EIMS | ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

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

BASIC ASSESSMENT REPORT

BLACK MOUNTAIN MINING- VAALHOEK PROSPECTING RIGHT PROJECT

DOCUMENT DETAILS

EIMS REFERENCE:	1304-6
DOCUMENT TITLE:	Basic Assessment Report: Black Mountain Mining Vaalhoek Prospecting Right Project

DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
COMPILED:	GP Kriel		2020/02/04
CHECKED:	Brian Whitfield		2020/02/04
AUTHORIZED:	Liam Whitlow		2020/02/04

REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
2020/02/04	ORIGINAL DOCUMENT	Basic Assessment Report and Environmental Management Programme

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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:

EIMS | ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

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: NC30/5/1/1/2/12396PR

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.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AMSL	: Above Mean Sea Level
BAR	: Basic Assessment Report
BID	: Background Information Document
BGL	: Below Ground Level
DMR	: Department of Mineral Resources[1]
DWS	: Department of Water and Sanitation[2]
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

[1] 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.

[2] 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 Authorization 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.

Vaalhoek covers an area of 66 042 hectares. The area is located approximately 187 kilometres South West of the town of Upington and 193 km kilometres South East of the town of Aggeneys, Kenhardt District, 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 Bushmanland Group.

The Prospecting Right Application and Application for Environmental Authorisation was submitted to the DMR via the South African Mineral Resources Administration (SAMRAD) on 21 June 2019. The DMR accepted the Application for Environmental Authorisation on 8 July 2019 and the Prospecting Right Application on 15 July 2019. The DMR has subsequently 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.

The BAR (this report) will be made available to Interested and Affected Parties (I&AP's) for comment from 12 February 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
NEMA EIA Regulations, 2014		
Appendix 1(3)(a):	Details of – (i) The EAP who prepared the report; and (ii) The expertise of the EAP, including a curriculum vitae;	Section 1.2 Section 1.3
Appendix 1(3)(b):	The location of the activity, including: (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; and (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.4
Appendix 1(3)(c):	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 – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.4, 1.5
Appendix 1(3)(d):	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered and being applied for; and (ii) A description of the activities to be undertaken including associated structures and infrastructure;	Section 2

Environmental Regulation	Description	Section in Report
Appendix 1(3)(e):	A description of the policy and legislative context within which the development is proposed including – (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 (ii) How the proposed activity complies with and responds to the legislation and policy context plans, guidelines, tools frameworks, and instruments;	Section 3
Appendix 1(3)(f):	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	Section 4
Appendix 1(3)(g):	A motivation for the preferred site, activity and technology alternative;	Section 5
Appendix 1(3)(h):	A full description of the process followed to reach the proposed alternative within the site, including: (i) Details of all the alternatives considered; (ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (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; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage, and cultural aspects; (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 – (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed or mitigated;	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
	(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; (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; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity;	
Appendix 1(3)(i):	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including – (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (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;	Section 6.5 Section 6.6 Section 6.7 Section 6.8 Section 7
Appendix 1(3)(j):	An assessment of each identified potentially significant impact and risk, including – (i) Cumulative impacts; (ii) The nature, significance and consequence of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and	Section 8

Environmental Regulation	Description	Section in Report
	(vii) The degree to which the impact and risk can be mitigated;	
Appendix 1(3)(k):	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 9
Appendix 1(3)(l):	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 indicting 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
Appendix 1(3)(m):	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
Appendix 1(3)(n):	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 12
Appendix 1(3)(o):	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
Appendix 1(3)(p):	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 14
Appendix 1(3)(q):	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
Appendix 1(3)(r):	An undertaking under oath or affirmation by the EAP in relation to: (i) The correctness of the information provided in the reports; (ii) The inclusion of comments and inputs from stakeholders and I&Ps; (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and (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 an d affected parties;	Section 27
Appendix 1(3)(s):	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 17
Appendix 1(3)(t):	Any specific information that may be required by the competent authority; and	Section 18
Appendix 1(3)(u):	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Section 19
Appendix 4(1)(1)(a):	Details of – (i) The EAP who prepared the EMPR; and (ii) The expertise of that EAP to prepare an EMPR, including a curriculum vitae;	Section 1
Appendix 4(1)(1)(b):	A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description;	Section 2
Appendix 4(1)(1)(c):	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
Appendix 4(1)(1)(d):	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 though the environmental impact assessment process for all phases of the development including – (i) Planning and design;	Section 7 Section 8 Section 11

Environmental Regulation	Description	Section in Report
	(ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities;	
Appendix 4(1)(1)(f):	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 – (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the ac regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 11, 21
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
Appendix 4(1)(1)(i):	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 23
Appendix 4(1)(1)(j):	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 21.5
Appendix 4(1)(1)(k):	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 23

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(l):	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 23
Appendix 4(1)(1)(m):	An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 25
Appendix 4(1)(1)(n):	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 Gideon Petrus Kriel
Tel No.:	043 722 7572
Fax No.:	086 571 9047
E-mail:	gp@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.

Gideon Kriel holds an M.Env.Sci (Water Sciences) Cum Laude from the North-West University (Potchefstroom Campus) and is currently employed as a Senior Environmental Consultant. He has over 12 years of experience in environmental management.

Gideon is a Registered Professional Natural Scientist (400202/09) with the South African Council for Natural and Scientific Professions (SACNASP) and Member of the Water Institute of Southern Africa. He has delivered presentations locally and internationally concerning the use of bio-indicators for the determination of water quality, and has experience in a wide variety of Environmental Management Projects, including: Environmental Impact Assessments, Basic Assessments, Geographic Information Systems (GIS), Environmental Compliance Monitoring, Environmental Awareness Training, Aquatic Ecological Assessments, Drinking and Waste Water Treatment Process Audits, Wetland Delineation and Assessments, ISO 14001 Aspect Registers, Water Use Licence Applications, Waste Management Licence Applications and Integrated Waste and Water Management Plans (IWWMP).

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

Farm Name (s)	Please refer to Table 4 below.
Application Area (Ha)	The area is approximately 66 042 Ha (Sixty Six Thousand and Forty Two Hectares)
Magisterial District	Kenhardt
Distance and direction from nearest town	The area is located approximately 187 kilometres South West of the town of Upington and 193 km kilometres South East of the town of Aggeneys, Kenhardt District, Northern Cape Province.
21 digit Surveyor General Code for each Portion	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 Loog Kolkjes 195 Portion 0 RE	Kenhardt	1688.3822	T13926/2006CTN	C0360000000019500000
2	Farm Loog Kolkjes 195 Portion 1	Kenhardt	4261.466378	T69406/2015CTN	C0360000000019500001
3	Farm Loog Kolkjes 195 Portion 2	Kenhardt	4232.2797	T13926/2006CTN	C0360000000019500002
4	Farm Loog Kolkjes 195 Portion 3	Kenhardt	1715.919782	T18092/1999CTN	C0360000000019500003
5	Farm Loog Kolkjes 195 Portion 5	Kenhardt	1730.030602	T76872/1998CTN	C0360000000019500005
6	Farm Loog Kolkjes 195 Portion 6	Kenhardt	1698.47877	T18092/1999CTN	C0360000000019500006
7	Farm Adjoining Geelvloer 197 Portion 5	Kenhardt	3040.694649	T75653/1989CTN	C0360000000019700005
8	Farm T Caimoeps Laagte 226 Portion 2	Kenhardt	4240.160157	T75661/1989CTN	C0360000000022600002
9	Farm Zeven Paard 239 Portion 0	Kenhardt	5612.339875	T455/2000CTN	C0360000000023900000
10	Farm Zeven Paard 239 Portion 1	Kenhardt	4955.428821	T103111/2006CTN	C0360000000023900001
11	Farm Hendrik Zyn Puts 240 Portion 2	Kenhardt	1801.725102	T455/2000CTN	C0360000000024000002
12	Farm Hendrik Zyn Puts 240 Portion 4	Kenhardt	931.828297	T103111/2006CTN	C0360000000024000004
13	Farm Boomen Rivier 243 Portion 1	Kenhardt	2616.718309	T42465/2011CTN	C0360000000024300001
14	Farm Jagt Kolk 244 Portion 0 RE	Kenhardt	4112.1485	T64503/2010	C0360000000024400000
15	Farm Jagt Kolk 244 Portion 4	Kenhardt	1286.29	T64503/2010	C0360000000024400004
16	Farm Jagt Kolk 244 Portion 6	Kenhardt	2390.242789	T106053/2000CTN	C0360000000024400006
17	Farm Jagt Kolk 244 Portion 7	Kenhardt	2372.748603	T106054/2000CTN	C0360000000024400007
18	Farm Vaalhoek 378 Portion 0	Kenhardt	1352.423261	T455/2000CTN	C0360000000037800000
19	Farm Farm 383 Portion 0	Kenhardt	6257.414131	T64504/2010CTN	C0360000000038300000
20	Farm Plaas 424 Portion 0	Kenhardt	10695.66135	T90097/2002CTN	C0360000000042400000
	TOTAL AREA (HA)		**66042**		

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	-29.55218619990	20.55743840010
2	-29.55679299960	20.55950159950
3	-29.61369779990	20.58499769970
4	-29.60948699960	20.57588490000
5	-29.60928029940	20.57488759950
6	-29.60914209970	20.57369409930
7	-29.60365969940	20.54044029970
8	-29.62441810000	20.52483869980
9	-29.63640179920	20.51614039950
10	-29.64020679930	20.50902310000
11	-29.65128179920	20.51513269920
12	-29.70580129980	20.53156019950
13	-29.71900799960	20.51984079940
14	-29.68789219970	20.49472300000
15	-29.66670709960	20.47777169940
16	-29.65949839930	20.47200419960
17	-29.61583219960	20.43684149990
18	-29.60375149950	20.38583139950
19	-29.61222229930	20.36191839930
20	-29.60272369940	20.35836800000
21	-29.59108609980	20.35357250010
22	-29.54444099930	20.33475769990
23	-29.54444089940	20.33475769990
24	-29.53681169960	20.36599019950
25	-29.53055749930	20.39157049960
26	-29.52381959960	20.39986189990
27	-29.51025879980	20.41654549930
28	-29.49519340010	20.43576459960
29	-29.46845069920	20.46898200000
30	-29.48969209960	20.50383200000

Point ID	Y Coordinate	X Coordinate
31	-29.51174879930	20.53933990000
32	-29.54274059980	20.55321000000
33	-29.55218619990	20.55743840010
34	-29.39780869980	20.19949529980
35	-29.39666019990	20.20275599960
36	-29.38899360000	20.22453160000
37	-29.40011509930	20.23045989940
38	-29.45860869950	20.26165799990
39	-29.49367749920	20.28052570000
40	-29.50426299990	20.28615869990
41	-29.51924909930	20.29956129990
42	-29.54705289940	20.32443509980
43	-29.56549209950	20.26656929920
44	-29.55217669950	20.25290629960
45	-29.55528539950	20.23363819970
46	-29.54213679950	20.22739799920
47	-29.53020519980	20.22639359950
48	-29.52394549930	20.20958879940
49	-29.51614970000	20.20942969940
50	-29.51203889990	20.20680349920
51	-29.41942459950	20.13959819960
52	-29.41930259920	20.13953149960
53	-29.43343209970	20.10466259940
54	-29.45367929960	20.05614029980
55	-29.52622589940	20.03965429950
56	-29.52889709990	20.04952829980
57	-29.53279749920	20.05780239990
58	-29.54524129960	20.07916489930
59	-29.57526339990	20.08515949950
60	-29.57869389980	20.07038700000
61	-29.61811159970	20.07116180010
62	-29.64329599930	20.07093829970
63	-29.64264609970	20.06489599950

Point ID	Y Coordinate	X Coordinate
64	-29.63622109930	20.00736360010
65	-29.63356809930	19.98283659940
66	-29.63013069980	19.94935779930
67	-29.62947170000	19.94863169930
68	-29.59703629960	19.91288819940
69	-29.58228349970	19.93786519920
70	-29.55681869950	19.98093999940
71	-29.54439209950	19.98491999950
72	-29.51104829930	19.98069819960
73	-29.48802269980	19.97793219970
74	-29.48068679950	20.00730920010
75	-29.45253289960	20.03424039970
76	-29.44623659930	20.02617669960
77	-29.43617719930	20.03427059980
78	-29.44521969990	20.04556849940
79	-29.41290899960	20.09215519980
80	-29.39938269960	20.13293549940
81	-29.39169299960	20.15596329960
82	-29.39780869980	20.19949529980

1.5 LOCALITY MAP

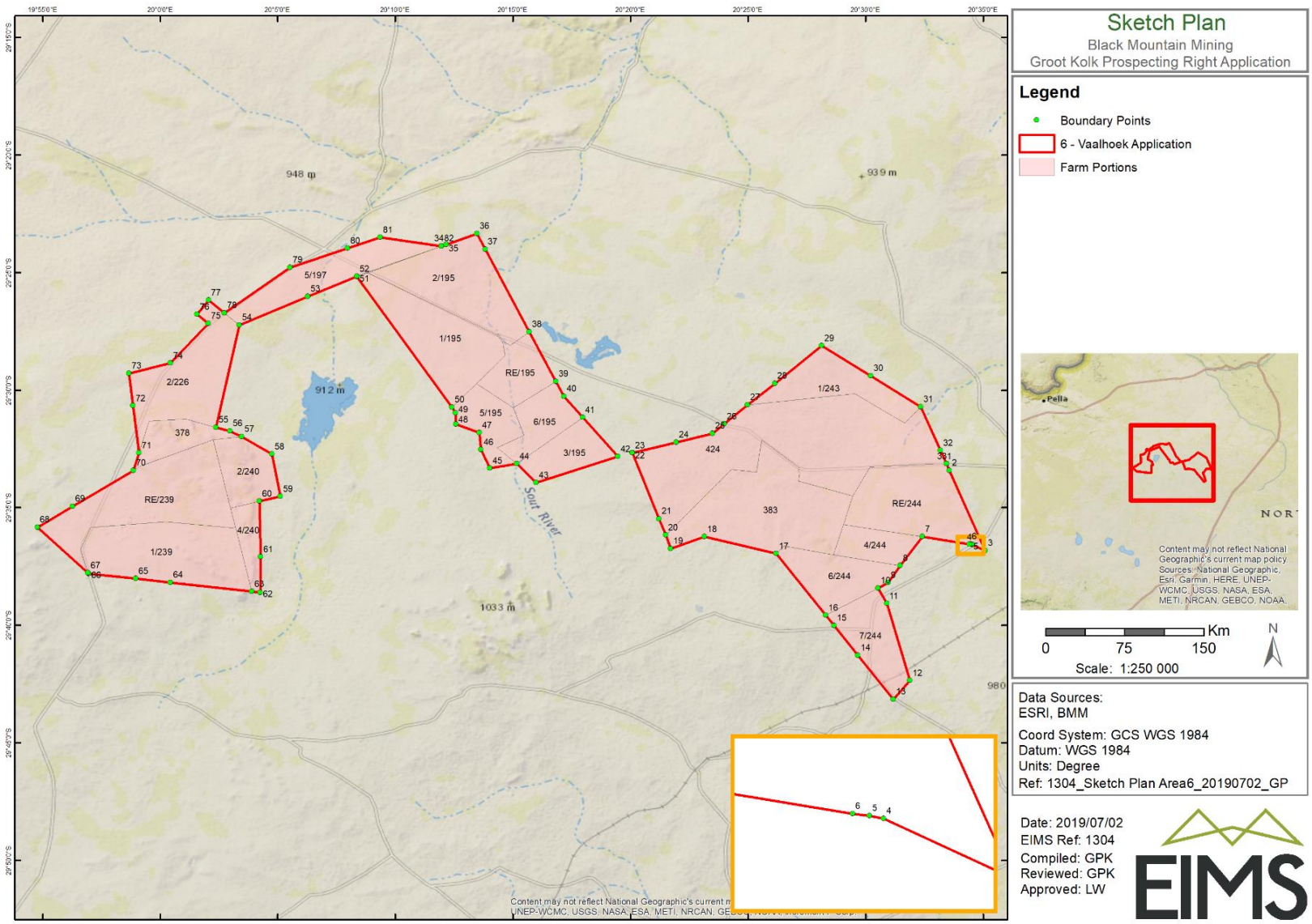


Figure 1: Locality Map

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^2 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 3m.

