



**mineral resources**

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

**FINAL 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).

**NAME OF APPLICANT:**

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**FILE REFERENCE NUMBER SAMRAD: NC30/5/1/1/2/13317PR**

### **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 or instructions or guidance provided by the competent authority to the submission of applications.

**It is therefore an instruction that** the prescribed reports required in respect of applications 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 required 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 the order, and under the provided headings as set out below, and ensure that the report is not cluttered with uninterpreted 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 proposed activity is located and how the 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 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.

## DEFINITIONS

**Alternatives** - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –

- i. The property on which or location where it is proposed to undertake the activity;
- ii. The type of activity to be undertaken;
- iii. The design or layout of the activity;
- iv. The technology to be used in the activity, and;
- v. The operational aspects of the activity.

**Baseline** - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

**Basic Assessment Process** – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017). These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

**Biodiversity** - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

**Borehole** - collectively describe all of the various types of holes drilled and includes holes advanced to collect soil samples, water samples or rock cores, to advance in situ sampling equipment, or to install monitoring wells or piezometers.

**Community** - Those people who may be impacted upon by the construction and operation of the project. This includes surface owners, neighbouring landowners, local communities and other occasional users of the area.

**Construction Phase** - The stage of project development comprising site preparation as well as all construction activities associated with the development.

**Consultation** - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

**Critical Biodiversity Area** - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

**Cumulative Impacts** - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

**Environment** - The surroundings within which humans exist and that are made up of

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

**Environmental Authorisation (EA)** – The authorisation by a competent authority of a listed activity.

**Environmental Assessment Practitioner (EAP)** – The person responsible for planning, management and co-ordination of environmental impact assessment,

strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

**Environmental Impact Assessment (EIA)** – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

**Environmental Impact Report (EIR)** - A report assessing the potential significant impacts as identified during the Scoping phase.

**Environmental Management Programme (EMPr)** - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

**Gross Domestic Product (GDP) by region** - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

**Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.**

**Impact** - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

**Interested and Affected Party (I&AP)** – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

**Municipality** –

(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or

(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means

(i) The district municipality, or

(ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

**NEMA EIA Regulations** - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

**No-Go Alternative** – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

**Public Participation Process (PPP)** - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

**Registered Interested and Affected Party** – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

**Scoping process** - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

**Scoping Report** – The report describing the issues identified during the scoping process.

**Significant impact** – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Spatial Development Framework (SDF)** - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

**Specialist study** - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

**Stakeholders** - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

**Sustainable development** - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

**Visibility** - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

**Visual Character** - The elements that make up the landscape including geology, vegetation and land-use of the area.

**Visual Quality** - The experience of the environment with its particular natural and cultural attributes.

**Visual Receptors** - Individuals, groups or communities who are subject to the visual influence of a particular project.

## ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESa	Early Stone Age
FoT	“Free on Truck “: means there is no processing and that it’s a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km <sup>2</sup>	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m <sup>3</sup>	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area

NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RDL	Red Data List
ROM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License
WUL A	Water Use License Application



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## 1. Contact Person & Contact Details EAP

### 1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl

EAPASA Number 2019/2034

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### 1.2 Expertise of the EAP

#### The qualifications of the EAP

Current qualifications in this field were obtained through formal studies at the Cape Town Technicon, Nelson Mandela Metropolitan University and the University of the Orange Free State, which is the following:

- National Diploma Nature Conservation (1986)
- National Higher Diploma (B-Tech) Nature Conservation (1992)
- Master's Degree Environmental Management (MOB 750) (2001)

Further qualifications in this field were also obtained through short courses at the University of the Orange Free State, which is the following:

Environmental Impact Assessment (2001)

Wildlife Management through Veld Management (2001)

Resource evaluation and game ranch management (2003)

Arc GIS (2009)

#### Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

With the implementation of the Mineral and Petroleum Resources Development Act 28 of 2002 Mr. van Zyl has started assisting small scale miners with all facets of applications for mining permits in terms of section 27 and prospecting rights in terms of section 16 of the MPRDA. Mr van Zyl has an excellent knowledge of the relevant acts applicable to the mining sector including the following:

- Mineral and Petroleum Resources Development Act 28 of 2002
- Mineral and Petroleum Resources Development Amendment Act 49 of 2008
- Mineral and Petroleum Resources Regulations 2004
- National Environmental Management Act 107 of 1998 as amended
- National Environment Laws Amendment Act 25 of 2014 as amended
- NEMA: Environmental Impact Assessment Regulations, 2014
- NEMA: Financial Provisioning Regulations, 2015
- NEMA: Waste Act 59 of 2008 as amended
- NEMA: Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015
- National Water Act 36 of 1998 as amended (with special attention to section 21 water uses)

Since 2002 Mr. van Zyl completed more than 150 applications for mining permits and more than 100 applications for prospecting rights. The mineral regulations and environmental management for most of these projects were managed throughout the life of the project including:

- Applications – manual and Samrad
- Prospecting work programs including financial and technical competence
- Public participation process
- EIA and EMP's now BAR and EMPr's
- Annual Rehabilitation Plans
- Final Rehabilitation, Decommissioning and Mine Closure Plans including Risk Assessment Reports

