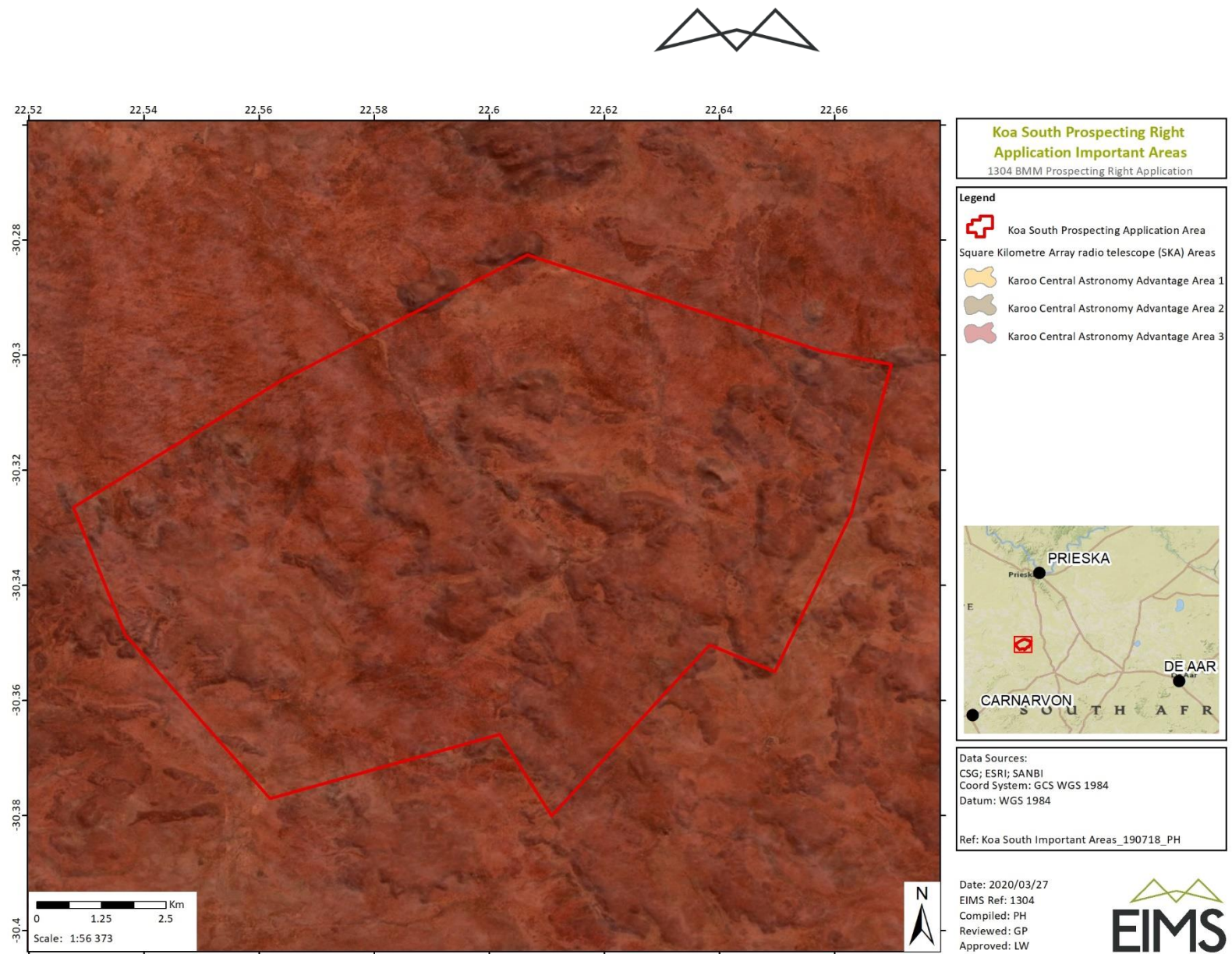


Figure 12: Location of Koa South Application area within Karoo Central Astronomy Advantage Area 3.



# Kao Prospecting application Heritage Sensitivity land forms

PGS Heritage (Pty) Ltd  
Heritage Management  
Unit

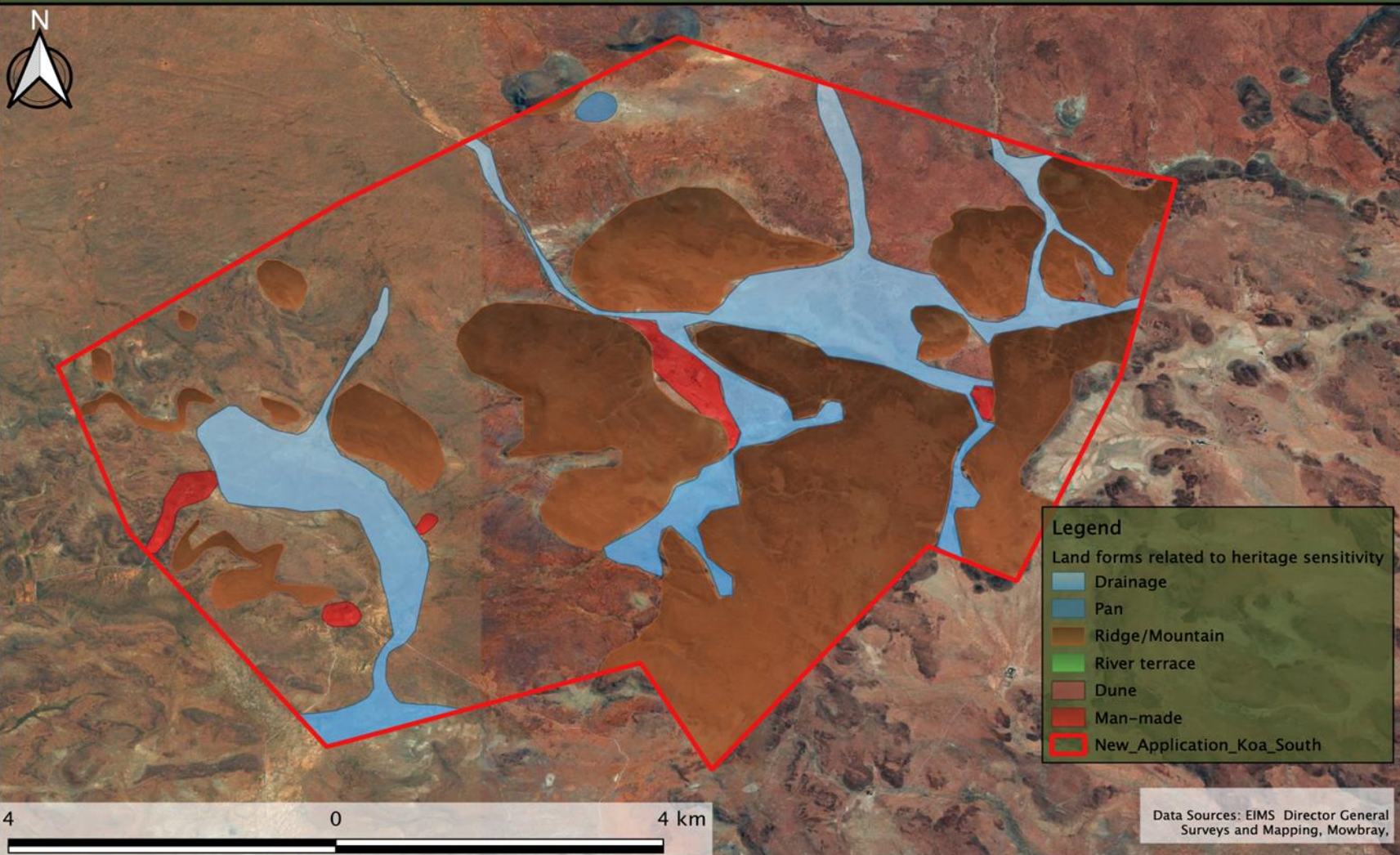


Figure 13: Heritage sensitivity (PGS, 2020)



#### 6.4.2.2 Climate

Prieska lies on 931 m above sea level and is considered to have a desert climate. There is virtually no rainfall during the year. The average annual temperature is 19.0°C, precipitation here is about 244 mm per year. The least amount of rainfall occurs in September, average in this month is approximately 5 mm. In March, the precipitation reaches its peak, with an average of 49 mm. The temperatures are highest on average in January, at around 26.9°C. At 9.8 °C on average, July is the coldest month of the year.

#### 6.4.2.3 Geology and Soils

The terrain consists of plains and low hills and the south-eastern parts of the Koa South Area are the highest with altitudes in the order of 1 240 m amsl. The terrain is underlain by Cenozoic and Karoo-aged sediments overlying Namaquan granitic gneiss and meta-sediments. The northern boundary of the Study Area is underlain by red aeolian sand, with calcrete mapped in the central parts. Massive dolerite intrusions are mapped on the eastern and western boundaries, these intruded into the Tierberg Formation. The Tierberg Formation consist of greenish weathering shale, subordinate siltstones and sandstones of the Permian age. Please refer to Figure 4 above.

#### 6.4.2.4 Hydrogeology

According to Vegter and Seymour (1995), the study area has a low groundwater potential of 30 – 40%. These percentages indicate the probability of drilling a successful borehole (yield > 2 L/s).

DWS initiated a project in 2003, referred to as the Groundwater Resource Assessment Phase 2 (GRA 2) and focussed on the quantification of the groundwater resources of South Africa on a national scale. The project included the quantification of recharge, storage and sustainable yield of the aquifer systems throughout South Africa. The expected average groundwater exploitation potential (AGEP) in the Koa South area is < 2 500 m<sup>3</sup>/km<sup>2</sup>/annum.

Based on the Aquifer Classification Map (Vegter), the aquifer is classified as a minor aquifer region – therefore being a moderately yielding aquifer system of variable water quality. These aquifers can be fractured or potentially fractured rocks which do not have a high permeability, or other formations with variable permeability.

The Koa South Area falls entirely within the Lower Orange WMA. The EWR report of 2016 covers the Lower Orange WMA and from this report the following information is deemed relevant to the Koa South Area:

- The areas adjacent to, and overlapping with, Koa South Area have an estimated 70 % dependency of groundwater (i.e. domestic use, irrigation, stock watering, bulk supply, mining).
- The Koa South Area falls mainly within D54D Quaternary Catchment which, according to the EWR report, is described as “poor groundwater quality from marine sediments”.

##### 6.4.2.4.1 Existing Groundwater Users

A data search on the National Groundwater Archive (NGA) maintained by the DHSWS revealed no existing boreholes within the Koa South Area, therefore the search was extended with 5 km from the boundary of the area. The result found were as follows:

- 25 boreholes were reported in the search;
- 13 boreholes had water level data – the average groundwater level is 9.23 m bgl, the deepest 24 m bgl and the shallowest 6 m bgl;
- 19 boreholes had recorded airlift yields - the average yield being 2.0 L/s and the maximum recorded yield 20 L/s;
- All the boreholes had recorded boreholes depths – the average depth being 31 m bgl and the deepest 67.3 m bgl; and



- 19 boreholes had recorded water strike depths – the average strike depth being 26 m bgl and the maximum strike depth 66 m bgl.

The drivers for future groundwater development usually include the following:

- Existing boreholes that dry up;
- Increase in groundwater demand (e.g. population growth, economic growth, agricultural growth);
- Insecurity of bulk water supplies;
- Surface water shortages (as result of global warming, increased demand); and
- Prolonged droughts.

#### 6.4.2.4.2 Groundwater as a Natural Resource

Groundwater falls under the protection of the NWA and may not be polluted.

#### 6.4.2.5 Land Cover

As illustrated in Figure 10, the application area is covered by mostly low shrubland, bare areas with no vegetation and grassland areas with minimal cultivation spread out across the area.

#### 6.4.2.6 Ecosystem Protection Level

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Driver *et al.*, 2011).

The area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 11). Based on this the terrestrial ecosystems associated with the proposed prospecting area are rated as poorly protected to not protected. This means that these ecosystem types (and associated habitats) are poorly protected while some are not protected anywhere in the country (such as in nationally protected areas).

#### 6.4.2.7 Ramsar Sites & World Heritage Sites

There are no Ramsar sites or World heritage sites within the application area.

#### 6.4.2.8 Terrestrial Ecosystems

The prospecting area is situated mainly in the Nama Karroo Biome. The prospecting area is situated across four vegetation types: Bushmanland Arid Grassland, Bushmanland Sandy Grassland, Northern Upper Karoo and Upper Karoo Hardeveld, according to Mucina & Rutherford (2006). Majority of the prospecting area fall across the Bushmanland Arid Grassland and Upper Karoo Hardeveld (Figure 5). According to Mucina and Rutherford (2006), these vegetation types are classified as Least Threatened. Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 397 plant species are expected to occur in the prospecting area. Of the 397-plant species, one (1) species is listed as being SCCs. This species is *Aloidendron dichotomum*. It is described in Section 8 of the Ecological Specialist Report (Appendix E4: Ecological Assessment Report).

Table 8: Plant Species of Conservation Concern expected to occur in the prospecting area (BODATSA-POSA, 2016)

Family	Taxon	Author	IUCN	Endemic	Likelihood of Occurrence
Asphodelaceae	<i>Aloidendron dichotomum</i>	(Masson) Klopper & Gideon F.Sm.	VU	Indigenous; Endemic	Moderate



#### 6.4.2.9 Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Driver *et al.*, 2011).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Driver *et al.*, 2011).

The prospecting area was superimposed on the terrestrial ecosystem threat status (Figure 9). As seen in this figure the area falls across one ecosystem which is listed as LT (TBC, 2020).

#### 6.4.2.10 Critical Biodiversity Areas (CBA)

The prospecting area falls almost completely in an area classified as an Other Natural Area (ONA), with only small portions of the prospecting area being classified as an Ecological Support Area (ESA) and Critical Biodiversity Area Two (CBA2) (Figure 8). ONAs consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs (TBC, 2020). Please refer to the specialist reports for more detail regarding the CBAs.

#### 6.4.2.11 Fauna

##### 6.4.2.11.1 Avifauna

Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 135 bird species are expected to occur in the vicinity of the prospecting area. Of the expected bird species, twelve (12) species are listed as SCC either on a regional scale or international scale. The SCC include the following:

- One (1) species that are listed as CR on a regional basis;
- Three (3) species that are listed as EN on a regional basis;
- Four (4) species that are listed as VU on a regional basis; and
- Four (4) species that are listed as NT on a regional basis.

Table 9: List of bird species of regional or global conservation importance that are expected to occur in the pendants mentioned above (SABAP2, 2019, ESKOM, 2015; IUCN, 2017).

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU	LC	Low
<i>Ardeotis kori</i>	Bustard, Kori	NT	NT	High
<i>Cursorius rufus</i>	Courser, Burchell's	VU	LC	High
<i>Eupodotis vigorsii</i>	Korhaan, Karoo	NT	LC	High
<i>Falco biarmicus</i>	Falcon, Lanner	VU	LC	High
<i>Gyps africanus</i>	Vulture, White-backed	CR	CR	Low
<i>Neotis ludwigii</i>	Bustard, Ludwig's	EN	EN	High
<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT	LC	Low
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN	VU	High



Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Sagittarius serpentarius</i>	Secretary bird	VU	VU	High
<i>Spizocorys sclateri</i>	Lark, Sclater's	NT	NT	High
<i>Torgos tracheliotus</i>	Vulture, Lappet-faced	EN	EN	Low

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017). No IBAs will be affected by this prospecting right application.

#### 6.4.2.11.2 Mammals

The IUCN Red List Spatial Data (IUCN, 2017) lists 71 mammal species that could be expected to occur within the vicinity of the prospecting area. Of these species, 11 are medium to large conservation dependant species, such as *Ceratotherium simum* (Southern White Rhinoceros) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the prospecting area and are removed from the expected SCC list.

Of the remaining 60 small to medium sized mammal species, six (6) are listed as being of conservation concern on a regional or global basis. The list of potential species includes:

- Two (2) that are listed as VU on a regional basis; and
- Four (4) that are listed as NT on a regional scale.