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
- 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 (Bushmanland 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)**	**Non-Invasive Prospecting** Desktop Study: Literature Survey / Review / acquisition of data	X				
Phase 2 **(Month 6-12)**	**Non-Invasive Prospecting** Regional Airborne Geophysical Survey	X				
Phase 3 **(Month 12-24)**	**Non-Invasive Prospecting** Ground Geophysical Survey and Geological Field Mapping		X			
Phase 4 **(Month 24-34)**	**Invasive Prospecting** Exploration Boreholes			X		
Phase 5 **(Month 34-36)**	**Non-Invasive Prospecting** Compilation, interpretation and modeling of data			X		
Phase 6 **(Month 36-42)**	**Non-Invasive Prospecting** Detailed Ground Geophysical Survey on individual positively mineralized targets to define possible extent				X	
Phase 7 **(Month 42-48)**	**Invasive Prospecting** Boreholes to confirm continuity of mineralization & potential deposit size				X	
Phase 8 **(Month 48-60)**	**Invasive Prospecting** Resource definition drilling					X
Phase 9 **(Month 54-60)**	**Non-Invasive Prospecting** 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.	66 042 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	66 042 Ha	N/A	N/A	N/A
Ground Geophysical Surveys and Geological Field Mapping	66 042 Ha	N/A	N/A	N/A
Target Exploration Boreholes: **10 drill sites, each site covering a total area of 300 m^2**	3000 m^2 (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	66 042 Ha	N/A	N/A	
Environmental Screening by ECO	66 042 Ha	N/A	N/A	N/A
Ablutions - Chemical Toilets	5 m^2	N/A	N/A	N/A
Temporary Fuel storage	5 m^2 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^2 (1.5 ha)	X	GNR 985 Activity 12 g ii	N/A
Temporary general waste storage **(General/domestic waste - Wheelie bin)**	1m^2 less than 100 cubic metres	N/A	N/A	N/A
Temporary hazardous waste storage **(Hazardous waste – Sealed Wheelie bin)**	1m^2 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^2 (1.8 ha)	N/A	N/A	N/A
Monitoring of rehabilitation efforts	18000 m^2 (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
National Environmental Management Act (No. 107 of 1998) (NEMA): **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.**	This entire report is prepared as part of the Application for Environmental Authorisation under the NEMA.	In terms of the National Environmental Management Act an Application for Environmental Authorisation subject to a Basic Assessment Process has been applied for.
Minerals and Petroleum Resources Development Act (No.28 of 2002) (MPRDA) **In support of the Prospecting Right Application submitted by Black Mountain Mining, the applicant is required to conduct a NEMA BAR**	This entire report is prepared as part of the Environmental Authorisation application under the MPRDA and NEMA.	In terms of the Mineral and Petroleum Resources Development Act a Prospecting Right Application has been submitted.

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.		
National Water Act (No. 36 of 1998) (NWA): **Water may not be used without prior authorisation by the DWS. Section 21 of the NWA water uses for which authorisation is required.**	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.
The National Environmental Management: Biodiversity Act (Act No. 10 of 2004 – NEMBA) **Section 57 and 87**	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.
National Environmental Management: Waste Act (No. 59 of 2008) and	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.
National Heritage Resources Act (No. 25 of 1999) and Regulations	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.
National Environmental Management: Air Quality Act (No. 39 of 2004) and National Dust Control Regulations (2013)	Generation of dust during prospecting activities	Mitigation measures relating to the management of dust impacts are included Part B: EMPr of this report.
SANS 10103 (Noise Regulations)	Noise impacts during prospecting	Mitigation measures relating to the management of noise impacts are included Part B: EMPr of this report.
National Forests Act (No. 84 of 1998) and Regulations	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.
Occupational Health and Safety Act (No. 85 of 1993)	General duties of employers to their employees	Mitigation measures ensuring the health and safety of employees are included Part B: EMPr of this report.
Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision provided by a mine, January 2005	Financial provision associated with the prospecting activity	Financial provision for the rehabilitation or management of negative environmental impacts associated with the prospecting activity.
Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations – No R1147, 20 November 2015	Financial provision associated with the prospecting activity	Financial provision for the rehabilitation or management of negative environmental impacts associated with the prospecting activity.
Mining and Biodiversity Guidelines 2013	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
CBAs 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 CBAs 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 CBAs are biodiversity request priority that must be afforded special attention in assessing and evaluating impacts of prospecting or mining.** **Although CBAs 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 CBAs require field verification, but this is particularly the case for broad scale CBAs where it is only in the intact areas of the CBA that mining should be prohibited.** **Over time, CBAs will be identified in the Free State, and remaining areas of the Northern Cape, and may be**	Section 6.5 Impacts and risks identified Section 6.8 Possible mitigation measures	application are falls within any CBAs and recommend mitigation measures where applicable.

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.		
Siyanda (ZF Mgcawu) Environmental Management Framework	The EMF defined the Environmental Sensitivity of the District Municipality. In terms of this Index, the prpopsed prospecting area was located in low sensitivity areas. The EMF further defined Environmental Control Zones and this proposed prospecting areas are located in Zone 2 (Potential Wind Erosion Areas) and Zone 7 (Low Control Zone). For Control Zone 2, land uses and activities that may be compatible (depending on the specific nature of land use or activity) and that may be considered in the zone after an appropriate level of impact assessment (as required by law) has been conducted: • opencast mining and quarrying; and • new tracks, roads, railways, pipelines and cables. General parameters for the Control Zone 2 included amongst others: • new roads and tracks should be kept to the minimum necessary; • exposed bare areas should be paved or be rehabilitated with	Specialists have been appointed to undertake studies, recommend mitigation measures where applicable and comply with the relevant environmental legislation.

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
	vegetation cover whenever feasible. The EMF further mentioned the following: *"Mining has traditionally been the mainstay of the economy of the area and contributed significantly to the historic settlement pattern in the area…." "…Significant untapped and dormant mineral reserves of lesser quality, however, remain in the area. With the right market conditions, sometime in the future, mining could very well once again become a strong growth sector."*	
The Northern Cape Biodiversity Sector Plan	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.

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
Astronomy Geographic Advantage Act (Act No 21 of 2007)	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 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 66 042 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected. The area is located approximately 193 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.

6.1.1 PROPERTY

The Prospecting Right application area is located between 193 kilometres South East of the town of Aggeneys, near the Black Mountain - Gamsberg base metal mines. The terrain consists of flat lying plains with Cenozoic cover sediments overlying Namaqua granites and metasediments. 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 at Aggeneys and Gamsberg.

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^2 (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 (Aggeneys) & 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 hand held 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 during August 2019, 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 Vaalhoek Prospecting Right Application:

- Kai !Garib Local Municipality;
- ZF Mgcawu District Municipality;
- Department of Mineral Resources;
- Northern Cape Department of Environment and Nature Conservation (DENC): Springbok;
- Department of Water and Sanitation (DWS);
- 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 Vaalhoek Prospecting Right Application:

- Aggeneys Community Forum;
- Agri Namakwa;
- Augrabies Falls National Park;
- Boesmanland Farmers Union;
- Botanical Society;
- Conservation South Africa (CSA);
- Endangered Wildlife Trust;
- Environmental Monitoring Group;
- Eskom;
- Khai Ma Business Forum;
- Khai Ma Tourism;
- Namakwaland Action Group/Nago;
- Pofadder Landbou Vereniging;
- Riemvasmaak Community Conservancy;
- SANBI;
- South African Heritage Resources Agency;
- Ngwao-Boswa Ya Kapa Bokone (NBKB)
- South African National Roads Agency Limited (SANRAL).
- South African Tourism;
- Square Kilometre Array (SKA);
- Succulent Karoo Ecosystem Programme (SKEP)
- Wildlife and Environment Society of South Africa (WESSA) (Northern Cape Regional Office);

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 Vaalhoek Prospecting Right application:

- Coetzee Trust
- CORNE VAN DER WESTHUIZEN FAMILIE TRUST
- DOTCOM TRADING 849 C C
- Drieboom Boerdery CC
- E & J Louw Trust
- Jacobus Adriaan Moolman
- Johan Kruger Trust
- Johannes Willem Nicolaas Malan
- Jordaan Christiaan Jacobus-Trustees
- LEOPONT 340 PROP PTY LTD
- LOUW ALBA
- LOUW IZAK JACOBUS

- MOLLER ANNA JOHANNA MARIA
- MOLLER DANIEL ALBERTUS
- MULLER RONELL
- National Department of Rural Development and Land Affairs
- NEL HERMANUS ADRIAAN JACOBUS
- NEL JOHANNES JACOBUS
- NEL MARIA GERTRUIDA
- NIEKERK FRANS JACOBUS VAN
- NOLTE FRANZ PETRUS
- NOLTE RONELL
- Noute Boerdery Trust
- OBERHOLSTER MARIA CATHARINA
- P T M FAMILIE TRUST
- Pieter Johannes Stadler
- SANDKOLK BOERDERY TRUST
- SCHALKWYK MAGDALENA SUSANNA VAN
- SCHALKWYK PHILIPPUS LODEWICKUS VAN
- SEWE PERDT TRUST
- Spatial Planning and Land Use Management
- Thirion Susanna Jacoba
- Thomas Theron Familie Trust
- VAN DER WESTHUIZEN JOUBERT
- Van Jaarsveld Familie Trust
- VAN PIETER NEL FAMILIE TRUST
- VISAGIE MARIA MAGDALENA
- WYK MARTHA BARENDINA VAN
- ZALBANE 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 (5 English and 5 Afrikaans) A2 Correx Site Notices in various locations on the site;

5) Placement of a newspaper advert in the Gemsbok Newspaper on 26 July 2019;

6) Placement of a Provincial Government Gazette Notice on 19 August 2019.

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;
- The information contained in the BAR and EMPR;
- 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 12 February 2020, for review and comment. Comments obtained during the BAR process and the responses of the EAP will be included in the Final BAR as per the summary table below ().

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 Vaalhoek Prospecting Project will be situated on several farm portions as detailed on Table 4. The area is located approximately 187 kilometres South West of the town of Upington and 193 km kilometres South East of the town of Aggeneys. The application area falls within the Kai !Garib Local Municipality (LM), within the Kenhardt Magisterial District in the Northern Cape Province. The prospecting area falls within ward 9 of the Kai !Garib LM within the ZF Mgcawu District Municipality.

Kai !Garib LM is situated along the Orange River, and is bordered by !Khara Hais LM on the north-east and Namibia on the north-west. It falls within the ZF Mgcawu DM. This area consists of three large towns: Kakamas, Keimoes and Kenhardt.

Six former settlements can be found between these towns. It is characterised by its unique landscape with the Kalahari Desert on the one side and the Orange River on the other.

According to Census 2011, Kai !Garib Local Municipality has a total population of 65 869 people, of whom 62.2% are coloured, 28.3% are black African, 6.3% are white, and 0.8% are Indian/Asian. The other population groups make up the remaining 2.3%. In this municipality, 34.6% of households are headed by females. Of those aged 20 years and older, 8.7% have completed primary school, 39.1% have some secondary education, 15.5% have completed matric, and 3.9% have some form of higher education, while 9.0% of those aged 20 years and older have no form of schooling.

The agricultural sector is the main economic sector with the largest potential for economic growth. 30 949 people are economically active (employed or unemployed but looking for work), and of these, 10% are unemployed. Of the 19 375 economically active youth (15 – 35 years) in the area, 10% are unemployed.

There are 16 703 households in the municipality, with an average household size of 2.9 persons per household. 41.9% of households have access to piped water either in their dwelling or in the yard.

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 16 kilometres east of the town of Kenhardt, Northern Cape, South Africa. The area is subdivided into two portions and it covers 20 farms, over an area of 66 042 Ha (660.42 km^2). Topographically, the western part of the Vaalhoek Area is the highest with altitudes in the order of 1000 m amsl. The area then drops towards the east to elevations around 900 m amsl. (SRK, 2019). As can be seen in Figure 2 below, the average elevation is approximately 928 m and the average slope is 0.6%.