- Execution and registration of rights including sec 42 diagrams for MPTR0
- Performance audits including reviews of Annual Closure Plans and Rehabilitation, Decommissioning and Mine Closure Plans together with financial quantum reviews.
- Application for closure certificate

Although Mr. van Zyl specializes in small scale mining operations and prospecting operations that requires investigation, assessment and communication according to the procedure as prescribed in regulations 19 and 20 of the EIA Regulations he also assists 5 mining rights with environmental management. Other sections of the MPRDA that Mr. van Zyl has experience in is:

- Section 102 applications and Section 20 applications
- Section 53 Applications and Section 11 Applications

## 2. Location of the overall Activity

**Table 1:** Location of the overall Activity

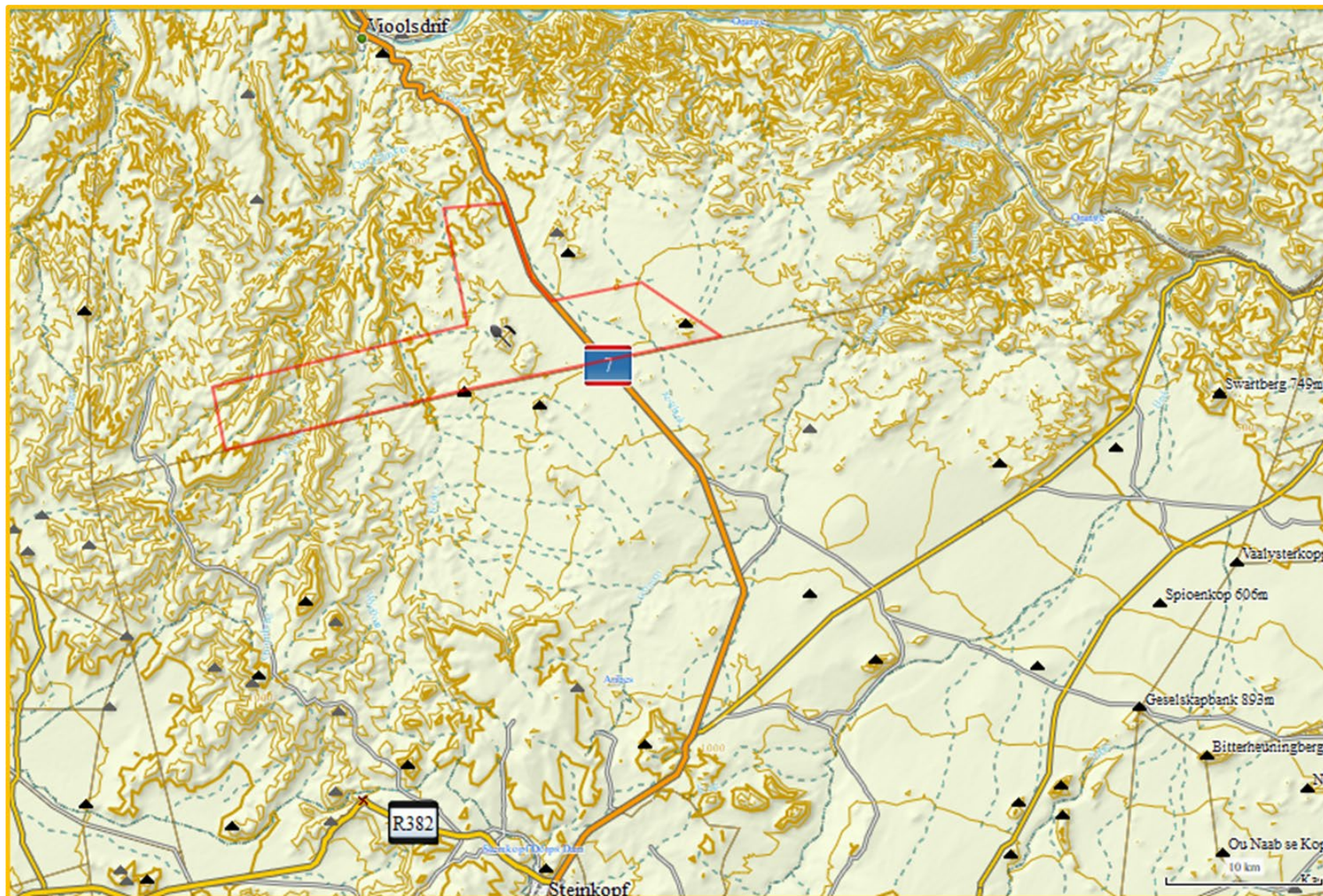
<b>Farm Name:</b>	<b>Property 1:</b> Portion of Remainder Plot 226 Vioolsdrift Settlement in extent 119486.4566Ha. Registered in the name of Local Government of the Republic of South Africa by virtue of title deed T585/2021. LPI Code C05300130000022600000
<b>Application area (Ha)</b>	±14 976Ha
<b>Magisterial district:</b>	Namakwaland
<b>Distance from nearest town</b>	100kms North of Springbok, 30kms South of Vioolsdrift
<b>21-digit Surveyor General Code</b>	Refer above