Table 10: List of mammal species of conservation concern that may occur in the prospecting area as well as their global and regional conservation statuses (IUCN, 2017; SANBI, 2016)

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Atelerix frontalis</i>	South Africa Hedgehog	NT	NT	Moderate
<i>Cephalophus natalensis</i>	Natal Red Duiker	NT	NT	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	High
<i>Panthera pardus</i>	Leopard	VU	VU	Low
<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT	High
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	LC	High

#### 6.4.2.11.3 Reptiles

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) 25 reptile species are expected to occur in the prospecting area. One (1) reptile SCC is expected to be present in the prospecting area (Table 11).

Table 11: Expected reptile species of conservation concern that may occur in the prospecting area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
<i>Psammobates tentorius verroxii</i>	Tent Tortoise	NT	NT	High





#### **6.4.2.11.4 Amphibians**

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017) eleven (11) amphibian species are expected to occur in the prospecting area. No amphibian of SCC is expected in the prospecting area.

#### **6.4.2.12 Watercourses**

No true FEPA wetlands can be found in the prospecting area. No FEPA rivers can be found inside the prospecting area. The prospecting area intersects with a LT river as well as wetlands that are unclassified. The river is rated as “not protected” and the wetlands unclassified. The SAIIE (2019) shows various water sources including the Sand River and other natural wetlands found throughout the prospecting area. Artificial water bodies that could occur in the project area are dams, fish farms, reservoirs (Nel *et al.*, 2011). Natural waterbodies can be found throughout the prospecting area.

#### **6.4.2.13 Astronomy Geographical Advantage Areas**

The application area falls within the Karoo Central Astronomy Advantage Area 3 (Figure 12). It is understood that there are limitations on the radio frequencies and activities within this area, that could affect the SKA activities.

It is further understood that all electrical and electromagnetic (EM) geophysical techniques that will be employed for mineral exploration fall well below the frequencies stated in the Regulations on the Protection of the Karoo Central Astronomy Advantage Areas in Terms of the Astronomy Geographic Advantage Act (Act No. 21 of 2007). Higher frequencies don't penetrate the earth and is not used in EM induction or electrical techniques.

For time-domain EM the proposal is to inject current in a transmitter loop (either in the air or on the ground). The current will then be switched off and the secondary EM fields induced in the nearby subsurface will be measured. These fields can take up to 1 second to decay. Attempts are made to switch the current off quickly to generate higher frequency content to image the near surface well. The highest frequencies, however, are well below the MHz Range, as detailed above.

For electrical techniques it is proposed to effectively transmit a DC current between 2 electrodes. The corresponding voltage difference measured with electrodes at the surface of the earth is then used to calculate an apparent resistivity of the subsurface.

In the induced polarisation method, the DC current is switched off. The presence of polarisable and conductive material is mapped if the current doesn't directly decay to zero. In the Magnetotelluric method, measurements of the passive (natural) EM fields generated by telluric and lightning activity are made. Occasionally a source / transmitter is used, but typically transmit below 1 kHz.

The applicant has requested a Risk Assessment for the proposed activities within the Karoo Central Astronomy Advantage Area 3.

#### **6.4.2.14 Cultural and Heritage**

The desktop heritage impact assessment identified various potential heritage resources within the study area, including burial grounds and graves, historical structures, palaeontological resources and archaeological resources that could be impacted during invasive prospecting activities.

##### **6.4.2.14.1 Burial grounds and graves**

It is possible that unknown burial grounds and graves are present in the study area (Figure 13). Burial grounds and graves have high heritage significance and are given a Grade IIIA significance rating.

The impact of the proposed activities on burial grounds and graves is rated as MEDIUM negative significance before mitigation, but with the implementation of the required mitigation measures the post-mitigation impact would be LOW negative.



#### **6.4.2.14.2 Historical Structures**

The impact of the proposed prospecting activities on potential historical structures is rated as LOW negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

Any identified historical structures should be avoided with a buffer of 30 m to avoid damage during the prospecting activities.

#### **6.4.2.14.3 Palaeontology**

The Koa South Prospecting Right Application area falls mainly in the Bushmanland Group of the Namaqua Metamorphic Province, igneous Karoo dolerite, as well as the Prince Albert, White Hill and Volksrust Formations (Ecca Group) of the Karoo Supergroup. Quaternary to Recent aeolian sediments of the Gordonia Formation (Kalahari Group) are also present.

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the Kalahari Group (green) is rated as Moderate. The igneous rocks of the Bushmanland and Karoo Dolerite (grey) is Insignificant or Zero while the Prince Albert and Volksrust Formations (orange) has a High Palaeontological Sensitivity and the White Hill Formation (red) a Very High Sensitivity (Figure 3).

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. The impact of the proposed activities on potential palaeontological resources is rated as MEDIUM negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

In the event that fossil remains are discovered during any phase of the proposed prospecting activities, the Chance Find Protocol must be implemented by the ECO in charge of these developments.

#### **6.4.2.14.4 Archaeology**

Previous studies conducted in the surroundings of the study area have identified a number of archaeological sites. These include Stone Age (ESA, MSA and LSA) sites including find spots, surface scatters and rock art sites.

The impact of the proposed project on potential archaeological resources is rated as MEDIUM negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

When physical prospecting is planned an archaeologist must first visit and assess the areas of impact and make recommendations on any finds made.

In the event that archaeological artefacts are discovered during any phase of the proposed prospecting activities, the Chance Find Protocol must be implemented by the ECO in charge of these developments.

### **6.4.3 DESCRIPTION OF CURRENT LAND USES**

The Prospecting application area is situated between the R386 tar road from Carnavon to Prieska and the R403 tar road from Vosburg to Prieska. Several farm roads and servitude gravel roads cross these properties. Existing power lines are also situated across these properties.

The properties are expected to be previously largely undisturbed and mainly used for grazing of sheep and cattle. Existing farm infrastructure such as windmills, boreholes, fencing and livestock pens are expected to be sparsely dotted across the properties. Only a few tracks or roads cross these properties (PGS, 2020).

### **6.4.4 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON SITE**

The most notable infrastructure located within the application area includes the following:

- Roads;
- Windmills;
- Boreholes;



- Fencing; and
- Livestock pens.

## 6.5 IMPACTS AND RISKS IDENTIFIED

In order to calculate the significance of an impact, probability, duration, extent and magnitude will be used. The pre- and post-mitigation scores will provide an indication of the extent to which an impact can be mitigated.

Potential impacts that may occur as a result of the proposed prospecting activities are:

- Job Creation
- Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.
- Destruction of, and fragmentation of, portions of the vegetation community;
- Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;
- Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;
- Continued disturbance of vegetation communities (including portions of a CBA1, CBA2 and ESA and a section classed as moderate and highest biodiversity importance)
- Encroachment by alien invasive plant species;
- Displacement of avifauna by the airborne survey;
- Disturbance and mortalities of herpetofauna due to assaying (Rock chips and Soil sampling);
- Ongoing displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances because of the drilling and access roads;
- Further impacts due to the spread and/or establishment of alien and/or invasive species;
- Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust, vibrations, poaching and noise);
- Degradation of aquifers;
- Impacts on existing groundwater users;
- Impacts on surface water features (e.g. streams, rivers, wetlands, saltpans) – which may be recharged by groundwater;
- Impact on potential burial grounds and graves;
- Impact on structures older than 60 years;
- Impact on archaeological resources;
- Impact on palaeontological resources;
- Noise;
- Pollution of Soils;
- Air Quality;
- Deterioration and damage to existing access roads and tracks;
- Safety and security risks to landowners and lawful occupiers;
- Interference with existing land uses;
- Generation and disposal of waste; and
- Erosion due to improper rehabilitation.



## 6.6 THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations, 2014. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 12.

Table 12: Criteria for determination of impact consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),



Aspect	Score	Definition
Intensity	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 13.

Table 13: Probability scoring

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 14: Determination of environmental risk

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20



3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5
	1	2	3	4	5
Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 15.

Table 15: Significance classes

Environmental Risk Score	
Value	Description
< 10	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥ 10; < 20	Medium (i.e. where the impact could have a significant environmental risk),
≥ 20	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

In accordance with the requirements of Appendix 3(3)(j) of the EIA Regulations, 2014, and further to the assessment criteria presented above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented.

Table 16: Criteria for the determination of prioritisation

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.



	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 16. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (refer to Table 17).

Table 17: Determination of prioritisation factor

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 18: Environmental Significance Rating



Value	Description
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).
≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

## 6.7 THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

The proposed prospecting activities to be undertaken include the use of both invasive and non-invasive prospecting techniques. There will therefore be physical disturbance to the application area although this disturbance will be limited to the identified borehole sites and not the entire application area. Another negative impact of the proposed activity would be the interference with landowners or communities and the existing land uses. The actual invasive work only covers a limited area within the application area itself and therefore the disturbance due to invasive work will be minimal.

The positive impact of the proposed activity is the discovery of an economically viable mineral resource within the Kareeberg LM's, whose economy is dependent on the agricultural industry.

It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be taken into account in this BAR. Furthermore, it should be noted that the impact scores themselves will include the results of the public response and comment. Please refer to Section 6.6 above for the Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.

The following provides a description and assessment of the potential impacts identified in the impact assessment process. The topographical and geophysical surveys will see an increase in the use of access tracks by vehicles driving around the site. The access roads may over time and continuous use deteriorate and become damaged. The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities; however, the impact will be minimal as people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.

The desktop heritage impact assessment identified various potential heritage resources within the study area, including burial grounds and graves, historical structures, palaeontological resources and archaeological resources that could be impacted during invasive prospecting activities.

The potential identified heritage resources are allocated a sensitivity buffer based on the recognised management buffers accepted by SAHRA in the past few years. No regulations in the NHRA provide guidelines





on buffer zones. In the case of heritage sensitivity, a buffer of 30 – 50 meters is proposed based on the type of heritage resource. In the case of burial grounds and graves (BGG) a buffer of 50 meters is generally proposed and 30 meters for a heritage structure such as ruins and other built structure.

The Koa South Prospecting Right Application area falls mainly Bushmanland Group of the Namaqua Metamorphic Province, igneous Karoo dolerite, as well as the Prince Albert, White Hill and Volksrust Formations (Ecca Group) of the Karoo Supergroup. Quaternary to Recent aeolian sediments of the Gordonia Formation (Kalahari Group) are also present. According to the SAHRIS PalaeoMap, the Palaeontological Sensitivity of the Kalahari Group is Moderate, the igneous rocks of the Bushmanland and Karoo Dolerite is insignificant or zero while the Prince Albert and Volksrust Formations has a High Palaeontological Sensitivity and the White Hill Formation a Very High Sensitivity. (Figure 3). In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. The impact of the proposed activities on palaeontological resources is rated as MEDIUM negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative. In the event that fossil remains are discovered during any phase of the proposed prospecting activities, the Chance Find Protocol must be implemented by the ECO in charge of these developments.

Approximately 1.8 ha of vegetation (including access roads) will be cleared during prospecting, however, care will be taken to ensure that any protected species identified are relocated outside the footprint of the prospecting activities. The proposed prospecting activity may lead to the loss and destruction of habitats, direct mortalities and displacement of fauna and flora. The removal of natural vegetation to accommodate the drill holes and their associated access roads may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area, at least temporarily. Heat generated from the super conducting quantum interference device might be a problem for some animals as the ambient temperature is high already and an increase in the temperature might increase the challenges the local fauna and flora face. Air borne surveys will influence the avifauna found in the area, while the assays (Rock chips and soil samples) will likely influence the herpetofauna. Access to the application area for the topographical and geophysical survey, prospecting drilling and resource definition drilling will be required which may interrupt the existing land uses, such as grazing and residential developments. However, this impact will be minimal as it is of short duration. Provisions have been made for the rehabilitation of all areas disturbed during prospecting, including access tracks.

Although the majority of the area is being classed as a minor aquifer system with potentially poor water quality and low expected yields, there could be existing groundwater users for which boreholes could be their only water source. It is therefore critical that existing groundwater users be taken into account and that their boreholes are not negatively affected in any way. Any negative impact on groundwater and/or groundwater users, whether factual or perceived (complaints from surrounding borehole users) can have a significant financial and reputational impact on the exploration programme and subsequent mining. It is not possible to accurately predict the aquifers that will be penetrated when drilling 400 m or more and it is therefore important that support by a geohydrologist is provided before and during the drilling activities. Due to the lack of information, such as hydrocensus information, exact drilling positions and drilling depths, a very basic sensitivity map could be compiled at this stage, incorporating areas covered by quaternary deposits (e.g. sands) and surface water / pans. This information was taken from available geological and topographical maps.

The prospecting activities will generate general waste during the operational phase. This waste must be collected during site visits to be disposed of at appropriate landfill sites. A summary of the positive and negative impacts of the proposed activity are provided in Table 19 below.

Table 19: Positive and Negative Impacts of The Proposed Activity

Impact	Phase
<b>Job Creation</b>	Planning and Construction
<b>Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.</b>	Planning
<b>Destruction of, and fragmentation of, portions of the vegetation community;</b>	Construction
<b>Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;</b>	Construction



<b>Impact</b>	<b>Phase</b>
Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;	Construction
Continued disturbance of vegetation communities (including portions of a CBA1, CBA2 and ESA and a section classed as moderate and highest biodiversity importance)	Operation
Encroachment by alien invasive plant species;	Operation
Displacement of avifauna by the airborne survey;	Operation
Disturbance and mortalities of herpetofauna due to assaying (Rock chips and Soil sampling);	Operation
Ongoing displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances because of the drilling and access roads;	Operation
Further impacts due to the spread and/or establishment of alien and/or invasive species;	Closure & Decommissioning
Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust, vibrations, poaching and noise);	Closure & Decommissioning
Degradation of aquifers;	Construction
Impacts on existing groundwater users;	Construction and Operation
Impacts on surface water features (e.g. streams, rivers, wetlands, saltpans) – which may be recharged by groundwater;	Construction
Impact on potential burial grounds and graves;	Construction
Impact on structures older than 60 years;	Construction
Impact on archaeological resources;	Construction
Impact on palaeontological resources;	Construction
Noise;	Construction
Pollution of Soils;	Construction
Air Quality;	Construction
Deterioration and damage to existing access roads and tracks;	Construction
Safety and security risks to landowners and lawful occupiers;	Construction
Interference with existing land uses;	Construction
Generation and disposal of waste; and	Construction
Erosion due to improper rehabilitation	Operation

## **6.8 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK**

The following sections provide a description and assessment of the mitigation measures for each potential impact identified in the impact assessment process. The impact scores below are reflective of the impacts before the implementation of mitigation measures. A second score indicating the final significance of each potential impact is also reflected below. This score indicates the degree of potential loss of irreplaceable resources, the cumulative nature of the impact, as well as the degree of public concern regarding the impact. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final report to be submitted to the DMR for adjudication. Furthermore, it should be noted that the impact scores themselves will include the results of the aforementioned public response and comment. The results of the public consultation will be used to update the impact scores upon completion of the public review period, where after the finalised report will be submitted to the DMR for adjudication.