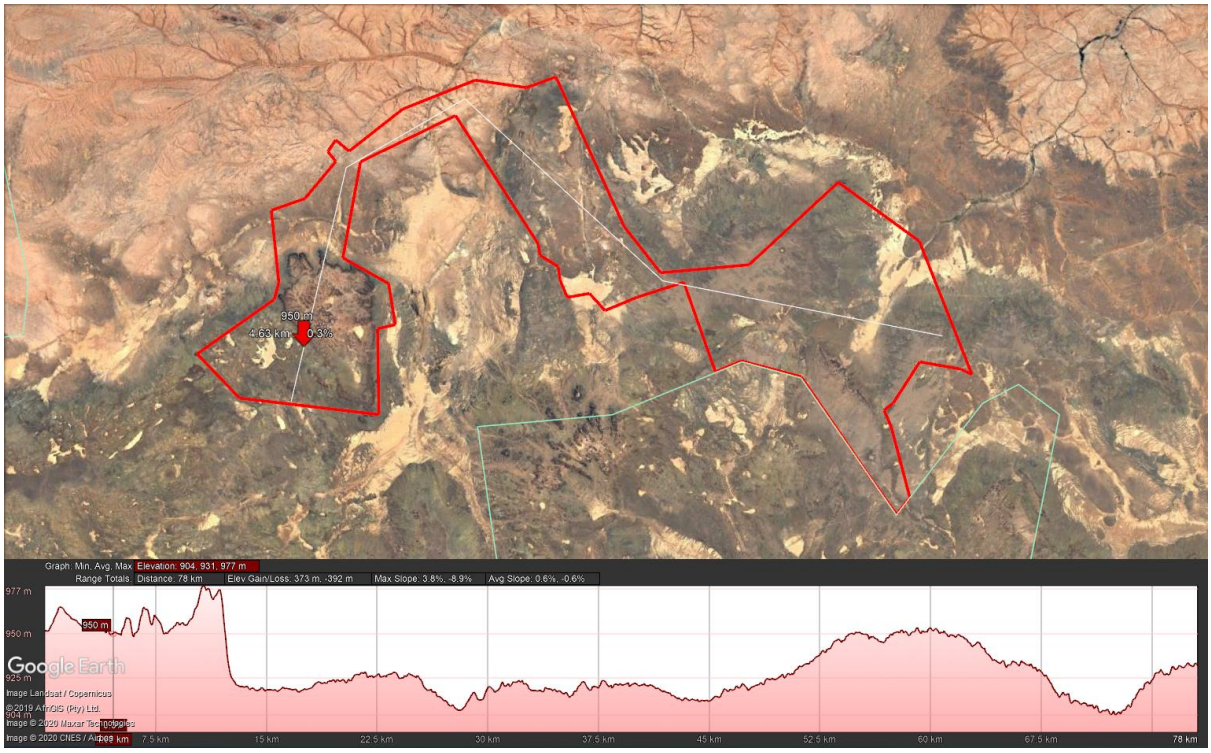


Figure 2: Elevation profile of the proposed sites.

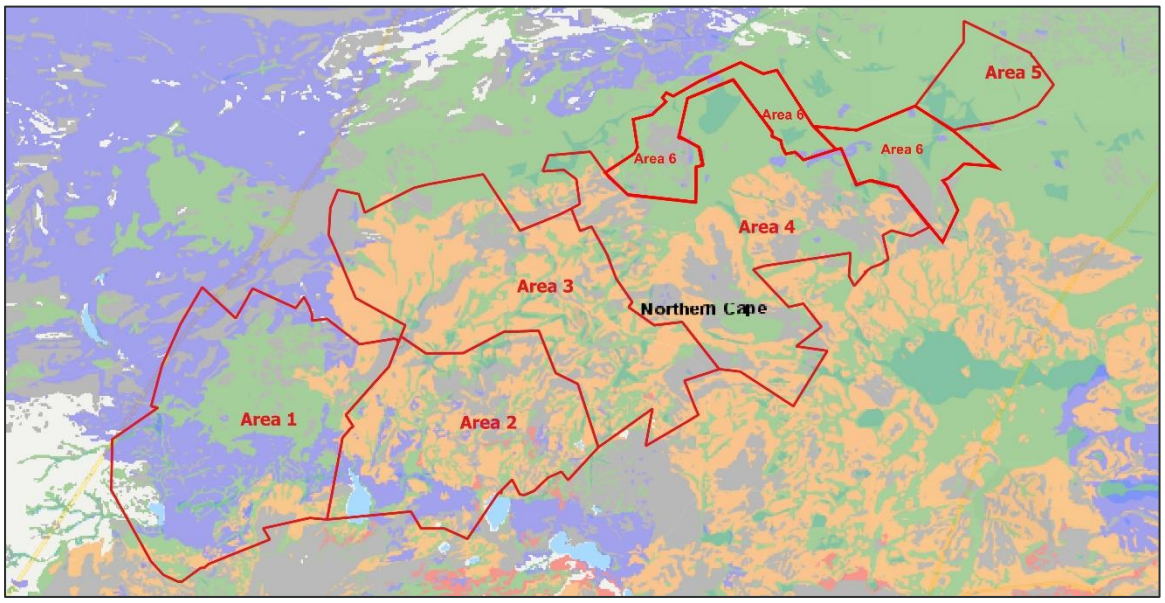


Figure 3: Extract of the 1: 250 000 SAHRIS Palaeosensitivity Map (Vaalhoek Application =Area 6)

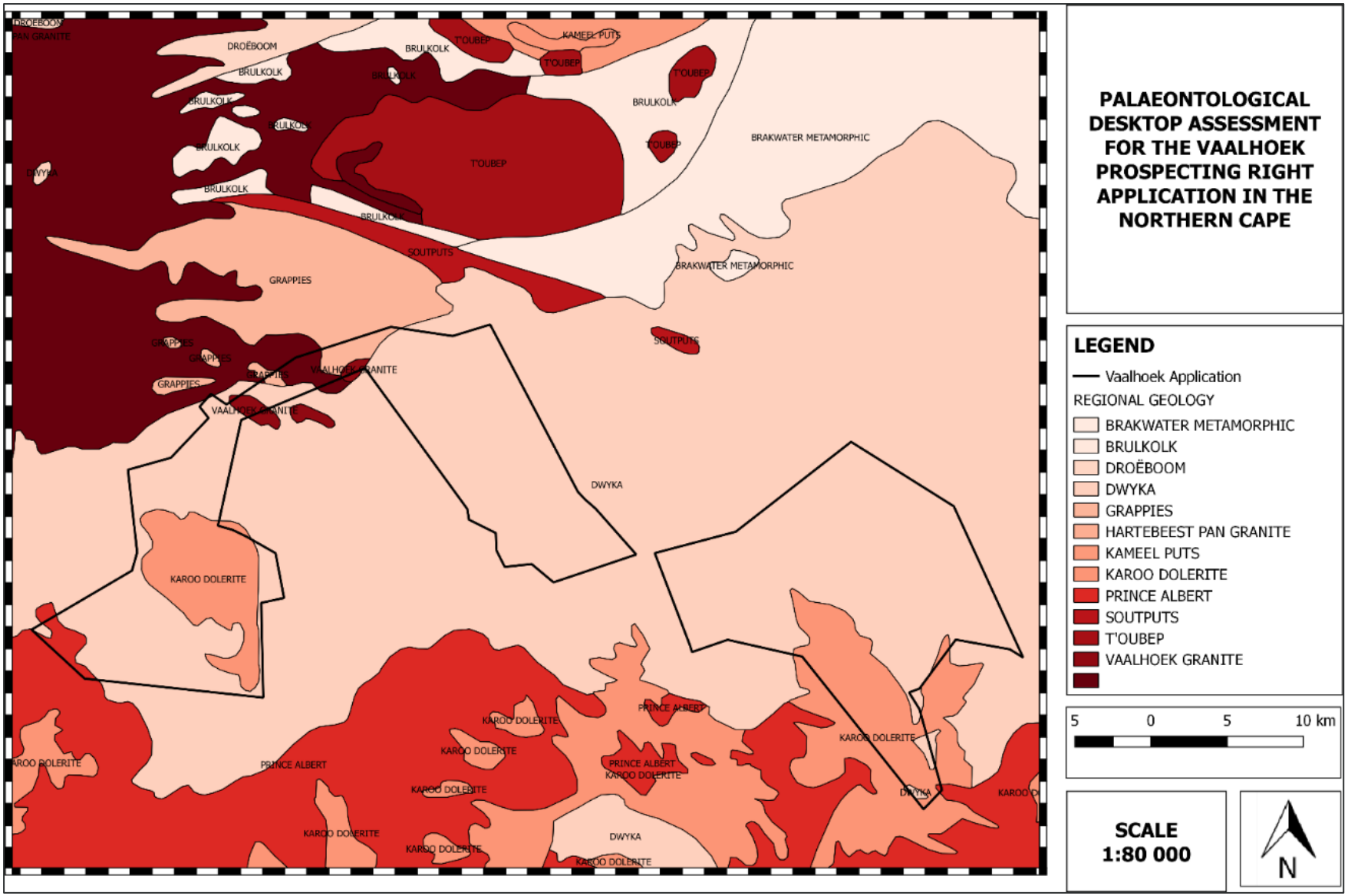


Figure 4: Geology of the application area.

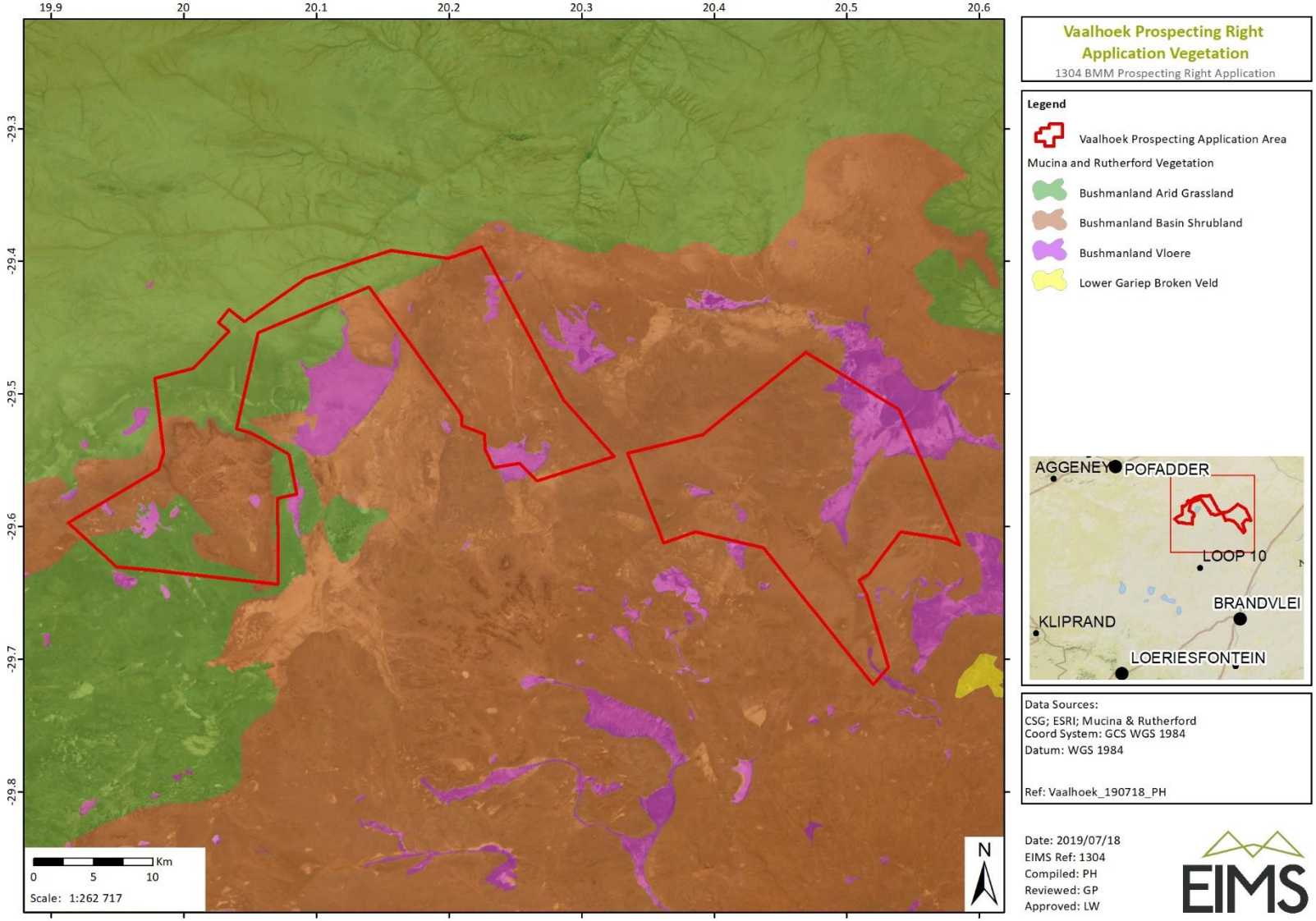


Figure 5: Vegetation types based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2018).