The mitigation hierarchy proposed by Macfarlane et al. (2016) was considered for this study (Figure 14)

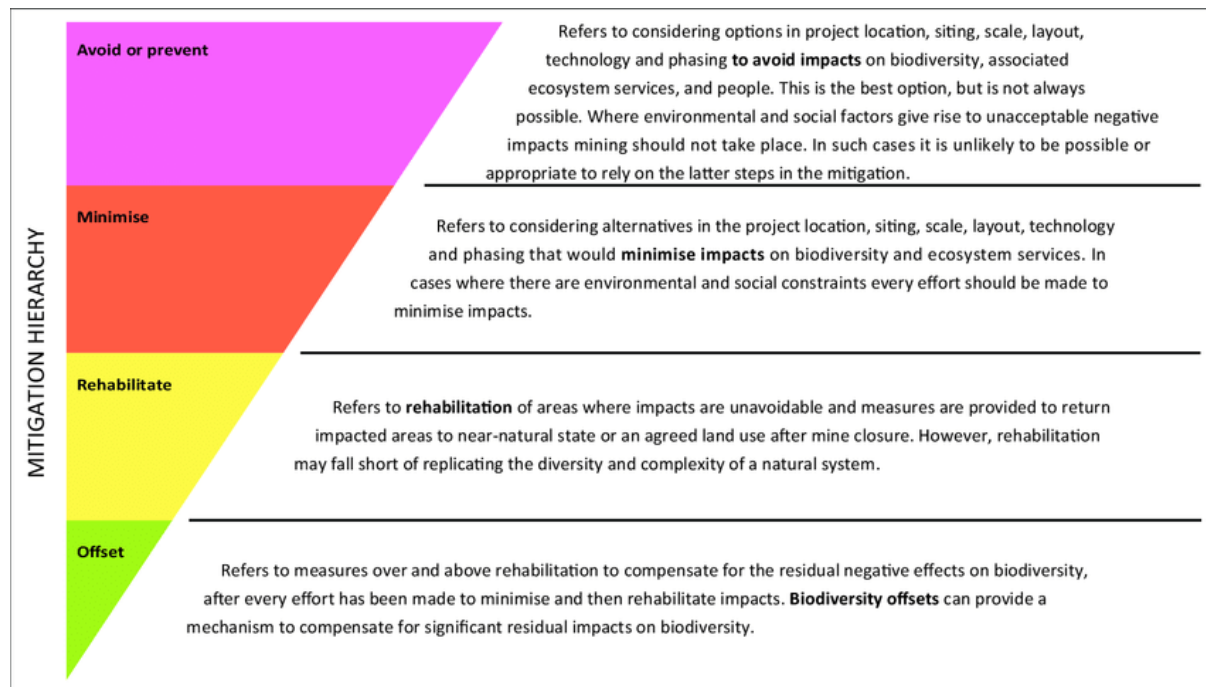


Figure 14: Mitigation hierarchy (ResearchGate, 2019)

Please refer to Section 8 for the detailed mitigation measures associated with each aspect and impact. The Pre-mitigation significance and final significance for each impact are identified in Table 20 below:

Table 20: Pre-Mitigation and Final Significance

Impact	Phase	Pre-mitigation Significance	Final Significance
<b>Job Creation</b>	Planning and Construction	+4.50	4.50
<b>Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.</b>	Planning	-5.00	-5.50
<b>Destruction of, and fragmentation of, portions of the vegetation community;</b>	Construction	-10.50	-8.25
<b>Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;</b>	Construction	-10.50	-8.25
<b>Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;</b>	Construction	-9.75	-6.19
<b>Continued disturbance of vegetation communities (including portions of a CBA1, CBA2 and ESA and a section classed as moderate and highest biodiversity importance)</b>	Operation	-9.00	-5.50
<b>Displacement of avifauna by the airborne survey;</b>	Operation	-9.00	-6.19
<b>Disturbance and mortalities of herpetofauna due to assaying (Rock chips and Soil sampling);</b>	Operation	-9.00	-5.50



Impact	Phase	Pre-mitigation Significance	Final Significance
Ongoing displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances because of the drilling and access roads;	Operation	-6.00	-5.50
Further impacts due to the spread and/or establishment of alien and/or invasive species;	Closure & Decommissioning	-8.25	-5.50
Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust, vibrations, poaching and noise);	Closure & Decommissioning	-5.50	-5.50
Degradation of aquifers;	Construction	-10.50	-12.38
Impacts on existing groundwater users;	Construction and Operation	-9.00	-8.25
Impacts on surface water features (e.g. streams, rivers, wetlands, salt pans) – which may be recharged by groundwater;	Construction	-6.50	-6.75
Impact on potential burial grounds and graves;	Construction	-11.25	-8.67
Impact on structures older than 60 years;	Construction	-7.00	-7.58
Impact on archaeological resources;	Construction	-10.50	-9.75
Impact on palaeontological resources;	Construction	-15.00	-8.67
Noise;	Construction	-4.50	-3.00
Pollution and compacting of Soils;	Construction	-4.50	-2.50
Air Quality;	Construction	-4.50	-2.50
Deterioration and damage to existing access roads and tracks;	Construction	-8.00	-5.00
Safety and security risks to landowners and lawful occupiers;	Construction	-6.00	-4.00
Interference with existing land uses;	Construction	-7.00	-5.83
Generation and disposal of waste; and	Construction	-6.00	-4.50
Erosion due to improper rehabilitation	Operation	-4.50	-3.00

## 6.9 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

The development footprint is expected to be a fraction (1,8 ha) of the application area size, which is estimated to be 9234.1442 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected is located approximately 375 kilometres South East of the town of Aggeneys, and the Aggeneys - Gamsberg base metal mines. Black Mountain Mining at Aggeneys is currently the only operating mine in the District. The meta-sedimentary sequences underling the Cenozoic cover are of mid-Proterozoic age and correlated to the Bushmanland Sequence which hosts the zinc – copper – lead – silver deposits that are currently being exploited at the Black Mountain Mine. As such no assessment of alternative development scenarios was conducted.

It should be noted that specific areas have been identified as highly sensitive in terms of the surface environmental features. As such, the main alternative (only alternative assessed further in this document) for this project will be the avoidance (no-go areas) of the invasive prospecting activities within these areas. For



remaining areas, mitigation measures have been recommended as per the sections below and these should be adhered to. Please refer to Section 10.2 below for a detailed composite map showing the areas of high sensitivity.

## **6.10 STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE**

As discussed above, the proposed application area has been selected due to the geology of the site and the anticipated favourable tectono-stratigraphic setting of the prospect area. There are no protected areas within 5 km of the application area. No prospecting will occur in close proximity to watercourses. The land or properties affected are mostly vacant and/or used for grazing and therefore the potential discovery of viable mineral resources within the application area would be beneficial in terms of diversifying the use of land in the area. Negative impacts identified above will be mitigated through implementation of the proposed measures as detailed in the EMP, where negative impacts cannot be avoided, rehabilitation will be undertaken.

The impacts of the development alternative are of Medium to Low significance and would be reduced to Medium/Low should the proposed mitigation measures be implemented accordingly.

## **7 FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY**

The impact assessment process may be summarised as follows:

1. Identification of proposed prospecting activities including their nature and duration;
2. Screening of activities likely to result in impacts or risks;
3. Utilisation of the above mentioned EIMS methodology to assess and score preliminary impacts and risks identified;
4. Inclusion of I&AP comment regarding impact identification and assessment;
5. Finalisation of impact identification and scoring.



## 8 IMPACT ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
<b>Geological Field Mapping and Environmental Screening</b>	Interference with existing land uses	Site Access	Planning	-7.00	<ul style="list-style-type: none"> <li>Site access control, heritage impact assessment; consultation with Landowners</li> </ul>	-5.83
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	<ul style="list-style-type: none"> <li>Site access control; Demarcation of access tracks to be used</li> </ul>	-5.00
<b>Regional Ground and Airborne Geophysical Surveys and Detailed Ground Geophysical Surveys</b>	Interference with existing land uses	Site Access	Planning	-7.00	<ul style="list-style-type: none"> <li>Site access control, heritage impact assessment; consultation with Landowners</li> </ul>	-5.83
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	<ul style="list-style-type: none"> <li>Site access control; Demarcation of access tracks to be used</li> </ul>	-5.00
	Displacement of avifauna	Airborne survey	Planning and Construction	-9,00	<ul style="list-style-type: none"> <li>All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the prospecting area to inform contractors and site staff of the presence of Red / Orange List species, their identification,</li> </ul>	-6,19



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>conservation status and importance, biology, habitat requirements and management requirements;</p> <ul style="list-style-type: none"> <li>• In the event that a bird strike of SCCs occur, all flights must be halted. Details pertaining to the strike must be reported to the EWT and ACSA bird strike programme (clairep@ewt.org.za) hereafter advice from these stakeholders must be followed on how to proceed;</li> <li>• Prospecting site footprints should be kept to a minimum;</li> <li>• Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC;</li> <li>• Outside lighting should be designed to minimize impacts on fauna. All outside lighting should be directed away from Very high and high sensitive areas. Fluorescent and mercury vapour lighting should be avoided and sodium vapour</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>(yellow) lights should be used wherever possible;</p> <ul style="list-style-type: none"> <li>• A qualified ECO must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that are found during the prospecting activities;</li> <li>• No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals;</li> <li>• Rehabilitation of the disturbed areas existing in the prospecting area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type; and</li> <li>• The boreholes need to be sealed to ensure that no fauna species can fall in the drill hole.</li> </ul>	
<b>Site Clearance</b>	Destruction of, and fragmentation of, portions	Prospecting areas	Construction Operation	-10,50	<ul style="list-style-type: none"> <li>• Site establishment shall take place in an orderly manner and</li> </ul>	-8,25





NAME OF POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
<p><b>and establishment</b></p>	<p>of the vegetation community</p> <p>(Clearance of vegetation)</p> <p>Loss of ESA and sections of area classed as moderate and highest biodiversity importance;</p>			<p>all amenities shall be installed before the onset of exploration;</p> <ul style="list-style-type: none"> <li>• A method statement is required from the Contractor(s) that includes the layout of the prospecting camp, management of facilities and wastewater management during prospecting;</li> <li>• The planning and design for the camp must ensure that there is a minimum impact on the environment;</li> <li>• No permanent structures will be permitted at the camp.</li> <li>• Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials.</li> <li>• All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the prospecting area to inform contractors and site staff of the presence of Red / Orange List</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>species, their identification, conservation status and importance, biology, habitat requirements and management requirements;</p> <ul style="list-style-type: none"> <li>• Prospecting site footprints should be kept to a minimum;</li> <li>• Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC;</li> <li>• Clearing of vegetation should be minimized and avoided where possible. Maintain small patches of natural vegetation within the prospecting site to accelerate restoration and succession of cleared patches;</li> <li>• When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery;</li> <li>• Construction vehicles must be restricted to existing roads and new pathways must be restricted;</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery</li> <li>• Implement alien vegetation management;</li> <li>• Ongoing identification of risks and impacts;</li> <li>• Emergency preparedness; and</li> <li>• Monitoring and review.</li> </ul>	
	<p>Impact on potential burial grounds and graves;</p> <p>Impact on structures older than 60 years;</p>	Prospecting areas	Construction Operation	-11.25	<ul style="list-style-type: none"> <li>• Any graves or burial grounds that are identified should be demarcated and avoided with at least a 30m buffer zone adhering to the requirements of Section 36 of the NHRA and its regulations.</li> <li>• Any structures that could be 60 years or older should be avoided with a buffer zone of at least 30m to prevent any damage or destruction as required by Section 34 of the NHRA.</li> <li>• If any other heritage resources are identified SAHRA should be contacted and a qualified</li> </ul>	-8,67



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					archaeologist appointed to evaluate the structures and make appropriate recommendation on mitigation	
	Impact on archaeological resources	Prospecting Areas	Construction	-10,50	<ul style="list-style-type: none"> <li>When physical prospecting (drilling) is planned an archaeologist must first visit and assess the areas of impact and make recommendations on any finds made.</li> <li>If stone artefacts are discovered during any phase of the proposed prospecting activities, either on the surface or exposed by additional excavations the Chance Find Protocol (which must be included in the Prospecting Work Program) must be implemented by the ECO in charge of the activities. As required by Section 35 of NHRA.</li> </ul>	-9,75
	Impact on palaeontological resources	Prospecting Areas	Construction	-15.00	<ul style="list-style-type: none"> <li>The EAP and ECO must be notified that portions of the study area have a High Palaeontological Sensitivity. A "Chance Find Protocol" must be</li> </ul>	-8.76



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>implemented during the proposed prospecting activities and incorporated in the PWP of this project.</p> <ul style="list-style-type: none"> <li>If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (preferably in situ) and the ECO ought to alert SAHRA so that appropriate mitigation (e.g. documented and collection) can be undertaken by a professional palaeontologist.</li> </ul>	
	<p>Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;</p>	<p>Prospecting areas</p>	<p>Construction Operation Decommissioning</p>	<p>-9,75</p>	<ul style="list-style-type: none"> <li>All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the prospecting area to inform contractors and site</li> </ul>	<p>-6.19</p>



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements;</p> <ul style="list-style-type: none"> <li>• Prospecting site footprints should be kept to a minimum;</li> <li>• Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC;</li> <li>• Clearing of vegetation should be minimized and avoided where possible. Maintain small patches of natural vegetation within the prospecting site to accelerate restoration and succession of cleared patches;</li> <li>• When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery;</li> <li>• Construction vehicles must be restricted to existing roads and</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>new pathways must be restricted;</p> <ul style="list-style-type: none"> <li>• Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery</li> <li>• Implement alien vegetation management;</li> <li>• Herpetofauna observed while rock sampling, should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified environmental control officer (ECO) trained in the handling and relocation of animals.</li> <li>• A qualified ECO must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that are found during the prospecting activities.</li> <li>• No trapping, killing or poisoning of any wildlife is to be allowed on site, including</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					snakes, birds, lizards, frogs, insects or mammals. <ul style="list-style-type: none"> <li>Rehabilitation of the disturbed areas existing in the prospecting area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.</li> </ul>	
	Pollution of Soils	Prospecting areas	Construction Operation	-4.50	<ul style="list-style-type: none"> <li>A site plan of the camp must be provided indicating domestic waste areas, chemical storage areas, fuel storage area, site offices and placement of ablution facilities.</li> <li>All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals.</li> <li>The Contractor should inform all site staff to the use of supplied ablution facilities and under no</li> </ul>	-2.50





NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</p> <ul style="list-style-type: none"> <li>• The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.</li> <li>• Where a registered disposal facility is not available close to the prospecting area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.</li> <li>• Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided.</li> <li>• Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill; and way that does not pose any</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>danger of pollution even during times of high rainfall.</p> <ul style="list-style-type: none"> <li>• Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities.</li> <li>• No storage of vehicles or equipment will be allowed outside of the designated prospecting area.</li> <li>• Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use;</li> <li>• No servicing of equipment on site unless absolutely necessary.</li> <li>• Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</li> <li>• The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages;</li> <li>All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers;</li> <li>A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site;</li> <li>Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li> </ul>	
	Encroachment by alien invasive plant species	Prospecting areas	Construction Operation Rehabilitation	-11.25	<ul style="list-style-type: none"> <li>Clearing of vegetation should be minimized and avoided where possible. Maintain small patches of natural vegetation within the prospecting site to accelerate restoration and succession of cleared patches;</li> <li>Use of indigenous species for rehabilitation</li> </ul>	-10.50



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• Rehabilitation of the disturbed areas existing in the prospecting area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;</li> <li>• Rehabilitation efforts must be monitored by a suitably qualified ECO until adequate vegetation cover is achieved.</li> </ul>	
	Air Quality	Prospecting areas	Construction Operation	-4.50	<ul style="list-style-type: none"> <li>• Clearing of vegetation should be minimized and avoided where possible. Maintain small patches of natural vegetation within the prospecting site to accelerate restoration and succession of cleared patches.</li> <li>• Dust emission should be within acceptable levels and dust control mechanisms must be in place from start to the end of prospecting activities and must be strictly adhered to.</li> <li>• Use of suitable dust suppression measures such as water spraying;</li> </ul>	-2.50



NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>All stockpiles of fine material must be covered;</li> <li>Construction vehicles must be well serviced, in roadworthy condition and comply with speed limits.</li> </ul>	
	Interference with existing land uses	Site Access	Planning Construction Operation	-7.00	<ul style="list-style-type: none"> <li>Site access control, heritage impact assessment; consultation with Landowners</li> </ul>	-5.83
<b>Target Prospecting Boreholes &amp; Widely Spaced Boreholes</b>	Pollution and Compacting of Soils	Drilling	Construction Operation	-4.50	<ul style="list-style-type: none"> <li>A site plan of the camp must be provided indicating domestic waste areas, chemical storage areas, fuel storage area, site offices and placement of ablution facilities.</li> <li>All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals.</li> <li>The Contractor should inform all site staff to the use of supplied ablution facilities and under no</li> </ul>	-2.50



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</p> <ul style="list-style-type: none"> <li>• The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.</li> <li>• Where a registered disposal facility is not available close to the prospecting area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.</li> <li>• Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided.</li> <li>• Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill; and way that does not pose any</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>danger of pollution even during times of high rainfall.</p> <ul style="list-style-type: none"> <li>• Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities.</li> <li>• No storage of vehicles or equipment will be allowed outside of the designated prospecting area.</li> <li>• Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use;</li> <li>• No servicing of equipment on site unless absolutely necessary.</li> <li>• Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</li> <li>• The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages;</li> <li>• All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers;</li> <li>• A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site;</li> <li>• Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils.</li> <li>• Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li> <li>• An above ground drilling sump must be used to contain drilling mud in order to reduce surface</li> </ul>	





NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					and groundwater contamination. No earthen mud sumps are to be constructed and utilized; <ul style="list-style-type: none"> <li>No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes;</li> <li>Soils in drilling areas where disturbances will be encountered must be stripped and stockpiled outside affected areas for use after completion of the drilling program.</li> <li>Topsoil must be adequately stripped to the correct depth and stored separately from subsoils;</li> </ul>	
	Impacts on surface water features	Drilling	Construction Operation Decommissioning	-6.50	<ul style="list-style-type: none"> <li>No invasive prospecting activities to be undertaken within 150m of a watercourse.</li> <li>To reduce the risk of the drilling activities having a negative impact on any existing groundwater user (i.e. boreholes) and surface water that may be linked to</li> </ul>	-6.75



NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>groundwater, a detailed hydrocensus, followed by a geohydrological assessment would be required for the exploration area. The geohydrological report must include a risk assessment (source-pathway-receptor) of every drill site with nearby boreholes / springs and surface water features in mind.</p> <ul style="list-style-type: none"><li>• Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation.</li><li>• No ablution of site laydown areas are to be located within 150m of a watercourse.</li><li>• Any possible contamination of watercourses by hydrocarbons, concrete or concrete water must be avoided.</li><li>• Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li></ul>	



NAME OF POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Groundwater:  Degradation of aquifers  Impacts on existing groundwater users	Drilling	Construction  Operation  Decommissioning	-10.50	<p>The following mitigation measures should be implemented as standard during the prospecting phase in order to limit the impact on groundwater resources:</p> <ul style="list-style-type: none"> <li>• Ensure vehicles and equipment are in good working order.</li> <li>• Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at a fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.</li> <li>• Ensure that good housekeeping rules are applied.</li> <li>• A procedure for the storage, handling and transport of different hazardous materials must be drawn up and strictly enforced.</li> <li>• Implement and follow water saving procedures and methodologies.</li> </ul>	-12.38



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• If boreholes are to be drilled to supply water for the staff or drilling processes;               <ul style="list-style-type: none"> <li>○ Ensure the location of the borehole/s is selected to prevent a negative effect on the groundwater levels of existing boreholes.</li> <li>○ Ensure the abstraction from the borehole/s is determined scientifically to prevent over abstraction.</li> <li>○ Liaise with potentially affected groundwater water users and monitor any potential impact.</li> <li>○ The distance between a planned exploration drill hole and a privately owned borehole is important to note, as it also affects the distance (pathway) that any</li> </ul> </li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>potential pollutant must migrate to reach the borehole</p> <ul style="list-style-type: none"> <li>○ Monitoring of the groundwater quality during and after activities are completed.</li> <li>● Portable chemical toilets must be used during the exploration phase.</li> <li>● Mud pits (if to be used) must be lined and properly covered with impermeable material after completion of exploration boreholes</li> <li>● Cap and seal all exploration boreholes to prevent surface water from entering the borehole.</li> </ul> <p>It is not currently known whether groundwater from boreholes is considered to be utilised during the prospecting phase. It is anticipated that local water sources will be located or created in consultation with nearby landowners.</p>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>During exploration drilling the following information must be recorded and reported on:</p> <ul style="list-style-type: none"> <li>• Aquifer type;</li> <li>• Depths to first water strike;</li> <li>• Depths to deeper water zones;</li> <li>• Salinity of water strike zones (EC measurement with field probe);</li> <li>• Strike yields;</li> <li>• Standing water level (allow several hours after completion); and</li> <li>• Hole completion details (e.g. cement / bentonite plug, backfill material, bore cap, bore number and coordinates).</li> <li>• Once the drilling sites are identified and prior to any invasive prospecting work, a detailed hydrocensus must of the entire application area be completed by a geohydrologist / geohydrological technician who has experience in the</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>collection of geosite data, as prescribed by the DWS.</p> <ul style="list-style-type: none"> <li>• A detailed geohydrological assessment of expected aquifers is required prior to any invasive exploration work.</li> <li>• To reduce the risk of the drilling activities having a negative impact on any existing groundwater user (i.e. boreholes) and surface water that may be linked to groundwater, a detailed hydrocensus, followed by a geohydrological assessment would be required for the exploration area. The geohydrological report must include a risk assessment (source-pathway-receptor) of every drill site with nearby boreholes / springs and surface water features in mind.</li> <li>• A qualified geohydrologist must form part of the exploration project team during drilling phases to provide the necessary input and scientific support in terms</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>of preventing / mitigating degradation of aquifers.</p> <ul style="list-style-type: none"> <li>A Geohydrological Management Plan (GMP) can be compiled for the Koa South Area once a hydrocensus has been completed, also taking cognisance of the specific drilling positions and potential receptors.</li> </ul> <p>Site specific information / instructions that will ultimately have to be included in the final GMP and overseen by an experienced and qualified geohydrologist (Pr. Sci. Nat. registered) must include:</p> <ul style="list-style-type: none"> <li>A description of the expected geological formations that will be penetrated and the expected aquifer characteristics associated with each geological formation – depth of the borehole will dictate the potential risks;</li> <li>Expected water qualities of each aquifer (associated with the different geological formations) that will be</li> </ul>	





NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					penetrated – depth of the exploration borehole will dictate the potential risks; <ul style="list-style-type: none"> <li>An assessment of the potential degradation of the aquifers should variable water qualities mix;</li> <li>Surrounding groundwater users and the protection thereof: positions of boreholes, depths, abstraction rates, water quality and dependency of the owner of his/her borehole.</li> </ul>	
	Noise	Drilling	Construction Operation	-4.50	<ul style="list-style-type: none"> <li>Noise-generating activities associated with construction activities should be kept to a minimum.</li> <li>Local residents (landowners and directly adjacent landowners) should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. This work should not take place at night or on weekends;</li> </ul>	-3.00



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• Compliance with the appropriate legislation/ any local by-laws and regulations regarding the generation of noise must be adhered to.</li> <li>• Noises that could cause a major disturbance should only be carried out in areas located in close proximity to communities and/or residences during normal working hours. Should noise-generating activities have to occur at night communities and/or landowners in the vicinity of the drilling should be warned about the noise well in advance and the activities should be kept to a minimum.</li> <li>• Awareness training should be provided to construction staff on safety, health and environmental matters.</li> <li>• Provide appropriate Personal Protective Equipment (PPE) where required.</li> <li>• Compliance with the Occupational Health and</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					Safety Act (Act No. 85 of 1993) and associated regulations. <ul style="list-style-type: none"> <li>The Applicant and Contractor must ensure that he/she has the contact details of the nearest emergency rooms (hospitals) to the site, of both private and public hospitals.</li> </ul>	
	Impact on palaeontological resources	Prospecting Areas	Construction	-15.00	<ul style="list-style-type: none"> <li>The EAP and ECO must be notified that the whole study area has a High Palaeontological Sensitivity. A "Chance Find Protocol" must be implemented during the proposed prospecting activities and incorporated in the PWP of this project.</li> <li>If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries ought to be secured (preferably in situ) and the ECO ought to alert SAHRA so that</li> </ul>	-8.67



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					appropriate mitigation (e.g. documented and collection) can be undertaken by a professional palaeontologist.	
<b>Ablutions - Chemical Toilets</b>	Impacts on surface water features	Drilling	Construction Operation Decommissioning	-6.50	<ul style="list-style-type: none"> <li>No invasive prospecting activities to be undertaken within 150m of a watercourse.</li> <li>To reduce the risk of the drilling activities having a negative impact on any existing groundwater user (i.e. boreholes) and surface water that may be linked to groundwater, a detailed hydrocensus, followed by a geohydrological assessment would be required for the exploration area. The geohydrological report must include a risk assessment (source-pathway-receptor) of every drill site with nearby boreholes / springs and surface water features in mind.</li> <li>Should any watercourse be affected, then the necessary water use licences should be</li> </ul>	-6.75



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>obtained from the Department of Water and Sanitation.</p> <ul style="list-style-type: none"> <li>No ablution or site laydown areas are to be located within 150m of a watercourse.</li> <li>Any possible contamination of watercourses by hydrocarbons, concrete or concrete water must be avoided.</li> <li>Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li> </ul>	
<b>Temporary Fuel storage</b>	Pollution and compacting of Soils	Drilling	Construction Operation	-4.50	<ul style="list-style-type: none"> <li>A site plan of the camp must be provided indicating domestic waste areas, chemical storage areas, fuel storage area, site offices and placement of ablution facilities.</li> <li>All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals.</li> </ul>	-2.50



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• The Contractor should inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.</li> <li>• The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.</li> <li>• Where a registered disposal facility is not available close to the prospecting area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.</li> <li>• Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided.</li> <li>• Appropriate measures must be implemented to prevent spillage and appropriate steps</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>must be taken to prevent pollution in the event of a spill; and way that does not pose any danger of pollution even during times of high rainfall.</p> <ul style="list-style-type: none"> <li>• Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities.</li> <li>• No storage of vehicles or equipment will be allowed outside of the designated prospecting area.</li> <li>• Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use;</li> <li>• No servicing of equipment on site unless absolutely necessary.</li> <li>• Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</li> <li>• The Contractor shall be in possession of an emergency spill kit that must be complete</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<p>and available at all times on site.</p> <ul style="list-style-type: none"> <li>• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages;</li> <li>• All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers;</li> <li>• A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site;</li> <li>• Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils.</li> <li>• Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li> </ul>	





NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Degradation of aquifers  Impacts on existing groundwater users;	Drilling	Construction  Operation	-10.50	<ul style="list-style-type: none"> <li>• Ensure vehicles and equipment are in good working order.</li> <li>• Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at a fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.</li> <li>• Ensure that good housekeeping rules are applied.</li> <li>• A procedure for the storage, handling and transport of different hazardous materials must be drawn up and strictly enforced.</li> </ul>	-12.38
<b>Creation of access roads</b>	Destruction of, and fragmentation of, portions of the vegetation community	Transportation	Construction  Operation	-10,50	<ul style="list-style-type: none"> <li>• No indiscriminate driving in natural areas.</li> <li>• Demarcation of access tracks to be used</li> <li>• Construction vehicles must be restricted to existing roads and new pathways must be restricted.</li> </ul>	-8,25



NAME OF POTENTIAL IMPACT ACTIVITY	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance		-10,50	<ul style="list-style-type: none"> <li>Prospecting site footprints should be kept to a minimum.</li> <li>Rehabilitation of any disturbed areas due to prospecting.</li> </ul>	-8,25
	Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;	Transportation	-9,75	<ul style="list-style-type: none"> <li>All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the prospecting area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements;</li> <li>Prospecting site footprints should be kept to a minimum;</li> <li>Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC;</li> </ul>	-6,19



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• Clearing of vegetation should be minimized and avoided where possible. Maintain small patches of natural vegetation within the prospecting site to accelerate restoration and succession of cleared patches;</li> <li>• When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery;</li> <li>• Construction vehicles must be restricted to existing roads and new pathways must be restricted;</li> <li>• Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery;</li> <li>• Implement alien vegetation management;</li> <li>• Herpetofauna observed while rock sampling, should be carefully and safely removed to a suitable location beyond the extent of the development</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					footprint by a suitably qualified environmental control officer (ECO) trained in the handling and relocation of animals. <ul style="list-style-type: none"> <li>• A qualified ECO must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that are found during the prospecting activities.</li> <li>• No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals.</li> <li>• Rehabilitation of the disturbed areas existing in the prospecting area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.</li> </ul>	
<b>Undertake closure and rehabilitation as per the annual</b>	Encroachment by alien invasive plant species	Rehabilitation	Operation Rehabilitation	-11.25	<ul style="list-style-type: none"> <li>• Only indigenous plant species must be used during revegetation of disturbed</li> </ul>	-10.50



NAME OF POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
<b>and final rehabilitation plan</b>	Abandonment of construction equipment  Appropriate waste removal and documentation thereof			areas, a plant specialist must be consulted for this purpose. <ul style="list-style-type: none"> <li>• Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;</li> <li>• Rehabilitation efforts must be monitored by a suitably qualified ECO until adequate vegetation cover is achieved.</li> <li>• Any excess or waste material or chemicals, including drilling muds etc. must be removed from the site and must preferably be recycled (e.g. oil and other hydrocarbon waste products).</li> <li>• Any waste materials or chemicals that cannot be recycled must be disposed of at a suitably licensed waste facility.</li> <li>• Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed;</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• Sites must be restored to the original condition with vegetation cover (where applicable) equalling the surrounding vegetation cover.</li> <li>• No permanent structures will be permitted at the camp;</li> <li>• All structure footprints to be rehabilitated and landscaped after prospecting is complete;</li> <li>• All debris and contaminated soils must be removed and suitably disposed of.</li> <li>• Contours and natural surrounding must be reformed;</li> <li>• Natural drainage patterns must be restored.</li> <li>• All surface infrastructure on site must be removed;</li> <li>• Temporary access routes/roads must be suitably rehabilitated; and</li> <li>• Sites must be monitored by the ECO (including relevant specialist's inputs if, necessary) for adequate rehabilitation until the desired rehabilitation objectives have been achieved.</li> </ul>	



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					<ul style="list-style-type: none"> <li>• The boreholes need to be sealed to ensure that no fauna species can fall in the drill hole.</li> <li>• During decommissioning, compacted surfaces should be broken-up and covered with brush, leaf litter or reseeded with site specific grass species.</li> </ul>	
<b>Monitoring of rehabilitation efforts</b>	Erosion due to improper rehabilitation	Closure and Rehabilitation	Rehabilitation Post-rehabilitation	-4.50	<ul style="list-style-type: none"> <li>• The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority.</li> <li>• The monitoring activities during this period will include but not be limited to:               <ul style="list-style-type: none"> <li>• Biodiversity monitoring; and</li> <li>• Re-vegetation of disturbed areas where required.</li> </ul> </li> <li>• Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed</li> </ul>	-3.00



NAME OF POTENTIAL IMPACT ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					prospecting activities and incorporated into post closure monitoring and management. <ul style="list-style-type: none"><li>• Restoration success should be monitored through a follow-up site visit during the next growing season in order to identify remedial actions</li></ul>	





## 9 SUMMARY OF SPECIALIST REPORTS

Specialist undertaken	study	Conclusions and Recommendations of Specialist Report	Specialist Recommendations that have been included in the EIA Report (Mark with X where applicable)	Reference to the applicable section of the Report where Specialist recommendations have been included.
<b>Heritage Assessment</b>	<b>Impact</b>	<p>The desktop heritage impact assessment identified various potential heritage resources within the study area, including burial grounds and graves, historical structures, palaeontological resources and archaeological resources that could be impacted during invasive prospecting activities.</p> <p>Assuming that unknown graves or burial grounds are present in the application area, the impact of the proposed activities on burial grounds and graves is rated as MEDIUM negative significance before mitigation, but with the implementation of the required mitigation measures the post-mitigation impact would be LOW negative.</p> <p>The impact of the proposed prospecting activities on potential historical structures is rated as LOW negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.</p>	X	Section 6.4 and 8



Specialist study undertaken	Conclusions and Recommendations of Specialist Report	Specialist Recommendations that have been included in the EIA Report (Mark with X where applicable)	Reference to the applicable section of the Report where Specialist recommendations have been included.
<p><b>Palaeontological Impact Assessment</b></p>	<p>The Koa South Prospecting Right Application area falls mainly in the Bushmanland Group of the Namaqua Metamorphic Province, igneous Karoo dolerite, as well as the Prince Albert, White Hill and Volksrust Formations (Ecca Group) of the Karoo Supergroup. Quaternary to Recent aeolian sediments of the Gordonia Formation (Kalahari Group) are also present.</p> <p>According to the SAHRIS PalaeoMap, the Palaeontological Sensitivity of the Kalahari Group is Moderate, the igneous rocks of the Bushmanland and Karoo Dolerite is insignificant or zero while the Prince Albert and Volksrust Formations has a High Palaeontological Sensitivity and the White Hill Formation a Very High Sensitivity (Figure 3).</p> <p>In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. The impact of the proposed activities on palaeontological resources is rated as MEDIUM negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.</p> <p>In the event that fossil remains are discovered during any phase of the proposed prospecting activities, the Chance Find Protocol must be implemented by the ECO in charge of these developments.</p>	<p>X</p>	<p>Section 6.4 and 8</p>
<p><b>Hydrogeological Risk Assessment</b></p>	<p>Although the majority of the area is being classed as a minor aquifer system with potentially poor water quality and low expected yields, there are existing groundwater users for which boreholes could be their only water source. It is therefore critical</p>	<p>X</p>	<p>Section 6.4 and 8</p>