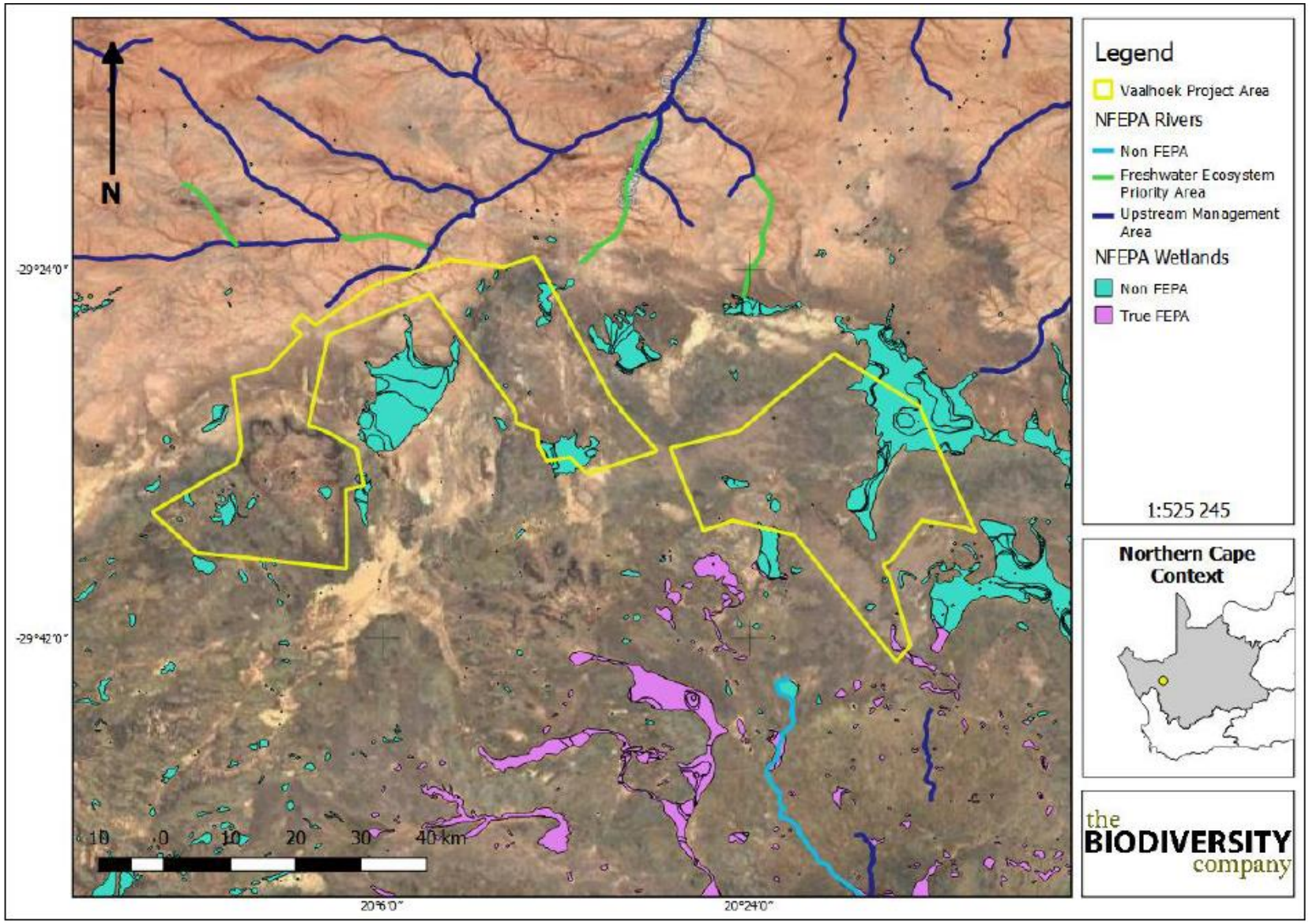


Figure 6: Watercourses identified within the application area

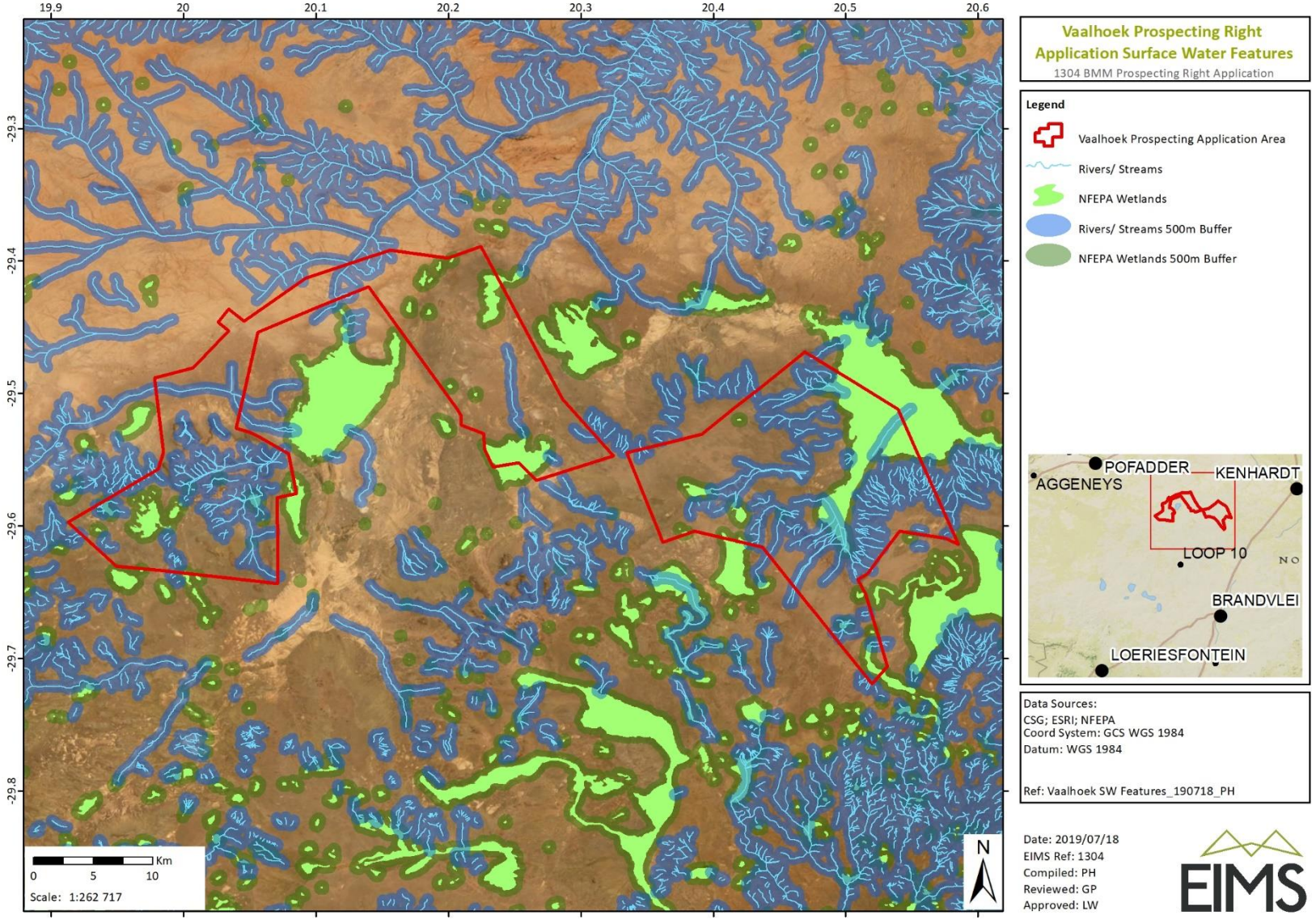


Figure 7: Surface water features in the application area

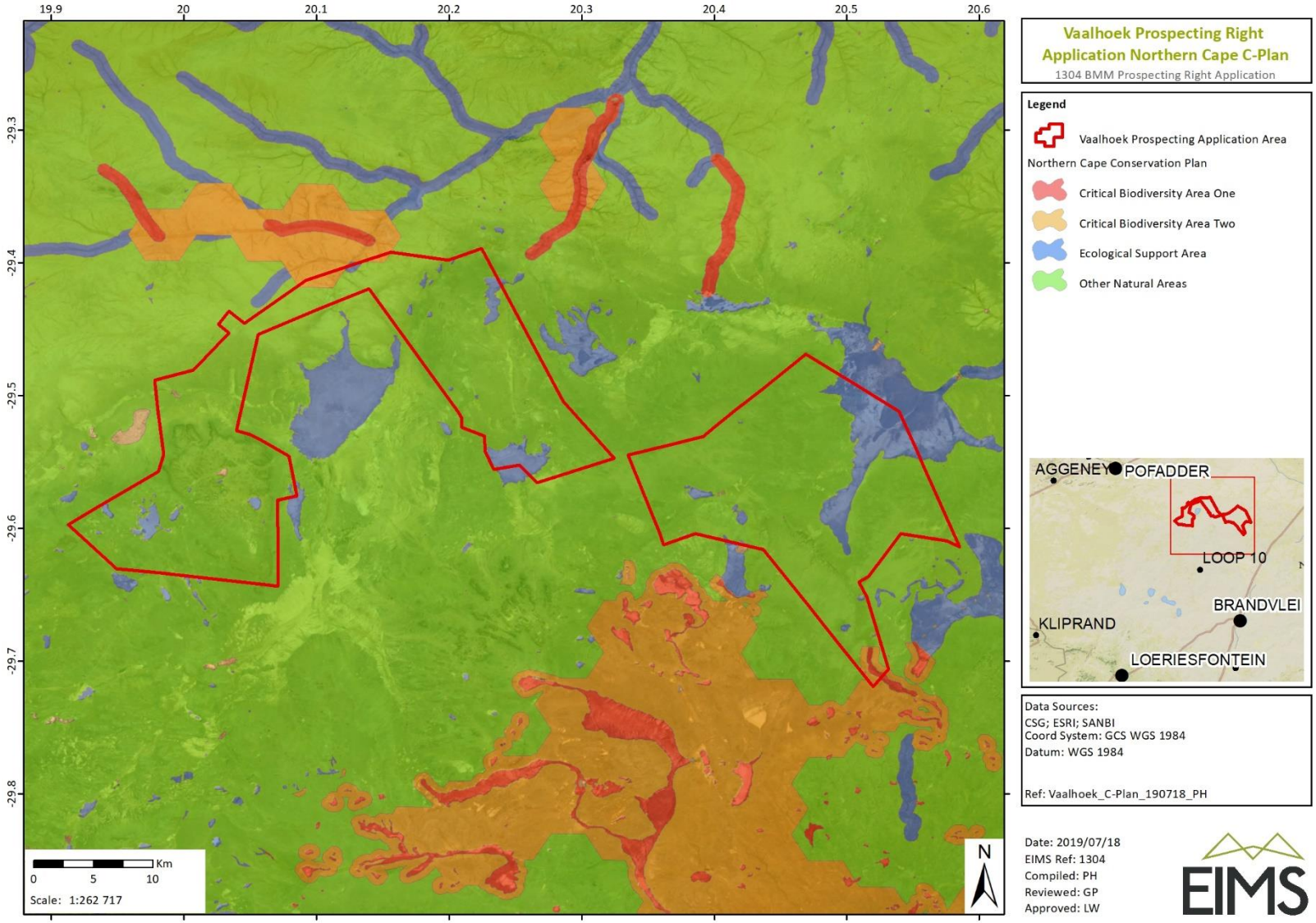


Figure 8: Northern Cape Conservation Plan

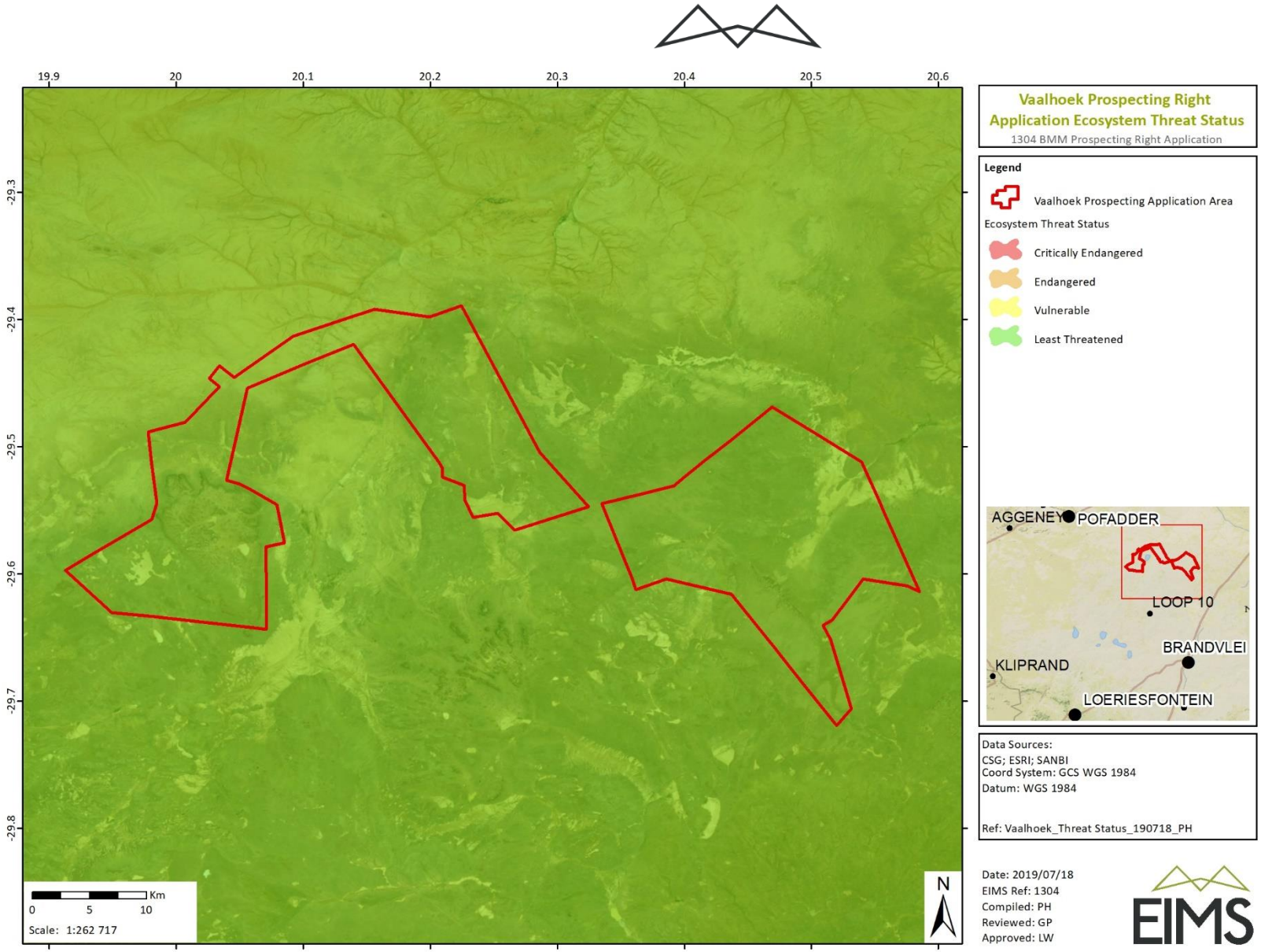


Figure 9:Ecosystem Threat Status

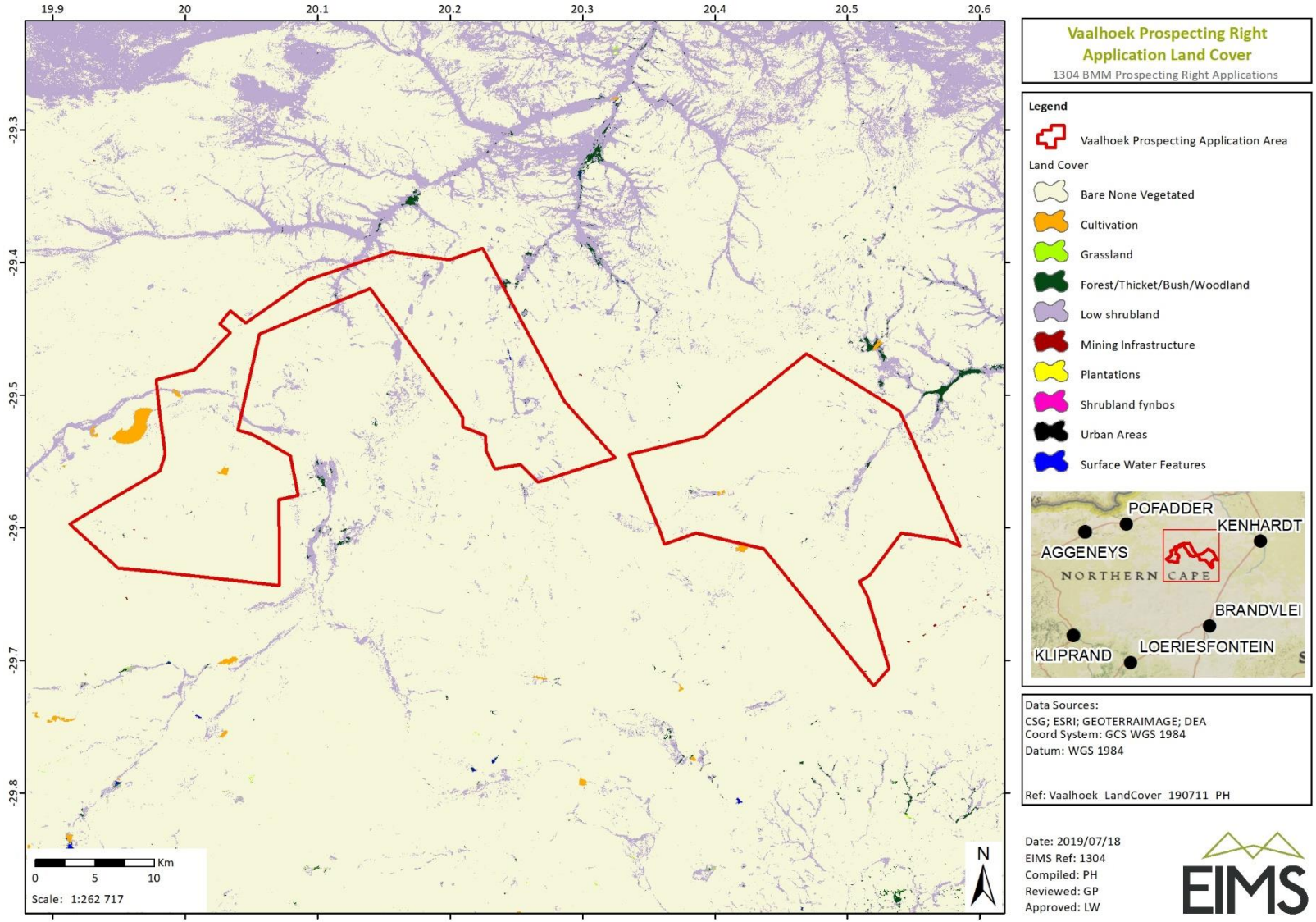


Figure 10: Land Cover

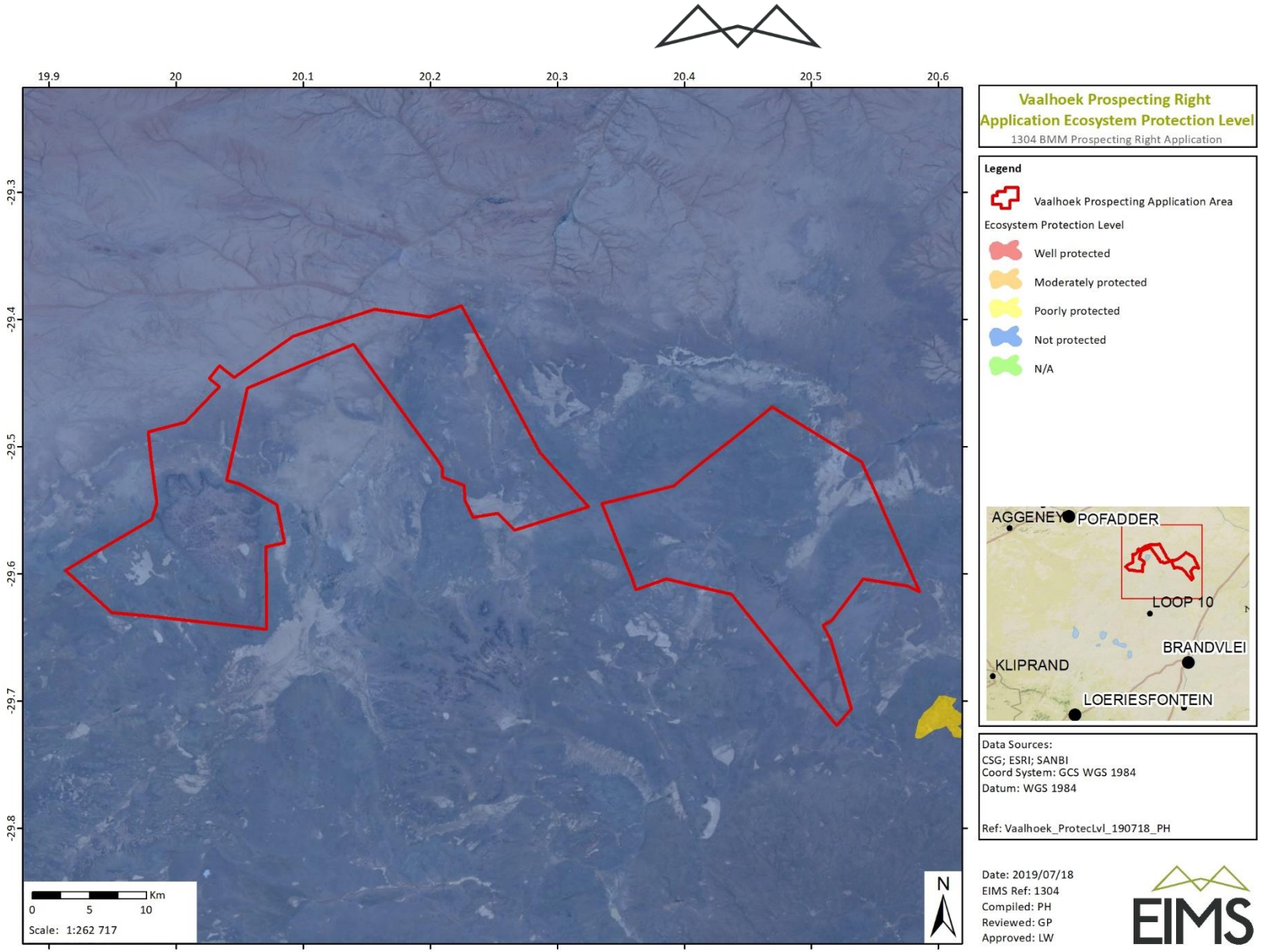


Figure 11: Ecosystem Protection Level

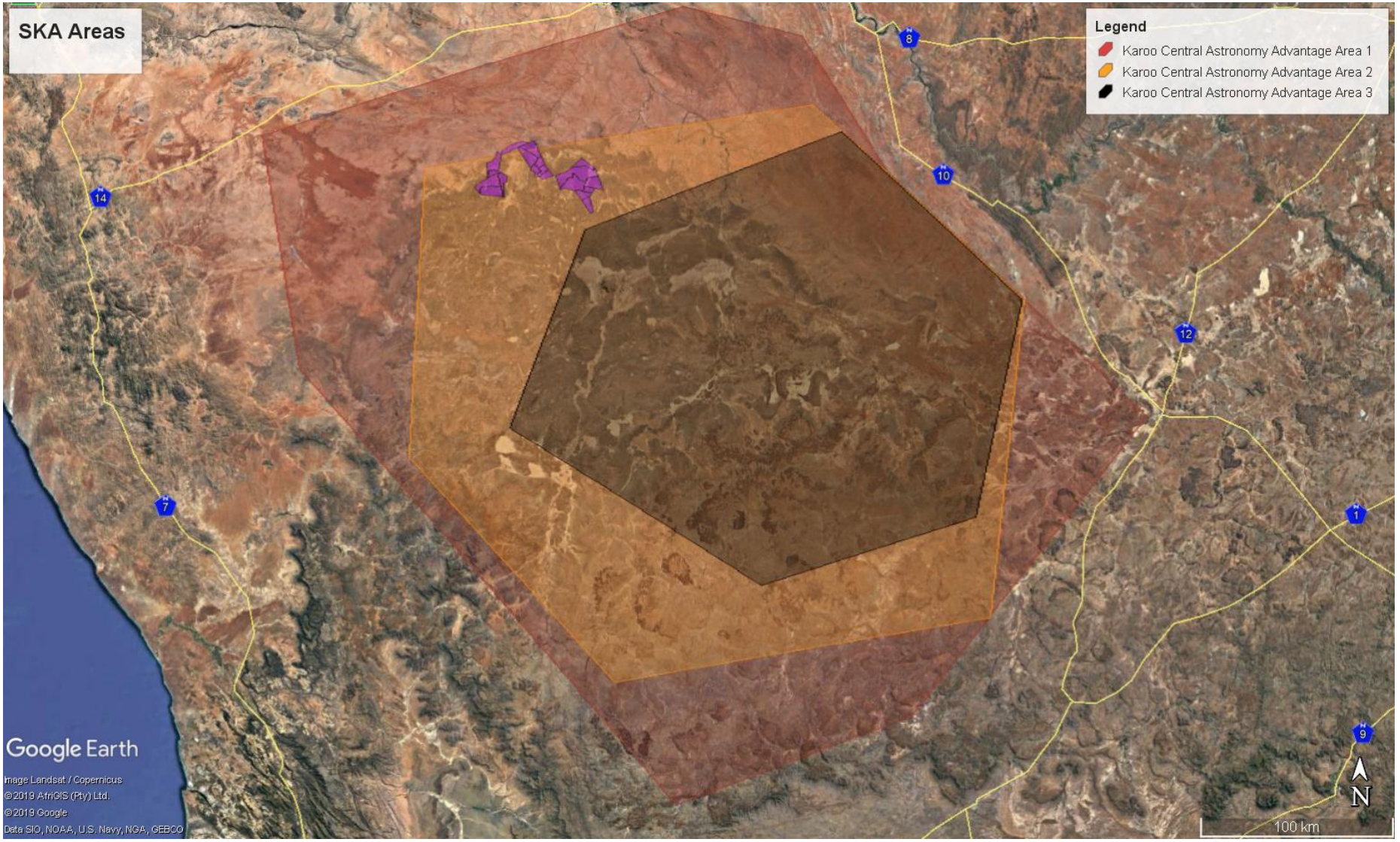


Figure 12: Location of Vaalhoek Application area (purple polygon) within Karoo Central Astronomy Advantage Area 1 and 2.

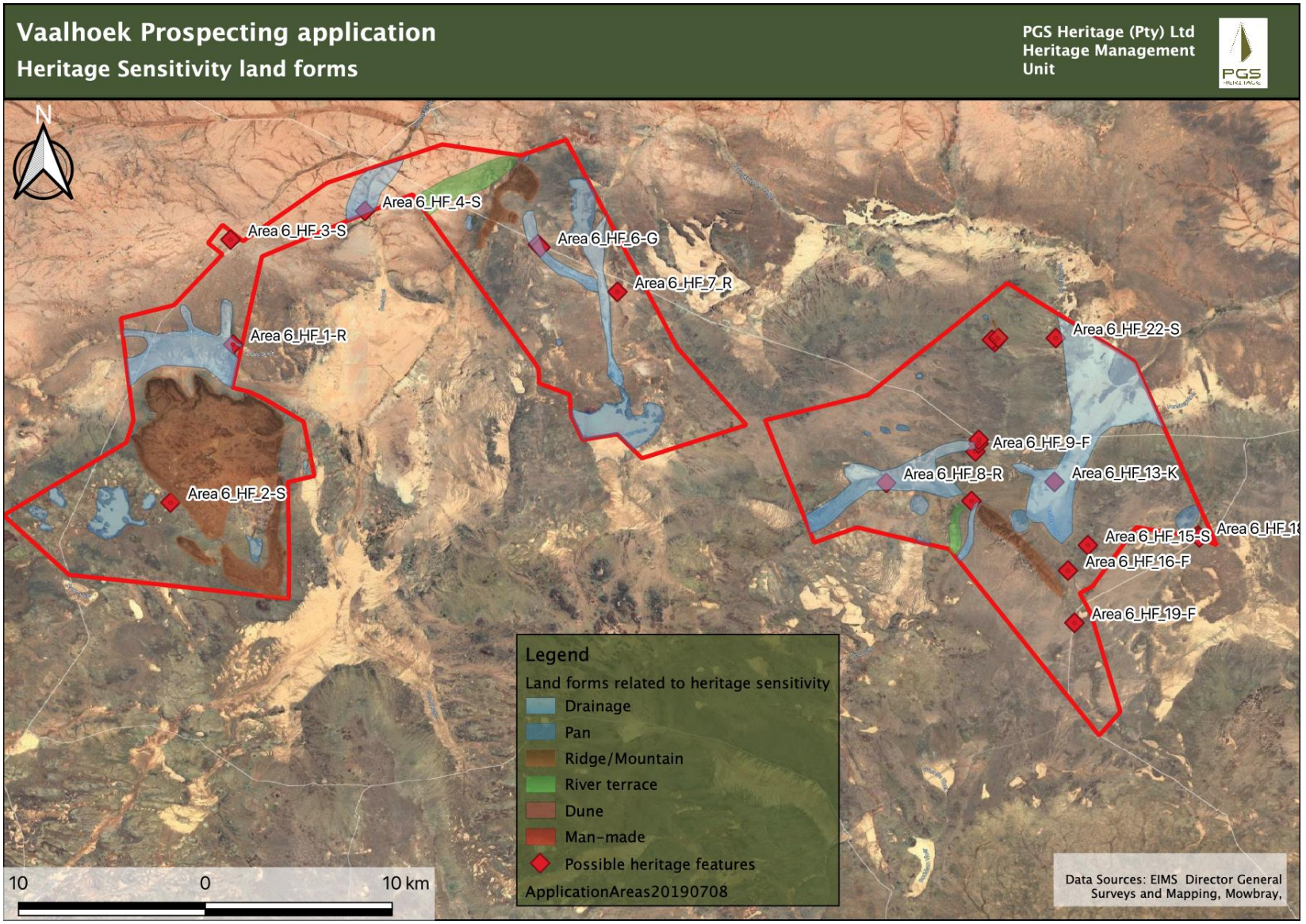


Figure 13: Heritage sensitivity (PGS, 2019)

6.4.2.2 Climate

ZF Mgcawu (2008) states that the area is known for its hot days and cold nights. The summer days are hot and the winter nights very cold. The area is very dry with an average yearly rainfall of approximately 189 mm per annum. The sunshine in the area is very suitable for solar energy generation. The predominant wind direction is from the North, closely followed by a South-South-Westerly direction.

6.4.2.3 Geology and Soils

The terrain consists of flat lying plains with Cenozoic and Karoo-aged sediments overlying the Dwyka Group consisting of tillite, diamictite, sandstone and dolomitic limestone. The southern parts of the two project areas are further characterised by large dolerite intrusions. Alluvium and sand are mapped along the non-perennial rivers and pan areas. Minor granite and gneiss occurrences are found mapped in the northern areas. Please refer to Figure 4 above.

6.4.2.4 Hydrogeology

According to Vegter and Seymour (1995), two small portions, one in the western parts of the area and a portion in the southeast have a low groundwater potential of 10 – 20% with the remainder of the area having a groundwater potential of 20 – 30 %. 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 Vaalhoek area is < 2 500 m^3/km^2/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 Vaalhoek 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 Vaalhoek Area:

- The Vaalhoek Area have an estimated 30 – 60 % dependency of groundwater (i.e. domestic use, irrigation, stock watering, bulk supply, mining).
- The Vaalhoek Area falls within D53D and D53G which, according to the EWR report, is described as “metamorphic terrain of poor groundwater quality”.