Specialist study undertaken	Conclusions and Recommendations of Specialist Report	Specialist Recommendations that have been included in the EIA Report (Mark with X where applicable)	Reference to the applicable section of the Report where Specialist recommendations have been included.
	<p>that existing groundwater users be taken into account and that their boreholes are not negatively affected in any way. Any negative impact on groundwater and/or groundwater users, whether factual or perceived (complaints from surrounding borehole users) can have a significant financial and reputational impact on the exploration programme and subsequent mining. It is not possible to accurately predict the aquifers that will be penetrated when drilling 400 m or more and it is therefore important that support by a geohydrologist is provided before and during the drilling activities. Due to the lack of information, such as hydrocensus information, exact drilling positions and drilling depths, a very basic sensitivity map could be compiled at this stage, incorporating areas covered by quaternary deposits (e.g. sands) and surface water / pans. This information was taken from available geological and topographical maps.</p>		
<p><b>Biodiversity Assessment</b></p>	<p>Based on the desktop ecological review the habitat is still regarded to be in a largely natural condition and will provide habitat for a number of faunal species, including some threatened species. A number of species of conservation concern (SCC) are expected to occur in the area, based on the overall unique habitat the number of endemic species is also high, this increases the importance of the area as a habitat. Majority of the area has a low sensitivity, while the areas classed as highest biodiversity importance as well as Critical Biodiversity Area (CBA1) and CBA2 were given a very high sensitivity. Ecological Support Area (ESA) were given a high sensitivity, these areas are important as movement corridors for species.</p>	<p>X</p>	<p>Section 6.4 and 8</p>



Specialist study undertaken	Conclusions and Recommendations of Specialist Report	Specialist Recommendations that have been included in the EIA Report (Mark with X where applicable)	Reference to the applicable section of the Report where Specialist recommendations have been included.
	<p>The following further conclusions were reached based on the results of this desktop assessment:</p> <ul style="list-style-type: none"> <li>• Based on the Terrestrial Critical Biodiversity Area map, the prospecting area falls in areas classified as CBA1, CBA2, ESA and ONA;</li> <li>• The proposed project was superimposed on the terrestrial ecosystem threat status spatial data. According to this, the prospecting area falls across one ecosystem, which are listed as Least Threatened (LT);</li> <li>• The prospecting area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development. Based on this the terrestrial ecosystems associated with the proposed project area is rated as not protected and poorly protected;</li> <li>• According to the mining and biodiversity guidelines portions of the prospecting area is classified as moderate and highest biodiversity importance;</li> <li>• The prospecting area is situated across four vegetation types; Bushmanland Arid Grassland, Bushmanland Sandy Grassland, Northern Upper Karoo and Upper Karoo Hardeveld;</li> <li>• Based on the Plants of Southern Africa database, 397 plant species are expected to occur in the prospecting area. Of the 397-plant species, 1 species is listed as being SCCs;</li> <li>• Based on the South African Bird Atlas Project, Version 2 (SABAP2) database 135 bird species are expected to occur in the vicinity of the prospecting area of which twelve (12) species are listed as</li> </ul>		



Specialist undertaken	study Conclusions and Recommendations of Specialist Report	Specialist Recommendations that have been included in the EIA Report (Mark with X where applicable)	Reference to the applicable section of the Report where Specialist recommendations have been included.
	<p>SCC either on a regional scale or international scale;</p> <ul style="list-style-type: none"> <li>• Sixty mammal species are expected of which 6 are SCCs, while 25 reptile species are expected and 1 are SCC; and</li> <li>• Majority of the impacts had a moderate rating prior to mitigations, which were then decreased once mitigations are implemented.</li> </ul>		

## 10 ENVIRONMENTAL IMPACT STATEMENT

### 10.1 SUMMARY OF KEY FINDINGS

A summary of the key findings of the environmental impact assessment is outlined below.

- Based on the desktop ecological review the habitat is still regarded to be in a largely natural condition and will provide habitat for a number of faunal species, including some threatened species. A number of species of conservation concern (SCC) are expected to occur in the area, based on the overall unique habitat the number of endemic species is also high, this increases the importance of the area as a habitat. Majority of the area has a low sensitivity, while the areas classed as highest biodiversity importance as well as Critical Biodiversity Area (CBA1) and CBA2 were given a very high sensitivity. Ecological Support Area (ESA) and moderate biodiversity importance were given a high sensitivity, these areas are important as movement corridors for species. The following further conclusions were reached based on the results of this desktop assessment:
  - Based on the Terrestrial Critical Biodiversity Area map, the prospecting area falls in areas classified as CBA1, CBA2, ESA and ONA;
  - The proposed project was superimposed on the terrestrial ecosystem threat status spatial data. According to this, the prospecting area falls across one ecosystem, which is listed as Least Threatened (LT);
  - The prospecting area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development. Based on this, portions of the terrestrial ecosystems associated with the proposed project area are rated as not protected while others are listed as poorly protected;
  - According to the mining and biodiversity guidelines portions of the prospecting area is classified as moderate and highest biodiversity importance;
  - The prospecting area is situated across four vegetation types; Bushmanland Arid Grassland, Bushmanland Sandy Grassland, Northern Upper Karoo, and Upper Karoo Hardeveld;
  - Based on the Plants of Southern Africa database, 397 plant species are expected to occur in the prospecting area. Of the 397-plant species, 1 species are listed as being SCCs;



- Based on the South African Bird Atlas Project, Version 2 (SABAP2) database 135 bird species are expected to occur in the vicinity of the prospecting area of which twelve (12) species are listed as SCC either on a regional scale or international scale;
  - Sixty mammal species are expected of which 6 are SCCs, while 25 reptile species are expected and 1 are SCC; and
  - Majority of the impacts had a moderate rating prior to mitigations, which were then decreased once mitigations are implemented.
- The Koa South Prospecting Right Application area falls mainly in the Bushmanland Group of the Namaqua Metamorphic Province, igneous Karoo dolerite, as well as the Prince Albert, White Hill and Volksrust Formations (Ecca Group) of the Karoo Supergroup. Quaternary to Recent aeolian sediments of the Gordonia Formation (Kalahari Group) are also present. According to the SAHRIS PalaeoMap, the Palaeontological Sensitivity of the Kalahari Group is Moderate, the igneous rocks of the Bushmanland and Karoo Dolerite is insignificant or zero while the Prince Albert and Volksrust Formations has a High Palaeontological Sensitivity and the White Hill Formation a Very High Sensitivity (Figure 3).
  - According to Vegter and Seymour (1995), the study area has a low groundwater potential of 30 – 40%. These percentages indicate the probability of drilling a successful borehole (yield > 2 L/s).
  - DWS initiated a project in 2003, referred to as the Groundwater Resource Assessment Phase 2 (GRA 2) and focussed on the quantification of the groundwater resources of South Africa on a national scale. The project included the quantification of recharge, storage and sustainable yield of the aquifer systems throughout South Africa. The expected average groundwater exploitation potential (AGEP) in the Koa South area is < 2 500 m<sup>3</sup>/km<sup>2</sup>/annum.
  - Based on the Aquifer Classification Map (Vegter), the aquifer is classified as a minor aquifer region – therefore being a moderately yielding aquifer system of variable water quality. These aquifers can be fractured or potentially fractured rocks which do not have a high permeability, or other formations with variable permeability.
  - The Koa South Area falls within the Lower Orange WMA. The EWR report of 2016 covers the Lower Orange WMA and from this report the following information is deemed relevant to the Koa South Area: The Koa South Area have an estimated 70 % dependency of groundwater (i.e. domestic use, irrigation, stock watering, bulk supply, mining). The Koa South Area falls within D54D which, according to the EWR report, is described as “poor groundwater quality from marine sediments”

#### Key findings for the socio-economic environment

- The proposed prospecting activity will affect current land uses such livestock grazing. The proposed properties are situated between the R386 tar road from Carnavon to Prieska and the R403 tar road from Vosburg to Prieska. Several farm roads and servitude gravel roads cross these properties. Several farm roads and servitude gravel roads cross these properties. Existing power lines are also situated across these properties.
- Consultation with the community and landowners was conducted in order to capture any comments or concerns regarding the proposed activities and to ensure the community and landowners are kept informed and allowed to raise issues. The concerns raised will be included in the final BAR.
- The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities; however, the impact will be minimal as people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.
- The agricultural sector is the main economic sector of the Kareeberg with the largest potential for economic growth. 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.



- According to BMM's PWP, the amount to complete years 1 & 2 of the prospecting programme amounts to R3 805 377. Should the exploration strategy yield positive results the complete exploration program would amount to R31,656,506. This investment would have a positive impact in terms of stimulation of the local economy through job creation.

## **10.2 FINAL SITE MAP**

The final composite map showing the location of the sensitive areas is shown in Figure 15 below. Please refer to Appendix C: Maps for a detailed set of Composite Maps.

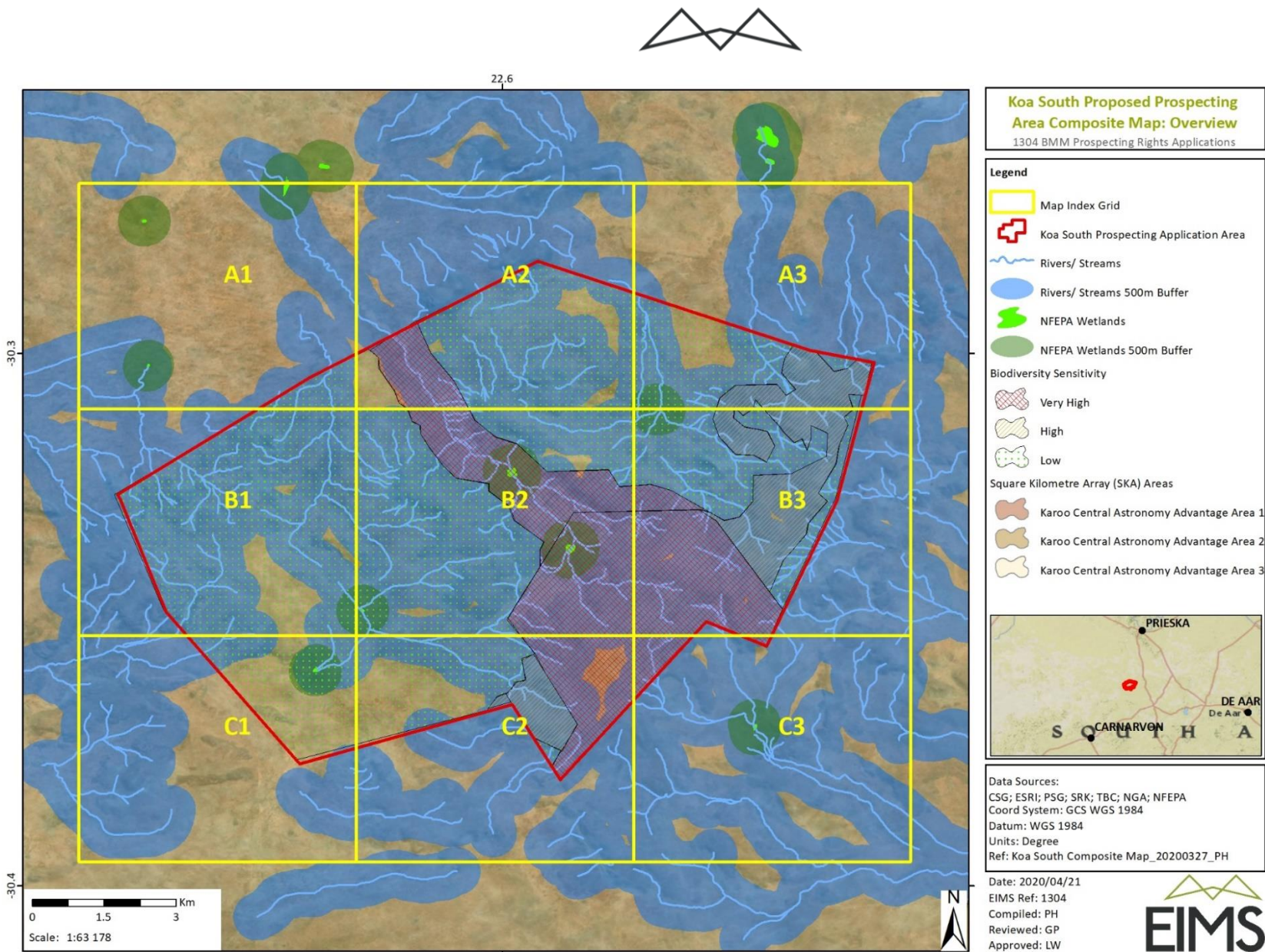


Figure 15: Final Composite Map





### 10.3 SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The positive implication of the Prospecting Right is the discovery of an economically viable mineral resource and stimulation of the economy through creation of jobs. Non-invasive techniques will be utilized as part of the proposed prospecting activities. The implementation of the proposed mitigation measure will ensure that the negative implications and risks of the project are minimised to acceptable levels. The potential negative impacts are as follows:

- Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.
- Destruction of, and fragmentation of, portions of the vegetation community;
- Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;
- Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;
- Continued disturbance of vegetation communities (including portions of a CBA1, CBA2 and ESA and a section classed as moderate and highest biodiversity importance)
- Encroachment by alien invasive plant species;
- Displacement of avifauna by the airborne survey;
- Disturbance and mortalities of herpetofauna due to assaying (Rock chips and Soil sampling);
- Ongoing displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances because of the drilling and access roads;
- Further impacts due to the spread and/or establishment of alien and/or invasive species;
- Displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust, vibrations, poaching and noise);
- Degradation of aquifers;
- Impacts on existing groundwater users;
- Impacts on surface water features (e.g. streams, rivers, wetlands, salt pans) – which may be recharged by groundwater;
- Impact on potential burial grounds and graves;
- Impact on structures older than 60 years;
- Impact on archaeological resources;
- Impact on palaeontological resources;
- Increased Noise;
- Pollution of Soils;
- Reduced Air Quality;
- Deterioration and damage to existing access roads and tracks;
- Safety and security risks to landowners and lawful occupiers;
- Temporary interference with existing land uses;
- Generation and disposal of waste; and



- Erosion due to improper rehabilitation.

The EMPr has identified appropriate mechanisms for avoidance and mitigation of these negative impacts.

## **11 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES**

The management objective is to minimise the socio-economic impact of the proposed prospecting activity in terms of the socio-economic perceptions and expectations of I&AP's. The outcome to be achieved is to lessen the impact through the following measures:

- Adhere to an open and transparent communication procedure with stakeholders at all times;
- Ensure that accurate information regarding the prospecting activities to be undertaken and the resultant lack of requirements for site access and labour is communicated to I&APs;
- Ensure that information is communicated in a manner which is understandable and accessible to I&APs;
- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community (including areas classified as a CBA1, CBA2 and ESA and sections classed as moderate and highest biodiversity importance);
- Prevent the loss of the faunal community (including potentially occurring species of conservation concern) associated with these vegetation communities; and
- Limiting the construction area to the defined prospecting areas and only impacting those areas where it is unavoidable to do so otherwise.
- Enhance project benefits and minimise negative impacts through consultation with stakeholders;
- To limit interference with existing land uses as far as possible during prospecting;
- Limit the impact on the groundwater and surface water features through the implementation of the EMPr and the impact mitigation measures.
- To avoid damage to road infrastructure; and
- To maintain safety to communities.

## **12 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION**

Please refer to Section 14.2 for the main mitigation measures that should be included as conditions in the authorisation.

## **13 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE**

The following assumptions, uncertainties, and gaps in knowledge are applicable to this BAR:

- The baseline environment was compiled through desktop studies only. The possibility exists that the desktop data is outdated or incomplete. A limited duration site visit was undertaken during the PPP in order to verify the desktop data utilised. Furthermore, the description of the baseline environment will be further informed by the results of the public participation process.
- In interpreting the NFEPA data, it must always be remembered that the NFEPA database is incomplete. The NFEPA Implementation Manual, Driver et al. (2011) states "not all wetlands have been mapped and there are substantial gaps". Furthermore, "rivers and wetlands that are not FEPAs... still require a biodiversity assessment because knowledge of special ecological features or species of special concern is incomplete.
- The potential impacts of any drilling activity on the groundwater regime will vary from site to site, even over short distances due to changes in geology and receptors. As no recent hydrocensus across the



entire exploration area has been conducted, SRK did not have access to, for example, positions of existing boreholes, dependency on groundwater, specific water quality, depth to groundwater levels and borehole depths. The sensitivity map and groundwater management plan, as presented in this report, must be seen as working documents that must be improved as more information becomes available.

- The accuracy of desktop impact assessment is reduced by several factors which may include the following: the databases of institutions are not always up to date and relevant locality and geological information were not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area and the sheet explanations were never intended to focus on palaeontological heritage. Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally assume that exposed fossil heritage is present within the development area. The accuracy of the Palaeontological Impact Assessment is thus improved considerably by conducting a field-assessment.
- This report only provides a high-level desktop / strategic screening of potential heritage risk areas. The recommendations and conclusions regarding the assessment of the potential impacts will require confirmation by a detailed field-based survey before physical prospecting is to commence. Specifically, it should be noted that some of the heritage sites that are depicted on the historical topographic maps may no longer exist due to past disturbance and that there may be grave and burial ground sites that are not depicted on the historic maps which will be identified only by the subsequent field study.

## **14 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED**

### **14.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT**

The impacts on the environment can be mitigated through open communication with the community and landowners, implementation of the proposed EMPr provisions including the decommissioning, closure and rehabilitation plans, and limiting site access requirements. It is therefore the opinion of the EAP that the proposed activity should be authorised.

### **14.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION**

The following conditions should be included in the environmental authorisation:

- Stakeholder Engagement must continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. These issues must then be addressed through a grievance mechanism.
- Arrangements for financial provisions for the decommissioning, closure and rehabilitation must be made. It should be noted that the Financial Provisioning Regulations under the NEMA will only come into effect in February 2021. The applicant must therefore update the financial provisions in line with the regulations when they come into effect as the current financial provision are based on the quantum rates.
- The applicant should adhere to the conditions of the EA, BAR, EMPR and the Specialist reports for this project.

## **15 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED**

The Environmental Authorisation is required for five (5) years.



## **16 UNDERTAKING**

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the BAR and the EMPR.

## **17 FINANCIAL PROVISION**

The preliminary estimate of the Rehabilitation Cost is (inclusive of contingencies and VAT): R 653 473.70.

### **17.1 Explain How the Aforesaid Amount Was Derived**

The Regulations Pertaining to the Financial Provision for Prospecting, Mining or Production Operations promulgated under section 44(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act No.107 of 1998) (20 November 2015) have been considered and this is anticipated to result in an increase in the rehabilitation costs estimated using above mentioned quantum.

A detailed Final Rehabilitation, Decommissioning and Closure Plan (FRDCP) has been compiled in terms of the requirements of Regulations Pertaining to the Financial Provision for Prospecting, Mining or Production Operations. This FRDCP has been included in Appendix D. Please refer to Appendix D for a detailed description of the amount required to meet the objectives of the FRDCP.

### **17.2 CONFIRM THAT THIS AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE**

Financing of the proposed work plan will be sourced from the broader Black Mountain Mine Prospecting budget. The current budget for financial year 2019 / 2020 is R177,000,000 of which some R30,000,000 is earmarked for greenfields prospecting. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mine plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations.

Arrangements to provide the financial provision detailed in Appendix D prior to commencing with any prospecting operations will be made.

## **18 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

### **18.1 COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24(3)(A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) THE BAR REPORT MUST INCLUDE THE:**

#### **18.1.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON**

The potential impacts on the socio-economic conditions have the potential to include:

- Job creation

The proposed prospecting activity is anticipated to stimulate the economy of Kareeberg LM through creation of employment opportunities during the planning, construction, closure & decommissioning and rehabilitation phases.

- Safety and security risks to landowners and lawful occupiers



The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities; however, the impact will be minimal as people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.

- Interference with existing land uses

Access to the application area for the topographical and geophysical survey will be required which may interrupt the existing land uses, such as residential developments. However, this impact will be minimal as no heavy equipment will be brought on site and it is of short duration.

The consultation process will allow directly affected parties to raise their concerns. Further to this, it must be noted that I&AP's, including directly affected parties such as landowners, have the opportunity to review and comment on this report. The results of the public consultation have been included in the final report submitted to the department for adjudication.

### **18.1.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT**

The desktop heritage impact assessment identified various potential heritage resources within the study area, including burial grounds and graves, historical structures, palaeontological resources and archaeological resources that could be impacted during invasive prospecting activities. No burial grounds or graves are depicted on the historical topographic maps for the study area. However, it is likely that unknown burial grounds and graves are present.

Notice of the proposed Prospecting Right Application will be uploaded onto the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS).

## **19 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT**

The proof of investigations conducted is attached as Appendix E.



## **PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME**

### **20 INTRODUCTION**

#### **20.1 DETAILS OF THE EAP**

The details and expertise of the EAP are detailed in Section 1 above as required.

#### **20.2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY**

A description of the aspects of the activity covered by the EMPr below is included in Section 2 above.

#### **20.3 COMPOSITE MAP**

Please refer to Section 10.2 above.

### **21 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS**

#### **21.1 DETERMINATION OF CLOSURE OBJECTIVES**

The vision, and consequent objective and targets for rehabilitation, decommissioning and closure, aim to reflect the local environmental and socio-economic context of the project, and to represent both the corporate requirements and the stakeholder expectations.

The receiving environment within which the prospecting activities will be undertaken include the following key land-uses:

- Natural Veld primarily utilised for livestock grazing;
- Low density rural residential.

With reference to Section 6.2 above, concerns raised by the stakeholders consulted during the public participation process for the basic assessment have been taken into consideration and included in the final BAR and EMPr which will be submitted to the DMR.

In practice the post closure land-use will depend on the pre-prospecting land-use applicable to the specific location of the invasive prospecting activities. Considering that the exact locations of the planned prospecting have been identified and assessed, it can be said that the closure plan will sufficiently address the objectives for the preferred alternative. This EMP does, however, aim to address the key closure objectives which are likely to remain consistent for the majority of the prospecting activities.

The EMPr includes a rehabilitation plan. The plan shall outline the closure objectives which are aimed at reinstating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with a number of specific objectives.

1. **Making the area safe.** i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing boreholes, etc.
2. **Recreating a free draining landform.** This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
3. **Re-vegetation.** This involves either reseeding or allowing natural succession depending on the area, climate etc.



4. **Storm water management and erosion control.** Management of stormwater and prevention of erosion during rehabilitation. E.g. cut off drains, berms etc. and erosion control where required.
5. **Verification of rehabilitation success.** Entails monitoring of rehabilitation.
6. **Successful closure.** Obtain closure certificate.

## **21.2 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE OPERATION**

Limited water will be consumed by the surface dust suppression activities (water mist added for dust suppression when required), approximately <500litres per day. If diamond drilling is to take place, then it is estimated that up to 40 000 litres per day could be required.

## **21.3 HAS A WATER USE LICENCE BEEN APPLIED FOR?**

No invasive prospecting activity will occur within identified watercourses. No water use licence has been applied for as part of this prospecting right application; however, it is anticipated that abstraction related water uses may be applicable. It is noted that the application area is within 500m of a watercourse, however, due to the fact that invasive prospecting will only be done at a later stage (after year 2), the initial phases will not require a water use licence and thus the water use licence will only be applied for once the non-invasive prospecting areas have been finalised. Proof of submission of the application will be provided once available.

It is recommended that this be confirmed with the DWS prior to commencement of the invasive prospecting activities that require water and should any of the NWA Section 21 water uses become applicable, then the Applicant will need to apply for the relevant water uses from the Department of Water and Sanitation prior to undertaking such activities.



## 21.4 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Table 21: Impacts to be mitigated

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
<b>Site clearance</b>	Construction Operation	1.8 ha, short term and localized	<ul style="list-style-type: none"> <li>• Demarcation of sensitive areas in consultation with relevant specialists and ECO;</li> <li>• Utilise local labour if possible;</li> <li>• Minimise removal of vegetation as far as possible;</li> <li>• Identification and relocation of protected species by a qualified ecologist (and application of the relevant biodiversity permits where required);</li> <li>• Minimize dust generation;</li> <li>• Limit vehicle access;</li> <li>• Implement alien vegetation management;</li> <li>• Ongoing identification of risks and impacts;</li> <li>• Emergency preparedness;</li> <li>• Monitoring and review; and</li> <li>• Avoid disturbance of fauna as much as possible, especially bird nesting sites.</li> </ul>	NEMA MPRDA NEMBA NEMAQA Dust regulations NWA DWAF Best Practice Guidelines	Throughout Construction and operation
<b>Site access</b>	Construction Operation	9234.1442 Ha, short term and localized	<ul style="list-style-type: none"> <li>• All employees and visitors to the site must undergo a site induction which shall include basic environmental awareness and site-specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures). This induction</li> </ul>	NEMA OHS MHSA and	Throughout Construction and operation





Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>should be presented or otherwise facilitated by the Contractors EO/Mine EO wherever possible.</p> <ul style="list-style-type: none"> <li>Landowners/lawful occupiers must be notified prior to accessing properties. A date and time that is suitable to landowners/lawful occupiers and is reasonable to the applicant should be negotiated and agreed upon.</li> <li>The number, identity of workers, work location and work to be done must be provided to the landowner/lawful occupier prior to going on site.</li> <li>Consideration must be taken by the applicant and/or contractors when on site not to interfere with the existing land uses and practices.</li> </ul>		
<b>Establishment of site infrastructure</b>	Construction	1.8 ha, short term and localized	<ul style="list-style-type: none"> <li>Minimise physical footprint of construction;</li> <li>Ensure construction is consistent with occupational health and safety requirements;</li> <li>Minimise vegetation clearance;</li> <li>Ensure proper and adequate drainage;</li> <li>Minimise waste and control waste disposal;</li> <li>Fencing of all drill sites with security access control and warning signs;</li> <li>Establish waste storage areas for recycling;</li> </ul>	NEMA MPRDA NEMBA NEMAQA Dust regulations NWA DWAF Best Practice Guidelines	Throughout Construction and operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>• Ensure adequate containment of waste to prevent pollution;</li> <li>• Minimise dust generation;</li> <li>• Limit vehicle access to approved access roads;</li> <li>• Prepare contingency plans for spillage and fire risks.</li> </ul>		
<b>Storage of construction vehicles</b>	Construction and Operation	0.1 ha, short term and localized	<ul style="list-style-type: none"> <li>• Any equipment that may leak, and does not have to be transported regularly, must be placed on watertight drips trays to catch any potential spillages of pollutants. The drip trays must be of a size that the equipment can be placed inside it;</li> <li>• Drip trays must be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility; and</li> <li>• Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils.</li> </ul>	NWA DWAFF BPG	Throughout Construction and operation
<b>Transportation/access to and from drill sites</b>	Construction and Operation	1.5 ha, short term and localized	<ul style="list-style-type: none"> <li>• Where possible, drill sites should be located along existing access roads to reduce the requirement for additional access roads;</li> <li>• Any new temporary access routes to a drill site should result in minimal disturbance to existing vegetation;</li> </ul>	NEMA NEMBA CARA NEMAQA	Throughout Construction and operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>• Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate landowners special conditions which would form a legally binding agreement;</li> <li>• All farm gates must be closed immediately upon entry/exit;</li> <li>• Under no circumstances may the contractor damage any farm gates, fences, etc.;</li> <li>• On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic (where relevant);</li> <li>• All construction and vehicles using public roads must be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport;</li> <li>• Damage caused to public roads as a result of the construction activities must be repaired in consultation with the relevant municipal authorities; and</li> <li>• All measures should be implemented to minimize the potential of dust generation.</li> </ul>	Dust Regulations Road Traffic Act	



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
<b>Storage of hazardous substances</b>	Construction and Operation	0.1 ha, short term and localized	<ul style="list-style-type: none"> <li>All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals. Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill; and way that does not pose any danger of pollution even during times of high rainfall.</li> <li>Hazardous substances must be confined to specific and secured areas, and stored at all time within bunded areas;</li> <li>Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities.</li> <li>Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.</li> </ul>	NWA NEMWA DWAF BPG NEMA	Throughout Construction and operation
<b>Waste management</b>	Construction and Operation	Short-medium term, localized	<ul style="list-style-type: none"> <li>Waste generated on site must be recycled as far as possible. Recyclable waste must not be stored on site for excessive periods to reduce risk of environmental contamination;</li> <li>Drill muds, formation water (if encountered), etc. would constitute waste and must be classified and ranked in terms of relevant legislation for correct disposal; and</li> </ul>	DWAF Minimum requirements for waste disposal NEMWA	Throughout Construction and operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>A Waste Management System must be implemented and provide for adequate waste storage (in the form of enclosed containers) waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site.</li> </ul>		
<p><b>Prospecting boreholes: 10 sites, with a footprint of 300 m<sup>2</sup> each</b></p>	<p>Construction and Operation Decommissioning</p>	<p>0.3 ha, short term</p>	<ul style="list-style-type: none"> <li>Vegetation clearing for prospecting sites should be kept to a minimum in order to reduce the disturbance footprint;</li> <li>Compaction of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils;</li> <li>All measures should be implemented to minimize the potential of dust generation;</li> <li>Local residents should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. These works should not take place at night or on weekends;</li> <li>Noise attenuation on engines must be adequate, and the noisy activities must be restricted as far as possible to times and locations whereby the potential for noise nuisance is reduced;</li> </ul>	<p>SANS 10103 ECA Noise Regulations NEMAQA Dust Regulations NWA</p>	<p>Throughout Construction and operation and decommissioning</p>



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>• When working near to a potential sensitive area, the contractor must limit the number of simultaneous activities to the minimum;</li> <li>• Ensure proper storage of fuels;</li> <li>• On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic;</li> <li>• Workforce should be kept within defined boundaries and to agreed access routes.</li> <li>• No invasive prospecting activities to be undertaken within 150m of a watercourse.</li> <li>• Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation.</li> <li>• No ablutions of site laydown areas are to be located within 150m of a watercourse.</li> <li>• Where shallow aquifers are encountered, a survey of the drinking water/ livestock watering boreholes should be undertaken (within 5km of the prospecting borehole sites). A detailed groundwater monitoring programme should be developed for these drinking water/ livestock watering boreholes and pre- and post-prospecting water quality samples should be taken.</li> </ul>		



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>Where drinking water/ livestock watering boreholes are to be affected, and where a pollution event occurs at a particular borehole, then the advice of a geohydrologist should be sought with regards to the need for plugging and casing of the prospecting boreholes.</li> </ul>		
<b>Prospecting</b>	Construction and Operation	9234,1442 Ha, short term	<ul style="list-style-type: none"> <li>Workers must be easily identifiable by clothing and ID badges. Workers should carry with them, at all times a letter from the applicant stating their employment, title, role and manager contact details.</li> </ul>	OHS and MHSA	Throughout Construction and operation
<b>Resource definition drilling</b>	Planning Phase Construction and Operation	1.8 ha, short term	<ul style="list-style-type: none"> <li>Local residents (landowners and directly adjacent landowners) should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. This work should not take place at night or on weekends;</li> <li>The contractor must attempt to restrict noisy activities as far as is possible to times and locations whereby the potential for noise nuisance is reduced;</li> <li>Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions.</li> <li>Any spills of hydrocarbons or fluids used during operation, must be cleaned up immediately;</li> <li>An above ground drilling sump must be used to contain drilling mud in order to reduce surface and groundwater contamination. No earthen mud sumps are to be constructed and utilized;</li> </ul>	MPRDA Regulations GN R527 SANS 10103 ECA Noise Regulations NEMAQA Dust Regulations NWA DWAFF BPG NHRA	Planning Phase Throughout Construction and operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>• No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes;</li> <li>• Soils in drilling areas where disturbances will be encountered must be stripped and stockpiled outside affected areas for use after completion of the drilling program.</li> <li>• Topsoil must be adequately stripped to the correct depth and stored separately from subsoils;</li> <li>• Cut of trench and berm must be constructed around the drill pad to prevent contaminated surface runoff from entering shallow aquifers and surrounding water resources, where required by the topography;</li> <li>• A liner should be placed over the drill pad and drip trays must be used in all areas where hydrocarbons are handled;</li> <li>• On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic;</li> <li>• Workforce should be kept within defined boundaries and to agreed access routes;</li> <li>• The designated competent authority (DMR) may, at the cost of the Applicant, appoint an independent and competent person to undertake borehole examination.</li> <li>• Should any fugitive emissions be detected, then the recommendations of the EMPR must be undertaken</li> </ul>		





Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<p>throughout the drilling activity up to the decommissioning of the wells.</p> <ul style="list-style-type: none"> <li>Should any chance finds be uncovered during the construction phase, these must be handled in accordance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA); and</li> <li>If a possible heritage site (including graves) or artefact is discovered during construction, all operations in the vicinity of the discovery (at least 30 m buffer) should stop and a qualified specialist contracted to evaluate and recommend appropriate actions. Depending on the type of site that can include initiating a grave relocation process, documentation of structures or archaeological excavations.</li> </ul>		
<b>Refuelling</b>	Construction and Operation	Short term and localized	<ul style="list-style-type: none"> <li>Refuelling may only take place within demarcated areas that is subject to appropriate spill prevention and containment measures. Refuelling and transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimize the potential for leakage and to prevent spillage onto the soil;</li> <li>Drip trays should be utilized in relevant locations (inlets, outlets, points of leakage, etc.) during transfer so as to prevent such spillage or leakage. Any accidental spillages must be contained and cleaned up promptly.</li> </ul>	NWA DWAf BPG	Throughout Construction and operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
<b>Maintenance and repair</b>	Construction and Operation	Short term and localized	<ul style="list-style-type: none"> <li>Trucks, machinery and equipment must be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks must be cleaned up immediately using spill kits or as per the emergency response plan. For large spills a hazardous materials specialist shall be utilized;</li> <li>Accidental hydrocarbon spillages must be reported immediately, and the affected soil should be removed, and rehabilitated or if this is not possible, disposed of at a suitably licenced waste disposal facility.</li> </ul>	NWA DWAF BPG NEMA	Throughout Construction and operation
<b>Borehole Closure</b>	Decommissioning and Closure	Short term and localized	<ul style="list-style-type: none"> <li>Where groundwater is encountered during drilling, all affected prospecting boreholes that will not be required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers;</li> <li>Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that:               <ul style="list-style-type: none"> <li>Concrete shall not be mixed directly on the ground;</li> <li>The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing</li> </ul> </li> </ul>	NWA DWAF BPG	Throughout Decommissioning and Closure



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>of visible signs into the ground is not acceptable); and</li> <li>o All excess aggregate shall also be removed.</li> </ul>		
<b>Removal of surface infrastructure</b>	Decommissioning	Short term and localized	<ul style="list-style-type: none"> <li>• All infrastructure, equipment, and other items used during prospecting will be removed from the site.</li> <li>• Compaction of soil must be avoided as far as possible. The use of heavy machinery must be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils.</li> </ul>	MPRDA Rehab Plan	Decommissioning
<b>Removal of waste</b>	Decommissioning	Small scale and localized	<ul style="list-style-type: none"> <li>• Any excess or waste material or chemicals, including drilling muds etc. must be removed from the site and must preferably be recycled (e.g. oil and other hydrocarbon waste products). Any waste materials or chemicals that cannot be recycled must be disposed of at a suitably licensed waste facility.</li> </ul>	NWA DWAf BPG	Decommissioning
<b>Rehabilitation</b>	Rehabilitation	All disturbed areas	<ul style="list-style-type: none"> <li>• Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed;</li> <li>• Sites must be restored to the original condition with vegetation cover (where applicable) equalling the surrounding vegetation cover;</li> <li>• All debris and contaminated soils must be removed and suitably disposed of;</li> <li>• Contours and natural surrounding must be reformed;</li> </ul>	MPRDA Rehab Plan NEMA	Rehabilitation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>Natural drainage patterns must be restored;</li> <li>All surface infrastructure on site must be removed;</li> <li>Temporary access routes/roads must be suitably rehabilitated; and</li> <li>Sites must be monitored by the ECO (including relevant specialist's inputs if, necessary) for adequate rehabilitation until the desired rehabilitation objectives have been achieved.</li> </ul>		
<b>Consultation</b>	Planning Phase Construction and Operation	Medium term, local	<ul style="list-style-type: none"> <li>Stakeholder engagement will continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. The Applicant shall attend applicable community meetings with the affected communities. Any issues raised will then be addressed through a grievance mechanism.</li> </ul>	NEMA OHS and MHSA	Planning Phase Throughout Construction and Operation
<b>Monitoring</b>	Post-Operational	All rehabilitated areas	<p>The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority.</p> <p>The monitoring activities during this period will include but not be limited to:</p> <ul style="list-style-type: none"> <li>Biodiversity monitoring; and</li> </ul>	MPRDA Rehab Plan	Post-operation



Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			<ul style="list-style-type: none"> <li>Re-vegetation of disturbed areas where required.</li> </ul> <p>Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.</p>		

## 21.5 IMPACT MANAGEMENT ACTIONS AND OUTCOMES

Table 22: Summary of Impact Management Actions and Outcomes

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
<b>Site clearance</b>	Deterioration and damage to existing access roads and tracks; Dust generation; Clearance of vegetation; Invasion by alien species; Sedimentation Erosion Impact on Fauna; Drilling impact on heritage resources Loss of fossil heritage.	Topography; Soil; Air Quality; Surface Water; Groundwater; Fauna and Flora; Transportation	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	NEMA NEMBA CARA Threatened or Protected Species (TOPS) regulations NEMAQA Dust regulations NWA



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
					DWAF best Practice Guidelines
<b>Establishment of base camps and access</b>	Interference with existing land uses; Safety and security risks to landowners and lawful occupiers; Deterioration and damage to existing access roads and tracks; Dust generation; Clearance of vegetation; Pollution of soils; Contamination on surface and ground	Topography; Landform; Soil disturbance; Fauna and Flora; Air Quality; Surface Water; Groundwater; Socioeconomics	Construction Operation	Avoidance and control through preventative measures (e.g. communication with landowners, site access control)  Remedy through application of mitigation measures in EMP	NEMA MPRDA NEMBA CARA Threatened or Protected Species (TOPS) regulations NEMAQA Dust regulations NWA DWAF best Practice Guidelines
<b>Storage of construction vehicles</b>	Pollution of surface and groundwater resources from potential hydrocarbon spills; and  Compaction of soils	Surface water; Groundwater; Soils.	Construction Operation	Avoid through implementation of EMP mitigation measures (e.g. communication with landowners)	Protected Species (TOPS) regulations NEMAQA Dust regulations



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				Control through implementation of ESMS	NWA DWAF best Practice Guidelines
<b>Transportation to and from drill sites</b>	Soil compaction; Disturbance and Loss of fauna and flora; Wearing and tearing of existing roads; and Dust generation from increased traffic.	Soil disturbance; Fauna and Flora; Air quality.	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	NEMA NEMBA CARA Threatened or Protected Species (TOPS) regulations NEMAQA Dust regulations NWA DWAF best Practice Guidelines
<b>Storage of hazardous substances</b>	Potential hydrocarbon spills that could pollute surface and ground water resources.	Surface water; Groundwater.	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed	NEMA NEMBA NWA DWAF best Practice



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				limit enforcement, vehicle maintenance)	Guidelines
<b>Waste management</b>	Pollution of habitats and surrounding areas.	Pollution	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	DWAF minimum requirement for waste disposal
<b>Prospecting boreholes</b>	Vegetation clearance; Possible erosion; Changes in drainage and surface hydrology; Soil disturbance and compaction; Emissions from vehicles; Land use conflict; Noise disturbance due to acoustic sources; Dust generation; Potential spills of hydrocarbons; Influx of people; Impact on groundwater; Impact on Fauna; Drilling impact on heritage resources; Loss of fossil heritage.	Ecology; Topography; Access/footprint; Soil disturbance; Noise; Air Quality; Socio-economics; Groundwater Fauna and Flora	Construction Operation Decommissioning	Control through implementation of EMPR mitigation measures	SANS10103 ECA Noise Regulations NEMAQA Dust regulations NWA





Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
<b>Resource definition drilling</b>	Vegetation clearance Removal of topsoil; Changes in drainage and surface hydrology; Drainage and soil contamination; Land use conflict; Dust generation; Disturbance of wildlife and communities in close vicinity; New access roads; Increased transportation; Damage to local infrastructure; Disturbance or damage of palaeontological resources; Influx of people; Waste water discharge; Spillage and leaks of hydrocarbons; Pollution or interplay between groundwater aquifers; Waste disposal. Changes in drainage and surface hydrology; Drainage and soil contamination; Land use conflict;	Air Quality; Noise; Surface water; Groundwater,	Operation	Control through implementation of EMPR mitigation measures	SANS10103 ECA Noise Regulations NEMAQA Dust regulations NWA DWAF best Practice Guidelines



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
<b>Refuelling</b>	Potential hydrocarbon spills that could pollute soil or surface and/or groundwater resources.	Pollution; Surface water; Groundwater	Construction Operation	Control through implementation of EMPR mitigation measures	NWA DWAFA best Practice Guidelines
<b>Maintenance and repair</b>	Potential hydrocarbon spills that could pollute surface and groundwater resources.	Pollution; Surface water; Groundwater	Construction Operation	Control through implementation of EMPR mitigation measures	NWA
<b>Borehole closure</b>	Pollution of groundwater resources; Potential pollution of habitats with cement residue that may be exposed to runoff etc.	Pollution; Groundwater	Decommissioning	Control through implementation of EMPR mitigation measures	NWA
<b>Removal of surface infrastructure</b>	Soil compaction; Pollution of soil and surrounding vegetation.	Landform; Topography; Soils.	Decommissioning	Control through implementation of EMPR mitigation measures	MPRDA In accordance with Rehabilitation plan
<b>Rehabilitation</b>	Soil compaction; Soil and Water contamination; Erosion; Change in drainage and surface hydrology; Loss of habitat; and	Topography Land use Soil disturbance Ecology Surface water Groundwater	Rehabilitation	Control through implementation of EMPR mitigation measures	MPRDA In accordance with Rehabilitation plan



Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	Disturbance to wildlife and communities in close vicinity				
<b>Monitoring of rehabilitated sites</b>	<ul style="list-style-type: none"> <li>• Soil compaction;</li> <li>• Soil and Water contamination;</li> <li>• Erosion;</li> <li>• Disturbance to wildlife; and communities in close vicinity.</li> </ul>	Topography Land use Soil disturbance Ecology Surface water Groundwater	Post-operation	Control through adhering to monitoring requirements	MPRDA and regulations



## 22 FINANCIAL PROVISION

On 20<sup>th</sup> of November 2015 the Minister promulgated the Financial Provisioning Regulations under the NEMA, which will come into effect in 2021. The regulations aim to regulate the determine and making of financial provision as contemplated in the NEMA for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. These regulations provide for, inter alia:

- Determination of financial provision: An applicant or holder of a right or permit must determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, mining or production operations, as contemplated in the Act and to the satisfaction of the Minister responsible for mineral resources.
- Scope of the financial provision: Rehabilitation and remediation; decommissioning and closure activities at the end of operations; and remediation and management of latent or residual impacts.
- Regulation 6: Method for determining financial provision – An applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:
  - Annual rehabilitation – annual rehabilitation plan
  - Final rehabilitation, decommission and closure at end of life of operations – rehabilitation, decommissioning and closure plan; and
  - Remediation of latent defects.
- Regulation 10: An applicant must-
  - ensure that a determination is made of the financial provision and the plans contemplated in regulation 6 are submitted as part of the information submitted for consideration by the Minister responsible for mineral resources of an application for environmental authorisation, the associated environmental management programme and the associated right or permit in terms of the Mineral and Petroleum Resources Development Act, 2002; and
  - Provide proof of payment or arrangements to provide the financial provision prior to commencing with any prospecting, mining or production operations.
- Regulation 11: Requires annual review, assessment and adjustment of the financial provision. The review of the adequacy of the financial provision including the proof of payment must be independently audited (annually) and included in the audit of the EMPr as required by the EIA regulations.

Appendix 4 of the Financial Provisioning Regulations provides the minimum content of a final rehabilitation, decommissioning and closure plan (FRDCP). A detailed FRDCP has been compiled and included as Appendix D.

### 22.1 OTHER GUIDELINES

The following additional guidelines which relate to financial provisioning and closure have been published in the South African context:

- Best Practice Guideline G5: Water Management Aspects for Mine Closure: This guideline was prepared by the DWS and aims to provide a logical and clear process that can be applied by mines and the competent authorities to enable proper mine closure planning that meets the requirements of the relevant authorities. This guideline is aimed primarily at larger scale mines and does not specifically address closure issues related to closure of prospecting activities, however certain principles related to closure and water management are relevant. The following technical factors which should be considered during closure, and which are likely to relate to prospecting activities, have been considered:



- Land use plan: directly interlinked with water management issues insofar as water is required to support the intended land use- in this regard the surrounding communities and the land uses implemented rely on available ground and surface water to be sustained. Management of water quality and quantity has been identified as an aspect to be covered in the FRDCP (Appendix D).
- Public participation and consultation: consultation is fundamental to closure and there is a need for full involvement of stakeholders in the development of the final closure plans, and in the agreement of closure objectives- in this regard this FRDCP has been made available through the Basic Assessment public participation process for comment by relevant stakeholders.
- Guideline for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine: The objectives of the guideline include the need to improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of mining activities. Whilst this guideline predates the recent NEMA Financial Provisioning Regulations, it does contain certain principles and concepts that remain valid and have been considered in the FRDCP (Appendix D).

## **22.2 DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER THE REGULATION**

Considering the relatively limited impact of the proposed prospecting activities, the closure objectives are aimed at re-instating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with a number of specific objectives.

1. **Making the area safe.** i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing boreholes, etc.
2. **Recreating a free draining landform.** This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
3. **Re-vegetation.** This involves either reseeding or allowing natural succession depending on the area, climate etc.
4. **Storm water management and erosion control.** Management of stormwater and prevention of erosion during rehabilitation. E.g. cut off drains, berms etc. and erosion control where required.
5. **Verification of rehabilitation success.** Entails monitoring of rehabilitation.
6. **Successful closure.** Obtain closure certificate.

## **22.3 CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES**

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant Interested and Affected Parties (I&AP's) are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the as part of the prospecting right application needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with national legislation;



- Establish and manage relationships with key stakeholder groups; and
- Encourage involvement and participation in the environmental study and authorisation/ approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project;
- Explain the environmental authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Determine and record issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&AP's and the project team;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

Landowners and interested and affected parties have been consulted and provided an opportunity to comment on this Basic Assessment Report, EMPr including all decommissioning, closure and rehabilitation plans.

## **22.4 REHABILITATION PLAN**

### **22.4.1 INTEGRATED REHABILITATION AND CLOSURE PLAN**

The main aim in developing this rehabilitation plan is to mitigate the impacts caused by the prospecting activities and to restore land back to a satisfactory standard. It is best practice to develop the rehabilitation plan as early as possible so as to ensure the optimal management of rehabilitation issues that may arise. It is important that the project's closure plan is defined and understood from before starting the process and is complementary to the rehabilitation goals. Rehabilitation and closure objectives need to be tailored to the project at hand and be aligned with the EMPr. The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the study area;
- Re-establishment of the pre-developed land capability to allow for a suitable post-mining land use;
- Prevent soil, surface water and groundwater contamination;
- Comply with the relevant local and national regulatory requirements; and
- Maintain and monitor the rehabilitated areas.

Successful rehabilitation must be sustainable, and requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

It is noted that a separate application for environmental authorisation must be submitted for closure in accordance with EIA Regulations, 2014 Listing Notice 1 Activity 22:

The decommissioning of any activity requiring –

- I. a closure certificate in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or
- II. A prospecting right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.