6.4.2.4.1 Existing Groundwater Users

A data search on the NGA revealed 29 existing boreholes, of which:

- 17 boreholes had water level data – the average groundwater level was 17.22 m bgl;
- 17 boreholes had recorded yields - the average yield being 1.06 L/s and the maximum recorded yield 4.73 L/s;
- 29 boreholes had recorded boreholes depths – the average depth being 45 m bgl and the deepest 96 m bgl; and
- 18 boreholes had recorded water strike depths – the average strike depth being 30 m bgl and the maximum strike depth 53 m bgl.

6.4.2.4.2 Future Groundwater Users

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.

6.4.2.4.3 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 bare areas with no vegetation, low shrubland and grassland areas with some 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 not protected. This means that these ecosystem types (and associated habitats) 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 Succulent Karoo biome, with small sections in the southern part of the prospecting area found in the Nama Karoo and Azonal vegetation biomes. The prospecting area is situated across three vegetation types; Bushmanland Arid Grassland, Bushmanland Basin Shrubland and Bushmanland Vloere, according to Mucina & Rutherford (2006). Majority of the prospecting area fall across the Bushmanland Arid Grassland and Bushmanland Basin Shrubland (Figure 5). According to Mucina and Rutherford (2006), these vegetation types is classified as Least Threatened. Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 599 plant species are expected to occur in the prospecting area. Of the 599-plant species, three (3) species are listed as being SCCs. These species are *Aloidendron dichotomum, Cleome conrathii and Conophytum achabense*. These are 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	*Aloidendron dichotomum*	(Masson) Klopper & Gideon F.Sm.	**VU**	Indigenous; Endemic	Moderate
Fabaceae	*Calobota lotononoides*	(Schltr.) Boatwr. & B.-E.van Wyk	**NT**	Indigenous; Endemic	Moderate
Aizoaceae	*Conophytum achabense*	S.A.Hammer	**VU**	Indigenous; Endemic	High

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, 2019).

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 a small portion of the prospecting area being classified as an Ecological Support Area (ESA) (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, 2019). 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, 133 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:

- Two (2) species that are listed as EN on a regional basis;
- Five (5) 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)	
Afrotis afra	Korhaan, Southern Black	**VU**	**VU**	High
Aquila verreauxii	Eagle, Verreaux's	**VU**	LC	Low
Ardeotis kori	Bustard, Kori	**NT**	**NT**	High
Calendulauda burra	Lark, Red	**VU**	**VU**	High
Calidris ferruginea	Sandpiper, Curlew	LC	**NT**	High
Cursorius rufus	Courser, Burchell's	**VU**	LC	High
Eupodotis vigorsii	Korhaan, Karoo	**NT**	LC	High
Falco biarmicus	Falcon, Lanner	**VU**	LC	High
Neotis ludwigii	Bustard, Ludwig's	**EN**	**EN**	High
Oxyura maccoa	Duck, Maccoa	**NT**	**NT**	High
Polemaetus bellicosus	Eagle, Martial	**EN**	**VU**	High
Spizocorys sclateri	Lark, Sclater's	**NT**	**NT**	High

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 56 mammal species that could be expected to occur within the vicinity of the prospecting area. Of these species, 4 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 52 small to medium sized mammal species, five (5) 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
- Two (2) 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)	
Eidolon helvum	African Straw-coloured Fruit Bat	LC	**NT**	Low
Felis nigripes	Black-footed Cat	**VU**	**VU**	High
Graphiurus ocularis	Spectacular Dormouse	**NT**	LC	Low
Panthera pardus	Leopard	**VU**	**VU**	Low
Parotomys littledalei	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) 47 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)	
Psammobates tentorius verroxii	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) seven (7) amphibian species are expected to occur in the prospecting area. One amphibian SCC could be present in the prospecting area according to the above-mentioned sources.

Table 12: Expected amphibian species of conservation concern that may occur in the prospecting area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2017)	
Pyxicephalus adspersus	Giant Bullfrog	**NT**	**LC**	Moderate

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, however an Upstream Management Area does occur in a small portion on the border of the northern section.. However, various water sources (DLA-CDSM, 2007), including dams, lakes, rivers, streams, pans, mudflats, pools, marshvlei and swamps all these are classified as natural water bodies. Artificial water bodies that could occur in the project area are dams, fish farms, reservoirs, sewage works, water tanks, and purification plants (Nel et al., 2011). Natural waterbodies can be found throughout the prospecting area, with a large waterbody in east of the prospecting area.

6.4.2.13 Astronomy Geographical Advantage Areas

The application area falls within the Karoo Central Astronomy Advantage Area 1 and 2 (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 an 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 propped to effectively transmit a DC current between 2 electrodes. The corresponding voltage deference 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 1 and 2.

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

A few burial grounds or graves are depicted on the historical topographic maps for the study area. It is possible that other unknown burial grounds and graves are also present (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 High 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 MODERATE 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 Vaalhoek Prospecting Right Application area falls mainly in the Dwyka Group with small isolated outcrops of Karoo Dolerite, Vaalhoek Granite, Grappies rocks as well as a small area of Prince Albert Formation in the eastern corner

According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the Kalahari Group is rated as Low. The igneous rocks of the Bushmanland and Karoo Dolerite is Insignificant or Zero while the Ecca sediments of the Karoo Supergroup have a Moderate Paleontological 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.

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 MODERATE 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 proposed properties are situated mainly south of the R358 tar road from Pofadder to Nuwerus. 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 were and are presently 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, 2019).

It is understood that some renewable energy developments are proposed to take place on some of the properties in future, however, these have not been approved at the time of this report. Should the applicant be awarded the Prospecting Right, it is recommended that these renewable energy developments be consulted prior to the prospecting activities being undertaken.

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:

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

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 13.

Table 13: 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 14.

Table 14: Probability scoring

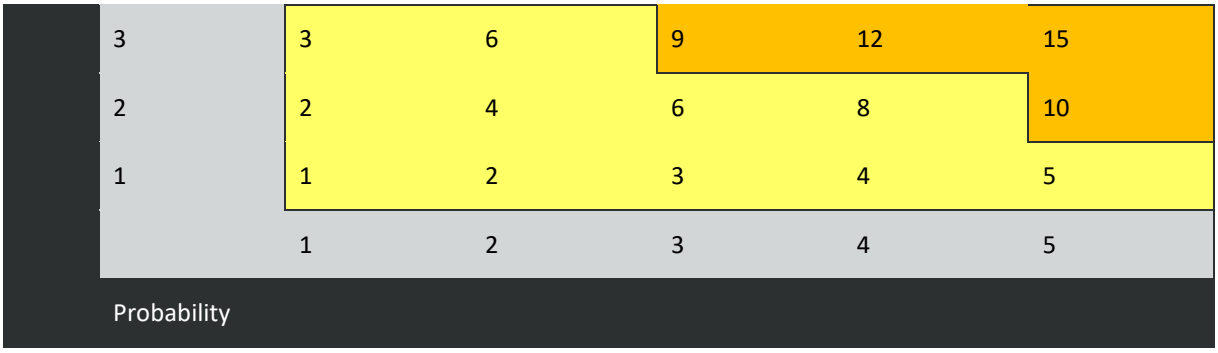
Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact 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 x P

Table 15: Determination of environmental risk

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



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 16.

Table 16: 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 1 3. (1) 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 17: 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 17. The impact priority is therefore determined as follows:

Priority = PR + CI + 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 18).

Table 18: 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 19: 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 Kai !Garib LM's, whose economy is very dependent on the mining 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.

In total, 22 potential heritage features were identified in the location of the study area as depicted on the topographical maps. The majority are depicted as several single structures and groups of structures. Since the first edition of the topographic maps for the area date to between 1970-73, the potential heritage features are likely to be 47-49 years or older.

The 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 Vaalhoek Prospecting Right Application area falls mainly in the Dwyka Group with small isolated outcrops of Karoo Dolerite, Vaalhoek Granite, Grappies rocks as well as a small area of Prince Albert Formation in the eastern corner. According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the Kalahari Group is rated as Low. The igneous rocks of the Bushmanland and Karoo Dolerite is Insignificant or Zero while the Ecca sediments of the Karoo Supergroup have a Moderate Paleontological 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 be 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 poor 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 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 20 below as well as the pre-mitigation significance scores of each impact.

Table 20: Positive and Negative Impacts of The Proposed Activity

Impact	Phase
Job Creation	Planning and Construction
Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.	Planning
Destruction of, and fragmentation of, portions of the vegetation community;	Construction

Impact	Phase
Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;	Construction
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)

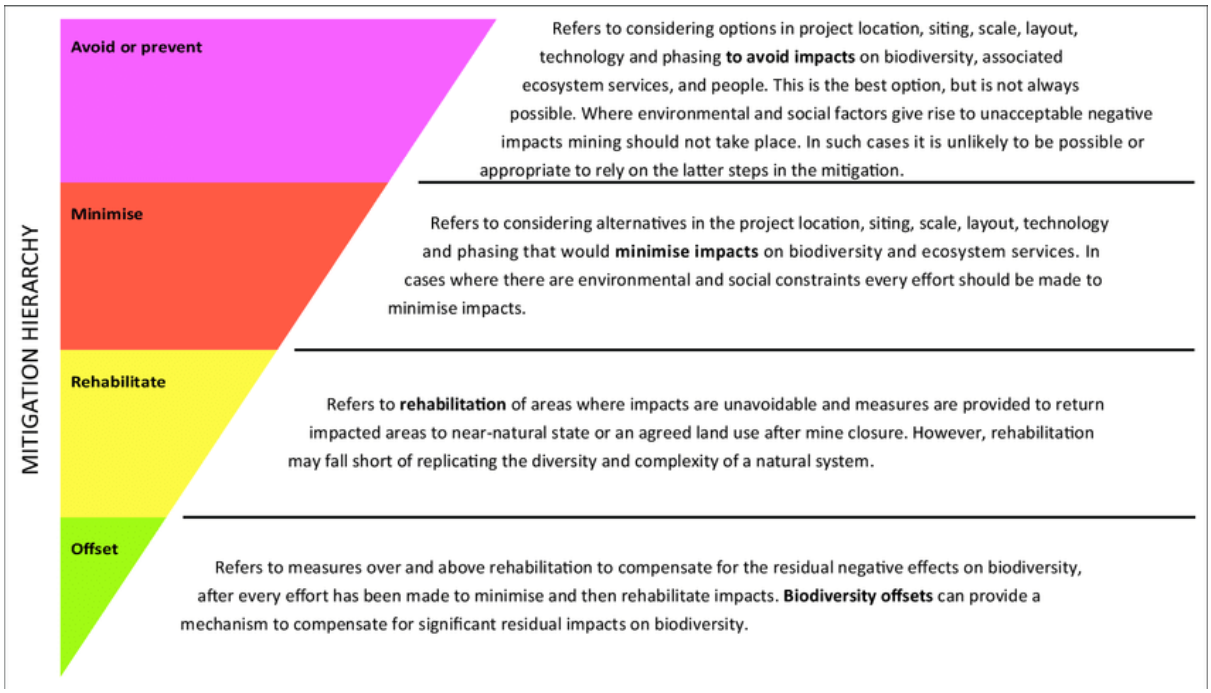


Figure 14: Mitigation hierarchy (ResearchGate, 2019)

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 21 below:

Table 21: Post Mitigation and Final Significance

Impact	Phase	Pre-mitigation Significance	Final Significance
Job Creation	Planning and Construction	+4.50	4.50
Temporary disturbance of wildlife due to increased human presence and possible use of machinery and/or vehicles.	Planning	-8.25	-5.25
Destruction of, and fragmentation of, portions of the vegetation community;	Construction	-16.00	-9.63
Loss of CBA1, CBA2 and ESA and sections of area classed as moderate and highest biodiversity importance;	Construction	-15.00	-10.50
Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;	Construction	-10.50	-8.75
Continued disturbance of vegetation communities (including portions of a CBA1, CBA2 and ESA and a section classed as moderate and highest biodiversity importance)	Operation	-16.00	-11.38
Displacement of avifauna by the airborne survey;	Operation	-17.50	-10.50

Impact	Phase	Pre-mitigation Significance	Final Significance
Disturbance and mortalities of herpetofauna due to assaying (Rock chips and Soil sampling);	Operation	-9.75	-10.50
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	-13.00	-6.42
Further impacts due to the spread and/or establishment of alien and/or invasive species;	Closure & Decommissioning	-11.25	-10.50
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	-10.50	-5.83
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, saltpans) – which may be recharged by groundwater;	Construction	-6.50	-6.75
Impact on potential burial grounds and graves;	Construction	-7.50	-4.33
Impact on structures older than 60 years;	Construction	-7.00	-3.79
Impact on archaeological resources;	Construction	-7.00	-3.79
Impact on palaeontological resources;	Construction	-7.00	-3.25
Noise;	Construction	-4.50	-3.0
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 66 042 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected. The area is located approximately 114 km 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 ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Geological Field Mapping and Environmental Screening	Interference with existing land uses	Site Access	Planning	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-5.83
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	• Site access control; Demarcation of access tracks to be used	-5.00
Regional Ground and Airborne Geophysical Surveys and Detailed Ground Geophysical Surveys	Interference with existing land uses	Site Access	Planning	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-5.83
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	• Site access control; Demarcation of access tracks to be used	-5.00
	Displacement of avifauna	Airborne survey	Planning and Construction	-17,50	• 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,	-10,50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					conservation status and importance, biology, habitat requirements and management requirements; • 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; • Prospecting site footprints should be kept to a minimum; • Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC; • 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					(yellow) lights should be used wherever possible; • 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; • No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals; • 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 • The boreholes need to be sealed to ensure that no fauna species can fall in the drill hole.	
Site Clearance	Destruction of, and fragmentation of, portions	Prospecting areas	Construction Operation	-16,00	• Site establishment shall take place in an orderly manner and	-9,63

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
and establishment	of the vegetation community (Clearance of vegetation) Loss of ESA and sections of area classed as moderate and highest biodiversity importance;				all amenities shall be installed before the onset of exploration; • 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; • The planning and design for the camp must ensure that there is a minimum impact on the environment; • No permanent structures will be permitted at the camp. • Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials. • 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					species, their identification, conservation status and importance, biology, habitat requirements and management requirements; • Prospecting site footprints should be kept to a minimum; • Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC; • 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; • When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery; • Construction vehicles must be restricted to existing roads and new pathways must be restricted;	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery • Implement alien vegetation management; • Ongoing identification of risks and impacts; • Emergency preparedness; and • Monitoring and review.	
	Impact on potential burial grounds and graves; Impact on structures older than 60 years;	Prospecting areas	Construction Operation	-7.50	• 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. • 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. • If any other heritage resources are identified SAHRA should be contacted and a qualified	-4,33

NAME OF 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	-7,00	• When physical prospecting (drilling) is planned an archaeologist must first visit and assess the areas of impact and make recommendations on any finds made. • 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.	-3,79
	Impact on palaeontological resources	Prospecting Areas	Construction	--7.00	• The EAP and ECO must be notified that the whole study area has a High Palaeontological Sensitivity. A "Chance Find Protocol" must be implemented	-3.25

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					during the proposed prospecting activities and incorporated in the PWP of this project. • 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.	
	Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;	Prospecting areas	Construction Operation Decommissioning	-10,50	• 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	-5.83

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements; • Prospecting site footprints should be kept to a minimum; • Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC; • 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; • When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery; • Construction vehicles must be restricted to existing roads and	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					new pathways must be restricted; • Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery • Implement alien vegetation management; • 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. • 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. • No trapping, killing or poisoning of any wildlife is to be allowed on site, including	

NAME OF 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. • 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.	
	Pollution of Soils	Prospecting areas	Construction Operation	-4.50	• 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. • 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. • The Contractor should inform all site staff to the use of supplied ablution facilities and under no	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. • 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. • 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. • Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. • 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					danger of pollution even during times of high rainfall. • Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities. • No storage of vehicles or equipment will be allowed outside of the designated prospecting area. • Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use; • No servicing of equipment on site unless absolutely necessary. • Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. • The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages; • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; • 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; • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	
	Encroachment by alien invasive plant species	Prospecting areas	Construction Operation Rehabilitation	-11.25	• 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; • Use of indigenous species for rehabilitation	-10.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• 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; • Rehabilitation efforts must be monitored by a suitably qualified ECO until adequate vegetation cover is achieved.	
	Air Quality	Prospecting areas	Construction Operation	-4.50	• 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. • 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. • Use of suitable dust suppression measures such as water spraying;	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• All stockpiles of fine material must be covered; • Construction vehicles much be well serviced, in roadworthy condition and comply with speed limits.	
	Interference with existing land uses	Site Access	Planning Construction Operation	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-5.83
Target Prospecting Boreholes & Widely Spaced Boreholes	Pollution and Compacting of Soils	Drilling	Construction Operation	-4.50	• 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. • 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. • The Contractor should inform all site staff to the use of supplied ablution facilities and under no	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. • 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. • 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. • Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. • 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					danger of pollution even during times of high rainfall. • Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities. • No storage of vehicles or equipment will be allowed outside of the designated prospecting area. • Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use; • No servicing of equipment on site unless absolutely necessary. • Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. • The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages; • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; • 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; • 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. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA. • An above ground drilling sump must be used to contain drilling mud in order to reduce	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					surface and groundwater contamination. No earthen mud sumps are to be constructed and utilized; • No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes; • 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. • Topsoil must be adequately stripped to the correct depth and stored separately from subsoils;	
	Impacts on surface water features	Drilling	Construction Operation Decommissioning	-6.50	• No invasive prospecting activities to be undertaken within 150m of a watercourse. • 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	-6.75

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					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. • Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation. • No ablution of site laydown areas are to be located within 150m of a watercourse. • Any possible contamination of watercourses by hydrocarbons, concrete or concrete water must be avoided. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	

NAME OF ACTIVITY	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	The following mitigation measures should be implemented as standard during the prospecting phase in order to limit the impact on groundwater resources: • Ensure vehicles and equipment are in good working order. • 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. • Ensure that good housekeeping rules are applied. • A procedure for the storage, handling and transport of different hazardous materials must be drawn up and strictly enforced. • Implement and follow water saving procedures and methodologies.	-12.38

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• If boreholes are to be drilled to supply water for the staff or drilling processes; ○ Ensure the location of the borehole/s is selected to prevent a negative effect on the groundwater levels of existing boreholes. ○ Ensure the abstraction from the borehole/s is determined scientifically to prevent over abstraction. ○ Liaise with potentially affected groundwater water users and monitor any potential impact. ○ 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					potential pollutant must migrate to reach the borehole ○ Monitoring of the groundwater quality during and after activities are completed. • Portable chemical toilets must be used during the exploration phase. • Mud pits (if to be used) must be lined and properly covered with impermeable material after completion of exploration boreholes • Cap and seal all exploration boreholes to prevent surface water from entering the borehole. 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.	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					During exploration drilling the following information must be recorded and reported on: • Aquifer type; • Depths to first water strike; • Depths to deeper water zones; • Salinity of water strike zones (EC measurement with field probe); • Strike yields; • Standing water level (allow several hours after completion); and • Hole completion details (e.g. cement / bentonite plug, backfill material, bore cap, bore number and coordinates). • 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	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					collection of geosite data, as prescribed by the DWS. • A detailed geohydrological assessment of expected aquifers is required prior to any invasive exploration work. • 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. • A qualified geohydrologist must form part of the exploration project team during drilling phases to provide the necessary input and scientific support in terms	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					of preventing / mitigating degradation of aquifers. • A Geohydrological Management Plan (GMP) can be compiled for the Vaalhoek Area once a hydrocensus has been completed, also taking cognisance of the specific drilling positions and potential receptors. 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: • 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; • Expected water qualities of each aquifer (associated with the different geological formations) that will be	

NAME OF 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; • An assessment of the potential degradation of the aquifers should variable water qualities mix; • Surrounding groundwater users and the protection thereof: positions of boreholes, depths, abstraction rates, water quality and dependency of the owner of his/her borehole.	
	Noise	Drilling	Construction Operation	-4.50	• Noise-generating activities associated with construction activities should be kept to a minimum. • 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;	-3.00

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					• Compliance with the appropriate legislation/ any local by-laws and regulations regarding the generation of noise must be adhered to. • 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. • Awareness training should be provided to construction staff on safety, health and environmental matters. • Provide appropriate Personal Protective Equipment (PPE) where required. • Compliance with the Occupational Health and	

NAME OF 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. • 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.	
	Impact on palaeontological resources	Prospecting Areas	Construction	-7.00	• 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. • 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	-3.25

NAME OF 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.	
Ablutions - Chemical Toilets	Impacts on surface water features	Drilling	Construction Operation Decommissioning	-6.50	• No invasive prospecting activities to be undertaken within 150m of a watercourse. • 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. • Should any watercourse be affected, then the necessary water use licences should be	-6.75

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					obtained from the Department of Water and Sanitation. • No ablution or site laydown areas are to be located within 150m of a watercourse. • Any possible contamination of watercourses by hydrocarbons, concrete or concrete water must be avoided. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	
Temporary Fuel storage	Pollution and compacting of Soils	Drilling	Construction Operation	-4.50	• 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. • 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.	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• 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. • 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. • 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. • Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. • Appropriate measures must be implemented to prevent spillage and appropriate steps	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					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. • Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities. • No storage of vehicles or equipment will be allowed outside of the designated prospecting area. • Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use; • No servicing of equipment on site unless absolutely necessary. • Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. • The Contractor shall be in possession of an emergency spill kit that must be complete	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					and available at all times on site. • All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages; • All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; • 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; • 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. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	

NAME OF 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	• Ensure vehicles and equipment are in good working order. • 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. • Ensure that good housekeeping rules are applied. • A procedure for the storage, handling and transport of different hazardous materials must be drawn up and strictly enforced.	-12.38
Creation of access roads	Destruction of, and fragmentation of, portions of the vegetation community	Transportation	Construction Operation	-16,00	• No indiscriminate driving in natural areas. • Demarcation of access tracks to be used • Construction vehicles must be restricted to existing roads and new pathways must be restricted.	-9,63

NAME OF ACTIVITY	POTENTIAL IMPACT	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			-15,00	• Prospecting site footprints should be kept to a minimum. • Rehabilitation of any disturbed areas due to prospecting.	-10,50
	Displacement of faunal community (including possible threatened or protected species) due to habitat loss, disturbance (noise, dust and vibration) and/or direct mortalities;	Transportation	Construction Operation	-10,50	• 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; • Prospecting site footprints should be kept to a minimum; • Schedule prospecting activities and operations during least sensitive periods, in order to avoid migration, nesting and breeding seasons of SCC;	-8,75

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• 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; • When vegetation is cleared, hand cutting techniques should be used as far possible in order to avoid the use of heavy machinery; • Construction vehicles must be restricted to existing roads and new pathways must be restricted; • Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery • Implement alien vegetation management; • Herpetofauna observed while rock sampling, should be carefully and safely removed to a suitable location beyond	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					the extent of the development footprint by a suitably qualified environmental control officer (ECO) trained in the handling and relocation of animals. • 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. • No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals. • 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.	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Undertake closure and rehabilitation as per the annual and final rehabilitation plan	Encroachment by alien invasive plant species Abandonment of construction equipment Appropriate waste removal and documentation thereof	Rehabilitation	Operation Rehabilitation	-11.25	• Only indigenous plant species must be used during revegetation of disturbed areas, a plant specialist must be consulted for this purpose. • 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; • Rehabilitation efforts must be monitored by a suitably qualified ECO until adequate vegetation cover is achieved. • 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. • Restoration and rehabilitation of disturbed areas must be	-10.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					implemented as soon as prospecting activities are completed; • Sites must be restored to the original condition with vegetation cover (where applicable) equalling the surrounding vegetation cover. • No permanent structures will be permitted at the camp; • All structure footprints to be rehabilitated and landscaped after prospecting is complete; • All debris and contaminated soils must be removed and suitably disposed of. • Contours and natural surrounding must be reformed; • Natural drainage patterns must be restored. • All surface infrastructure on site must be removed; • Temporary access routes/roads must be suitably rehabilitated; and • Sites must be monitored by the ECO (including relevant specialist's inputs if, necessary)	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					for adequate rehabilitation until the desired rehabilitation objectives have been achieved. • The boreholes need to be sealed to ensure that no fauna species can fall in the drill hole. • During decommissioning, compacted surfaces should be broken-up and covered with brush, leaf litter or reseeded with site specific grass species.	
Monitoring of rehabilitation efforts	Erosion due to improper rehabilitation	Closure and Rehabilitation	Rehabilitation Post-rehabilitation	-4.50	• 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.	-3.00

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• 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. • Restoration success should be monitored through a follow-up site visit during the next growing season in order to identify remedial actions	

9 SUMMARY OF SPECIALIST REPORTS

Specialist study undertaken	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.
Heritage Impact Assessment	In total, 22 potential heritage features were identified in the location of the study area as depicted on the topographical maps. The majority are depicted as several single structures and groups of structures. Since the first edition of the topographic maps for the area date to between 1970-73, the potential heritage features are likely to be 47-49 years or older. The identification of the features will have to be confirmed during the field work phase. Most of the previous studies conducted in the general area identified artefacts associated with the Stone Age. The occurrences ranged from single artefact find spots to low or medium density artefact scatters (Gaigher 2012; Pelser 2012, Fourie 2017; Webley & Halkett 2012). Several previous heritage studies undertaken in the area did identify a few isolated historical structures or farmsteads and graves or burial grounds that date to the historical period (Fourie 2016; Fourie 2017; Webley L & Halkett, D. 2012). This is in addition to the structures depicted on the historic topographic map sheets dating to 1972 and 1973. The impact of the proposed activities on burial grounds and graves is rated as HIGH negative significance before mitigation, but with the implementation of the required mitigation measures the post-mitigation impact would be LOW negative. The impact of the proposed prospecting activities on potential historical structures is rated as MODERATE negative significance	X	Section 6.4 and 8

Specialist study undertaken	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.
	before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.		
Palaeontological Impact Assessment	The Vaalhoek Prospecting Right Application area falls mainly in the Dwyka Group with small isolated outcrops of Karoo Dolerite, Vaalhoek Granite, Grappies rocks as well as a small area of Prince Albert Formation in the eastern corner According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the Kalahari Group is rated as Low. The igneous rocks of the Bushmanland and Karoo Dolerite is Insignificant or Zero while the Ecca sediments of the Karoo Supergroup have a Moderate Paleontological 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.	X	Section 6.4 and 8

Specialist study undertaken	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.
Hydrogeological Risk Assessment	Although the majority of the area is being classed as a poor 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 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. A data search on the NGA revealed 29 existing boreholes within the application area. Potential impacts that have been identified with regard to geohydrology are degradation of aquifers, impacts on existing groundwater users and impacts on surface water features. Proposed mitigation measures include undertaking a detailed hydrocensus to include surface water features. Once the exact drilling positions are known and the hydrocensus completed, the geohydrological report must be	X	Section 6.4 and 8

Specialist study undertaken	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.
	updated and must include an assessment of potential aquifers that could be penetrated by the drilling and whether mixing the water of these aquifers can lead to degradation of any of the aquifers penetrated.		
Biodiversity Assessment	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, majority of the prospecting area fall in an area classified as "Other Natural Area", with small portions of ESA as well as areas classified as CBA1	X	Section 6.4 and 8

Specialist study undertaken	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.
	and CBA 2 in the most north and southern portions of the prospecting areas; • 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); • 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; • 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 three vegetation types; Bushmanland Arid Grassland (LT), Bushmanland Basin Shrubland (LT), and Bushmanland Vloere (LT); • Based on the Plants of Southern Africa database, 599 plant species are expected to occur in the prospecting area. Of the 599-plant species, 3 species are listed as being SCCs; • Based on the South African Bird Atlas Project, Version 2 (SABAP2) database 133 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; • Fifty-six mammal species are expected of which 5 are SCCs, while 47 reptile species are expected and 1 are SCC; and		

Specialist study undertaken	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.
	• Majority of the impacts had a moderate rating prior to mitigations, which were then decreased once mitigations are implemented.		

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, majority of the prospecting area fall in an area classified as “Other Natural Area”, with small portions of ESA as well as areas classified as CBA1 and CBA 2 in the most north and southern portions of the prospecting areas;
- 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);
- 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;
- 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 three vegetation types; Bushmanland Arid Grassland (LT), Bushmanland Basin Shrubland (LT), and Bushmanland Vloere (LT);
- Based on the Plants of Southern Africa database, 599 plant species are expected to occur in the prospecting area. Of the 599-plant species, 3 species are listed as being SCCs;
- Based on the South African Bird Atlas Project, Version 2 (SABAP2) database 133 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;

- Fifty-six mammal species are expected of which 5 are SCCs, while 47 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.
- In total, 22 potential heritage features were identified in the location of the study area as depicted on the topographical maps. The majority are depicted as several single structures and groups of structures. Since the first edition of the topographic maps for the area date to between 1970-73, the potential heritage features are likely to be 47-49 years or older. The identification of the features will have to be confirmed during the field work phase.
- The Vaalhoek Prospecting Right Application area falls mainly in the Dwyka Group with small isolated outcrops of Karoo Dolerite, Vaalhoek Granite, Grappies rocks as well as a small area of Prince Albert Formation in the eastern corner. According to the Palaeosensitivity Map available on the South African Heritage Resources Information System database (SAHRIS), the Palaeontological Sensitivity of the Kalahari Group is rated as Low. The igneous rocks of the Bushmanland and Karoo Dolerite is Insignificant or Zero while the Ecca sediments of the Karoo Supergroup have a Moderate Paleontological Sensitivity (Figure 3).
- According to Vegter and Seymour (1995), two small portions, one in the western parts of the area and a portion in the southeast have a low groundwater potential of 10 – 20% with the remainder of the area having a groundwater potential of 20 – 30 %. 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 Vaalhoek area is < 2 500 m^3/km^2/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 Vaalhoek 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 Vaalhoek Area: The Vaalhoek Area have an estimated 30 – 60 % dependency of groundwater (i.e. domestic use, irrigation, stock watering, bulk supply, mining). The Vaalhoek Area falls within D53D and D53G which, according to the EWR report, is described as “metamorphic terrain of poor groundwater quality”.