#### **22.4.2 PHASE 1: MAKING SAFE**

In line with the DWAF (2008). Best Practice Guideline A6: Water Management for Underground Mines all prospecting boreholes that will not be required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers. Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that:

- Concrete shall not be mixed directly on the ground;
- The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing of visible signs into the ground is not acceptable); and
- All excess aggregate shall also be removed.

#### **22.4.3 PHASE 2: LANDFORM DESIGN, EROSION CONTROL AND REVEGETATION**

Landform, erosion control and re-vegetation is an important part of the rehabilitation process. Landform and land use are closely interrelated, and the landform should be returned as closely as possible to the original landform. Community expectations, compatibility with local land use practices and regional infrastructure, or the need to replace natural ecosystems and faunal habitats all support returning the land as closely as possible to its original appearance and productive capacity. This requires the following:

- Shape, level and de-compact the final landscape after removing all the project infrastructure, dress with topsoil and, where necessary, vegetate with indigenous species. Commission specialists to assist in planning re-vegetation and the management of environmental impact, as required.
- Remove access roads with no beneficial re-use potential by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Natural drainage patterns are to be reinstated as closely as possible.
- Shape all channels and drains to smooth slopes and integrate into the natural drainage pattern.
- Construct contour banks and energy dissipating structures as necessary to protect disturbed areas from erosion prior to stabilisation.
- Promote re-vegetation through the encouragement of the natural process of secondary succession.
- Natural re-vegetation is dependent on de-compactation of subsoils and adequate replacement of the accumulated reserves of topsoil (for example, over the borehole sites), so as to encourage the establishment of pioneer vegetation.
- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary, and as agreed with the re-vegetation specialist.

#### **22.4.4 PHASE 3: MONITORING AND MAINTENANCE**

The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority.

The monitoring activities during this period will include but not be limited to:

- Biodiversity monitoring; and
- Re-vegetation of disturbed areas where required.

Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.



#### **22.4.5 POST-CLOSURE MONITORING AND MAINTENANCE**

Prior to decommissioning and rehabilitation activities, a monitoring programme shall be developed and submitted to the relevant authority for approval, as a part of the Final Rehabilitation Plan. The programme is to include proposed monitoring during and after the closure of the prospecting borehole sites and related activities. It is recommended that the post-closure monitoring include the following:

- Confirmation that any waste, wastewater or other pollutants that is generated as a result of decommissioning will be managed appropriately, as per the detailed requirements set out in the Final Rehabilitation Plan,
- Confirmation that all de-contaminated sites are free of residual pollution after decommissioning.
- Confirmation that acceptable cover has been achieved in areas where natural vegetation is being re-established. 'Acceptable cover' means re-establishment of pioneer grass communities over the disturbed areas at a density similar to surrounding undisturbed areas, non-eroding and free of invasive alien plants.
- Confirmation that the prospecting borehole sites are safe and are not resulting in a pollution hazard.

Annual environmental reports will be submitted to the Designated Authority and other relevant Departments for at least one year post-decommissioning. The frequency and duration of this reporting period may be increased to include longer term monitoring, at intervals to be agreed with the Designated Authority.

The monitoring reports shall include a list of any remedial action necessary to ensure that infrastructure that has not been removed remains safe and pollution free and that rehabilitation of project sites are in a stable, weed and free condition.

#### **22.5 EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES**

The rehabilitation plan is compatible with the closure objectives in that it seeks to ensure that negative impacts on the receiving environment that could not be prevented or mitigated during prospecting are rehabilitated. The use of indigenous species during re-vegetation will ensure that ecosystem restoration is initiated and prevent invasion by alien species, the capping of boreholes will prevent future environmental issues related to fluid leakage or lateral movement through the borehole, as well as protect water resources. The appropriate disposal of waste will ensure that land is usable, in alignment with surrounding land uses and that no hazardous materials are left on site post-prospecting.

#### **22.6 CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE**

The preliminary estimate of the Rehabilitation Cost is (inclusive of contingencies and VAT): R 653 473.70. For a detailed description of the financial provision, please refer to Appendix D for the Final Rehabilitation, Decommissioning and Closure Plan.

#### **22.7 CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED.**

Financing of the proposed work plan will be sourced from the broader Black Mountain Mine Prospecting budget. The current budget for financial year 2019 / 2020 is R177,000,000 of which some R30,000,000 is earmarked for greenfields prospecting. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mine plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations.





Arrangements to provide the financial provision detailed in Appendix D prior to commencing with any prospecting operations will be made.



## 23 MECHANISMS FOR MONITORING COMPLIANCE

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
<b>Desktop Study: Literature Survey / Review / acquisition of data</b>	None	None	None	None
<b>Geological field mapping</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site inspections and checklists;</li> <li>Complaints register</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative; ECO</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Regional Ground and Aerial Geophysical Surveys</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Site Clearance:</b>	<ul style="list-style-type: none"> <li>Possession of permits for protected species</li> <li>Relocation of protected species</li> <li>Alien vegetation management;</li> <li>Implement the recommendations of the heritage specialist report and the Heritage Management Plan (See Appendix E).</li> </ul>	<ul style="list-style-type: none"> <li>Document Control</li> <li>Site Inspections and checklists</li> <li>Report review and</li> <li>Development of actions plans</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative;</li> <li>Environmental specialist, ECO</li> <li>Senior Environmental Management</li> </ul>	<ul style="list-style-type: none"> <li>Once-off control of documents, site visit and reporting;</li> <li>Monthly site visits;</li> <li>Monthly Reports Annual Performance Assessment</li> </ul>
<b>Target Prospecting Boreholes:</b>	<ul style="list-style-type: none"> <li>Alien vegetation management</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists;</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative;</li> </ul>	<ul style="list-style-type: none"> <li>Once-off control of documents, site visit and reporting;</li> </ul>



Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
<b>10 drill sites, each site covering a total area of 300 m<sup>2</sup></b>	<ul style="list-style-type: none"> <li>Noise (if any complaints are registered by residents)</li> <li>Air quality (if complaints are registered)</li> <li>Surface and groundwater management</li> <li>Implement the recommendations of the heritage specialist report and the Heritage Management Plan (See Appendix E).</li> </ul>	<ul style="list-style-type: none"> <li>Report review and development of corrective action plans</li> <li>Inspection of surface water features</li> <li>Survey of groundwater users and use within 5km of the invasive prospecting sites.</li> </ul>	<ul style="list-style-type: none"> <li>Environmental specialist, ECO</li> <li>Senior Environmental Management;</li> <li>Geohydrologist (if required)</li> </ul>	<ul style="list-style-type: none"> <li>Monthly site visits;</li> <li>Monthly Reports Annual Performance</li> <li>Prior to invasive prospecting activities and monitoring post-prospecting.</li> </ul>
<b>Data Compilation</b>	None	None	None	None
<b>Detailed Ground geophysical Surveys</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Closely Spaced Prospecting Boreholes</b>	<ul style="list-style-type: none"> <li>Alien vegetation management</li> <li>Noise (if any complaints are registered by residents)</li> <li>Air quality (if complaints are registered)</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists;</li> <li>Report review and development of corrective action plans</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative;</li> <li>Environmental specialist, ECO</li> <li>Senior Environmental Management.</li> </ul>	<ul style="list-style-type: none"> <li>Once-off control of documents, site visit and reporting;</li> <li>Monthly site visits;</li> <li>Monthly Reports Annual Performance</li> </ul>
<b>Environmental Screening by ECO</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>



Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
<b>Ablutions - Chemical Toilets</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Sample storage (Existing BMM prospecting office. No new infrastructure to be constructed)</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Access Route (Mostly existing roads to be utilised. Access tracks will be made where there are no existing routes.)  Approximate total length: 5000 m  Approximate width: 3m)</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Temporary general waste storage (General/domestic waste - Wheelie bin)</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>
<b>Temporary hazardous waste storage (Hazardous waste – Sealed Container)</b>	<ul style="list-style-type: none"> <li>All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>Contractors Environmental Representative</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspections and checklists</li> </ul>



Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
<b>Compilation of geological plans</b>	None	None	None	None
<b>Undertake decommissioning and rehabilitation as per the rehabilitation plan</b> <b>3 000 m<sup>2</sup> +15 000 m<sup>2</sup> (Drill sites + Access tracks)</b>	<ul style="list-style-type: none"> <li>• Alien vegetation management</li> <li>• Noise (if any complaints are registered by residents)</li> <li>• Air quality (if complaints are registered)</li> </ul>	<ul style="list-style-type: none"> <li>• Site Inspections and checklists;</li> <li>• Report review and development of corrective action plans</li> </ul>	<ul style="list-style-type: none"> <li>• Contractors Environmental Representative;</li> <li>• Environmental specialist, ECO</li> <li>• Senior Environmental Management</li> <li>• Surface water specialist</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly site visits;</li> <li>• Monthly Reports and Annual Performance Assessments</li> </ul>
<b>Monitoring of rehabilitation efforts</b>	<ul style="list-style-type: none"> <li>• All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>• Site Inspections and checklists</li> </ul>	<ul style="list-style-type: none"> <li>• ECO;</li> <li>• Independent Environmental Auditor</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly reports</li> </ul>
<b>Surface Water</b>	<ul style="list-style-type: none"> <li>• All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>• Site Inspections and checklists;</li> <li>• Report review and development of corrective action plans</li> </ul>	<ul style="list-style-type: none"> <li>• ECO;</li> <li>• Contractors Environmental Representative;</li> <li>• Senior Environmental Management</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly Reports</li> </ul>
<b>Groundwater</b>	<ul style="list-style-type: none"> <li>• All Impacts Identified in the EMP</li> </ul>	<ul style="list-style-type: none"> <li>• Site Inspections and checklists;</li> <li>• Report review and development of corrective action plans</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental specialist, ECO</li> <li>• Senior Environmental Management</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly;</li> <li>• If pollution event occurs at boreholes.</li> </ul>



## **24 INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ ENVIRONMENTAL AUDIT REPORT**

The result of environmental monitoring and compliance to the approved EMPr will be undertaken every year and submitted to the DMR in the form of an environmental performance assessment. Included in the report will be the following relevant information:

- The period when the performance assessment was conducted;
- The scope of the assessment;
- The procedures used for conducting the assessment;
- Interpreted information gained from monitoring the EMPr;
- Evaluation criteria used during the assessment;
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMPr and how it can be rectified; and
- Yearly updated layout plans.

Any emergency or unforeseen impacts will be reported immediately to the DMR and other relevant government departments.

## **25 ENVIRONMENTAL AWARENESS PLAN AND TRAINING**

Training and environmental awareness is an integral part of a complete EMPr. The overall aim of the training will be to ensure that all site staff are informed of their relevant requirements and obligations pertaining to the relevant authorisations, licences, permits and the approved EMPR and protection of the environment.

The applicant and contractor must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner and are capable of complying with the relevant environmental requirements. To obtain buy-in from staff, individual employees need to be involved in:

- Identifying the relevant risks;
- Understanding the nature of risks;
- Devising risk controls; and
- Given incentive to implement the controls in terms of legal obligations.

The applicant shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. All training must be formally recorded, and attendance registers retained. The environmental training should, as a minimum, include the following:

- General background and definition to the environment;
- The importance of compliance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- Compliance with mitigation measures proposed for sensitive areas;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving compliance with the environmental policy and procedures and with the requirement of the applicant's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences (legal and/or other) of departure from specified operating procedures;



- The mitigation measures required to be implemented when carrying out their work activities; and
- All operational risks must be identified, and processes established to mitigate such risk, proactively. Thus, the applicant needs to inform the employees of any environmental risks that may result from their work, and how these risks must be dealt with in order to avoid pollution and/or degradation of the environment.

In the case of new staff (including contract labour) the contractor / applicant shall keep a record of adequate environmental induction training.

## **25.1 MANNER IN WHICH EMPLOYEES WILL BE INFORMED OF ENVIRONMENTAL RISKS**

Environmental awareness could be fostered by induction course for all personnel on site, before commencing site visits. Personnel should also be alerted to particular environmental concerns associated with their tasks for the area in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by personnel. The environmental awareness training programme will include the following:

1. Occupational Health and Safety Training (OHS); and
2. Environmental Awareness Training EMPr management actions.

Environmental awareness training will focus on the following specific aspects and be undertaken in “Tool box talk” topics prior to site access:

1. Waste collection and disposal; and
2. EMPr management options and application.

## **25.2 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION**

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed prospecting activities taking place are provided below:

- Contain potential pollutants and contaminants (where possible) at source;
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates;
- Ensure the timeous clean-up of any spills;
- Implement a waste management system for all waste stream present on site;
- Investigate any I&AP claims of pollution or contamination as a result of mining activities; and
- Implement the impact management objectives, outcomes and actions, as described in Section 26 above.

It is of critical importance that the broad measures to control or remedy any causes of pollution or environmental degradation are applied during onsite prospecting activities.

## **26 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

No additional information was requested or is deemed necessary.



## 27 UNDERTAKING

The EAP herewith confirms:

- (a) The correctness of the information provided in the reports;
- (b) The inclusion of comments and inputs from stakeholders and I&AP's;
- (c) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- (d) That the 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 are correctly reflected herein.

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Signature of the environmental assessment practitioner:

**Environmental Impact Management Services (Pty) Ltd**

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Name of company:

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Date:

The Applicant herewith confirms

- (a) The person whose name and identity number is stated below is the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application;
- (b) The applicant undertakes to execute the Environmental Management Programme as proposed.

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Signature of the applicant / Signature on behalf of the applicant:

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Name of company (if applicable):

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Identity Number of Applicant's Representative

---

Date:





## 28 REFERENCES

- Banzai Environmental, 2019, Palaeontological Desktop Assessment For Five Proposed Black Mountain Mining Prospecting Right Applications, Without Bulk Sampling, In The Northern Cape
- Bridging the research–implementation gap: Mainstreaming biodiversity into the South African mining sector - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/The-mitigation-hierarchy-for-dealing-with-negative-impacts-on-biodiversity\\_fig2\\_325452359](https://www.researchgate.net/figure/The-mitigation-hierarchy-for-dealing-with-negative-impacts-on-biodiversity_fig2_325452359) [accessed 12 Jul, 2019]
- Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute, 2013, Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline A6: Water Management for Underground Mines.
- Department of Water Affairs, South Africa, September 2011. Classification of Significant Water Resources (River, Wetlands, Groundwater and Lakes) in the Upper, Middle and Lower Vaal Water Management Areas (WMA) 8, 9, 10: Status Quo Report. DWA, Pretoria.
- Google Earth, 2020.
- Government Notice 1411 in Government Gazette 41321 of 15 December 2017, Regulations on The Protection of The Karoo Central Astronomy Advantage Areas In Terms of The Astronomy Geographic Advantage Act, Act 21 of 2007.
- Minerals and Petroleum resources Development Act (No.28 of 2002) (MPRDA). Republic of South Africa.
- National Environmental Management Act no 107 of 1998 (NEMA). Republic of South Africa.
- National Water Act (No. 36 of 1998) (NWA). Republic of South Africa.
- PGS Heritage, 2020, Heritage Impact Assessment: Koa South Prospecting Right Application for Black Mountain Mining
- SRK Consulting, 2020, Geohydrological Specialist Study: KOA SOUTH AREA
- The Biodiversity Company, 2020, Biodiversity Desktop Assessment: Prospecting Right Application without Bulk Sampling on Koa South (Area 7)



## **29 APPENDICES**

### **29.1 APPENDIX A: DETAILS AND EXPERIENCE OF THE EAP**



## 29.2 APPENDIX B: PUBLIC PARTICIPATION



## 29.3 APPENDIX C: MAPS



## **29.4 APPENDIX D: FINAL REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN**



## 29.5 APPENDIX E: SPECIALIST REPORTS



## 29.6 APPENDIX E1: HERITAGE IMPACT ASSESSMENT REPORT



## 29.7 APPENDIX E2: PALAEOLOGICAL IMPACT ASSESSMENT REPORT





## 29.8 APPENDIX E3: WATER RESOURCE ASSESSMENT REPORT



## 29.9 APPENDIX E4: ECOLOGICAL ASSESSMENT REPORT



## 29.10 APPENDIX F: IMPACT ASSESSMENT CALCULATIONS