Key findings for the socio-economic environment

- The proposed prospecting activity will affect current land uses such livestock grazing. The proposed properties are situated mainly south of the R358 tar road from Pofadder to Nuwerus. 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 Kai !Garib with the largest potential for economic growth. 30 949 people are economically active (employed or unemployed but looking for work), and of these, 10% are unemployed. Of the 19 375 economically active youth (15 – 35 years) in the area, 10% 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 R**31,656,506**. 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.

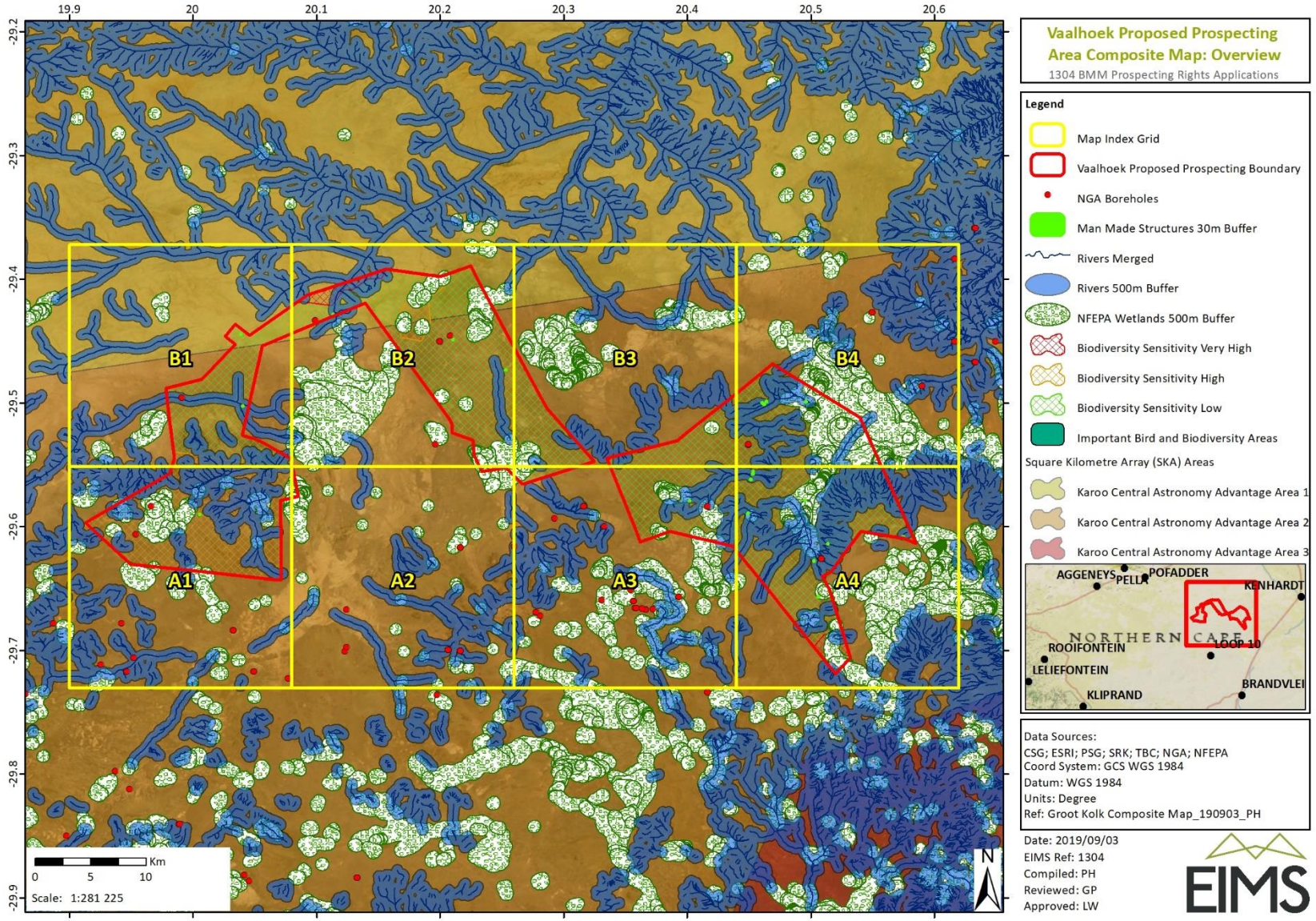

Figure 15: Final Composite Map

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, 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;
- 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 in 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 DIA 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 concentre 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, 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 Kai !Garib LMs 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. In total, 22 potential heritage features were identified in the location of the study area as depicted on the topographical maps in the HIA report and Figure 13 in this report. The majority are depicted as several single structures and groups of structures. Since the first edition of the topographic maps for the area date to between 1970-73, the potential heritage features are likely to be 47-49 years or older.

Several previous heritage studies undertaken in the area did identify a few isolated historical structures or farmsteads and graves or burial grounds that date to the historical period (Fourie 2016; Fourie 2017; Webley L & Halkett, D. 2012). This is in addition to the structures depicted on the historic topographic map sheets dating to 1972 and 1973.

Table 22: Tangible heritage site in the study area

Name	Description	Legislative protection
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Burial grounds	Graves	NHRA Sect 3 and 36 and MP Graves Act
Archaeological finds	Such as stone age sites	NHRA Sect 35

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 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.

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 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 23: Impacts to be mitigated

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site clearance	Construction Operation	1.8 ha, short term and localized	• Demarcation of sensitive areas in consultation with relevant specialists and ECO; • Utilise local labour if possible; • Minimise removal of vegetation as far as possible; • Identification and relocation of protected species by a qualified ecologist (and application or the relevant biodiversity permits where required); • Minimize dust generation; • Limit vehicle access; • Implement alien vegetation management; • Ongoing identification of risks and impacts; • Emergency preparedness; • Monitoring and review; and • Avoid disturbance of fauna as much as possible, especially bird nesting sites.	NEMA MPRDA NEMBA NEMAQA Dust regulations NWA DWAF Best Practice Guidelines	Throughout Construction and operation
Site access	Construction Operation	66 042 Ha, short term and localized	• 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	NEMA OHS and MHSA	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			should be presented or otherwise facilitated by the Contractors EO/Mine EO wherever possible. • 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. • 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. • Consideration must be taken by the applicant and/or contractors when on site not to interfere with the existing land uses and practices.		
Establishment of site infrastructure	Construction	1.8 ha, short term and localized	• Minimise physical footprint of construction; • Ensure construction is consistent with occupational health and safety requirements; • Minimise vegetation clearance; • Ensure proper and adequate drainage; • Minimise waste and control waste disposal; • Fencing of all drill sites with security access control and warning signs; • Establish waste storage areas for recycling;	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
			• Ensure adequate containment of waste to prevent pollution; • Minimise dust generation; • Limit vehicle access to approved access roads; • Prepare contingency plans for spillage and fire risks.		
Storage of construction vehicles	Construction and Operation	0.1 ha, short term and localized	• 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; • 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 • 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.	NWA DWAF BPG	Throughout Construction and operation
Transportation/ access to and from drill sites	Construction and Operation	1.5 ha, short term and localized	• Where possible, drill sites should be located along existing access roads to reduce the requirement for additional access roads; • Any new temporary access routes to a drill site should result in minimal disturbance to existing vegetation;	NEMA NEMBA CARA NEMAQA	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• 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; • All farm gates must be closed immediately upon entry/exit; • Under no circumstances may the contractor damage any farm gates, fences, etc.; • 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); • 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; • Damage caused to public roads as a result of the construction activities must be repaired in consultation with the relevant municipal authorities; and • All measures should be implemented to minimize the potential of dust generation.	Dust Regulations Road Traffic Act	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Storage of hazardous substances	Construction and Operation	0.1 ha, short term and localized	• 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. • Hazardous substances must be confined to specific and secured areas, and stored at all time within bunded areas; • Adequate spill prevention and clean-up procedures should be developed and implemented during the prospecting activities. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	NWA NEMWA DWAF BPG NEMA	Throughout Construction and operation
Waste management	Construction and Operation	Short-medium term, localized	• 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; • 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	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
			• 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.		
Prospecting boreholes: **10 sites , with a footprint of 300 m^2 each**	Construction and Operation Decommissioning	0.3 ha, short term	• Vegetation clearing for prospecting sites should be kept to a minimum in order to reduce the disturbance footprint; • 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; • All measures should be implemented to minimize the potential of dust generation; • 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; • Noise attenuation on engines must be adequate, and the noisy activities must be restricted as far as is possible to times and locations whereby the potential for noise nuisance is reduced;	SANS 10103 ECA Noise Regulations NEMAQA Dust Regulations NWA	Throughout Construction and operation and decommissioning

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• When working near to a potential sensitive area, the contractor must limit the number of simultaneous activities to the minimum; • Ensure proper storage of fuels; • 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; • Workforce should be kept within defined boundaries and to agreed access routes. • No invasive prospecting activities to be undertaken within 150m of a watercourse. • Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation. • No ablution of site laydown areas are to be located within 150m of a watercourse. • 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.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• 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.		
Prospecting	Construction and Operation	66 042 Ha, short term	• 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.	OHS and MHSA	Throughout Construction and operation
Resource definition drilling	Planning Phase Construction and Operation	1.8 ha, short term	• 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; • 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; • Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions. • Any spills of hydrocarbons or fluids used during operation, must be cleaned up immediately; • 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;	MPRDA Regulations GN R527 SANS 10103 ECA Noise Regulations NEMAQA Dust Regulations NWA DWAF BPG NHRA	Planning Phase Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes; • 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. • Topsoil must be adequately stripped to the correct depth and stored separately from subsoils; • 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; • A liner should be placed over the drill pad and drip trays must be used in all areas where hydrocarbons are handled; • 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; • Workforce should be kept within defined boundaries and to agreed access routes; • The designated competent authority (DMR) may, at the cost of the Applicant, appoint an independent and competent person to undertake borehole examination. • Should any fugitive emissions be detected, then the recommendations of the must be undertaken		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			throughout the drilling activity up to the decommissioning of the wells. • 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 • 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.		
Refuelling	Construction and Operation	Short term and localized	• 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; • 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.	NWA DWAF BPG	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Maintenance and repair	Construction and Operation	Short term and localized	• 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; • 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.	NWA DWAF BPG NEMA	Throughout Construction and operation
Borehole Closure	Decommissioning and Closure	Short term and localized	• 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; • 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: o Concrete shall not be mixed directly on the ground; o The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing	NWA DWAF BPG	Throughout Decommissioning and Closure

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			of visible signs into the ground is not acceptable); and ○ All excess aggregate shall also be removed.		
Removal of surface infrastructure	Decommissioning	Short term and localized	• All infrastructure, equipment, and other items used during prospecting will be removed from the site. • 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.	MPRDA Rehab Plan	Decommissioning
Removal of waste	Decommissioning	Small scale and localized	• 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.	NWA DWAF BPG	Decommissioning
Rehabilitation	Rehabilitation	All disturbed areas	• Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed; • Sites must be restored to the original condition with vegetation cover (where applicable) equalling the surrounding vegetation cover; • All debris and contaminated soils must be removed and suitably disposed of; • Contours and natural surrounding must be reformed;	MPRDA Rehab Plan NEMA	Rehabilitation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Natural drainage patterns must be restored; • All surface infrastructure on site must be removed; • Temporary access routes/roads must be suitably rehabilitated; and • 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.		
Consultation	Planning Phase Construction and Operation	Medium term, local	• 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.	NEMA OHS and MHSA	Planning Phase Throughout Construction and Operation
Monitoring	Post-Operational	All rehabilitated areas	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	MPRDA Rehab Plan	Post-operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• 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.		

21.5 IMPACT MANAGEMENT ACTIONS AND OUTCOMES

Table 24: Summary of Impact Management Actions and Outcomes

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
Site clearance	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; 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
Establishment of base camps and access	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
Storage of construction vehicles	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
Transportation to and from drill sites	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
Storage of hazardous substances	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
Waste management	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
Prospecting boreholes	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	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
Resource definition drilling	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
Refuelling	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 DWAF best Practice Guidelines
Maintenance and repair	Potential hydrocarbon spills that could pollute surface and groundwater resources.	Pollution; Surface water; Groundwater	Construction Operation	Control through implementation of EMPR mitigation measures	NWA
Borehole closure	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
Removal of surface infrastructure	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
Rehabilitation	Soil compaction; Soil and Water contamination; Erosion; Change is 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				
Monitoring of rehabilitated sites	• Soil compaction; • Soil and Water contamination; • Erosion; • Disturbance to wildlife; and communities in close vicinity.	Topography Land use Soil disturbance Ecology Surface water Groundwater	Post-operation	Control through adhering to monitoring requirements	MPRDA and regulations

22 FINANCIAL PROVISION

On 20th 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, 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, 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, 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-compaction 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 is 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 / 20120 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
Desktop Study: Literature Survey / Review / acquisition of data	None	None	None	None
Geological field mapping	• All Impacts Identified in the EMP	• Site inspections and checklists; • Complaints register	• Contractors Environmental Representative; ECO	• Daily inspections and checklists
Regional Ground and Aerial Geophysical Surveys	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Site Clearance:	• Possession of permits for protected species • Relocation of protected species • Alien vegetation management; • Implement the recommendations of the heritage specialist report and the Heritage Management Plan (See Appendix E).	• Document Control • Site Inspections and checklists • Report review and • Development of actions plans	• Contractors Environmental Representative; • Environmental specialist, ECO • Senior Environmental Management	• Once-off control of documents, site visit and reporting; • Monthly site visits; • Monthly Reports Annual Performance Assessment
Target Prospecting Boreholes:	• Alien vegetation management	• Site Inspections and checklists;	• Contractors Environmental Representative;	• Once-off control of documents, site visit and reporting;

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

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Ablutions - Chemical Toilets	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Sample storage **(Existing BMM prospecting office. No new infrastructure to be constructed)**	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
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)**	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Temporary general waste storage **(General/domestic waste - Wheelie bin)**	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Temporary hazardous waste storage **(Hazardous waste – Sealed Container)**	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists

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

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.

Signature of the environmental assessment practitioner:

Environmental Impact Management Services (Pty) Ltd

Name of company:

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.

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

Name of company (if applicable):

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

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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: PALAEONTOLOGICAL 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