2.1 Locality map (show nearest town, scale not smaller than 1:250000).

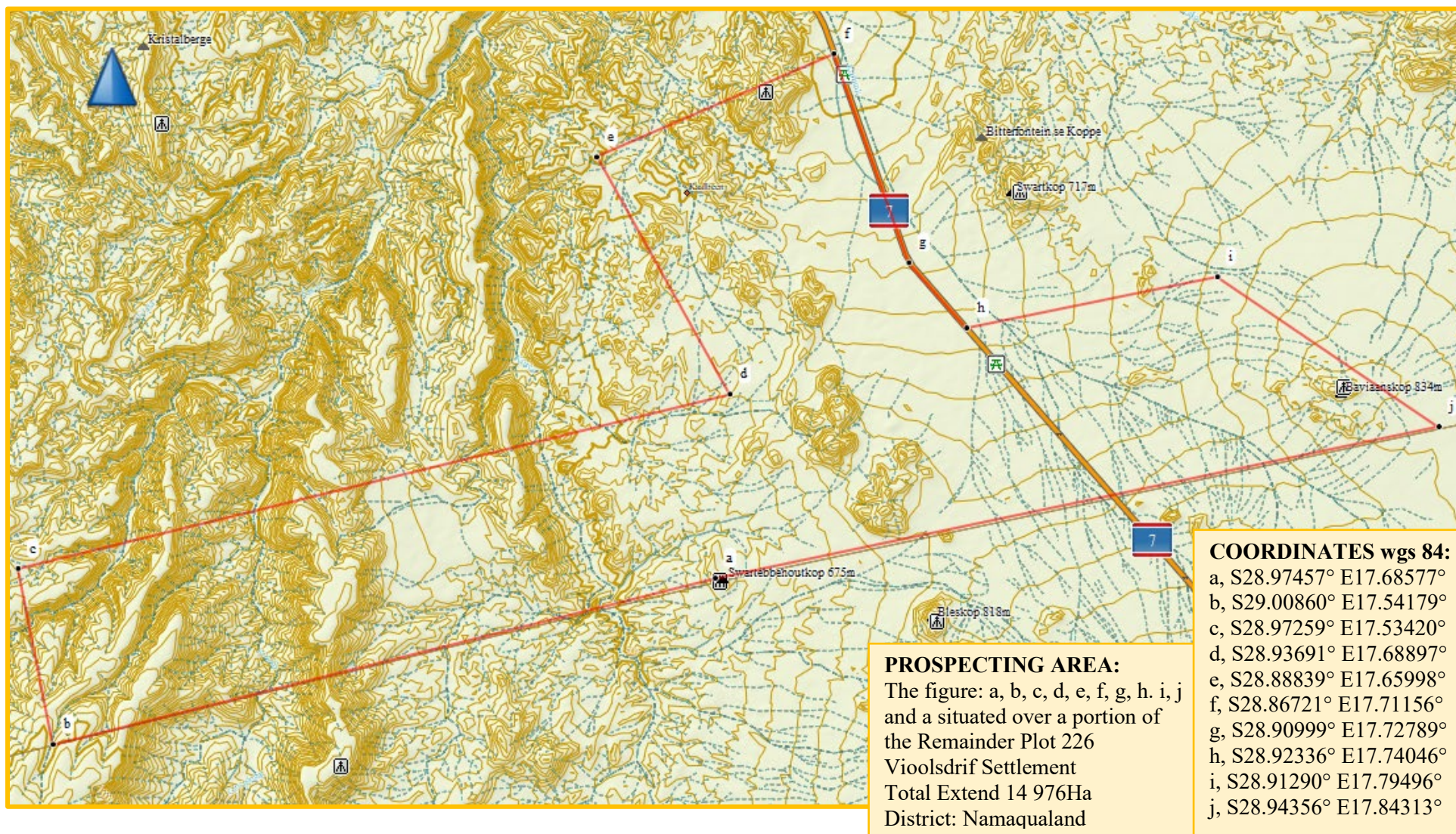
The proposed Prospecting Area is located on a ±14 976Ha area of portion of the remainder of Plot 226 Vioolsdrift Settlement situated in the Namakwa District Municipality and Nama Khoi Local Municipality of the Northern Cape Province.

Farm	Portion	Size		LPI Code	Deed	Owner
		Property	Application			
Plot 226 Vioolsdrift Settlement	Remainder	119486.4566	14976	C05300130000022600000	T585/2021	Local Government of the Republic of South Africa

**Figure 1: Locality plan with major Towns and Routes** (application area outlined in red)



**Figure 2: Layout of Prospecting Area showing co-ordinates in relation to property boundary**



### 3. Description of the scope of the proposed overall activity

This application employs a phased approach, where the work program is divided into several sequential sections. At the end of each section there will be a brief period of compiling and evaluating results. These results will not only determine whether the project proceeds, but also the manner in which it will go forward. Essentially, the Company will only action the next stage once satisfied with the results obtained. In addition, smaller, non-core parts of the work program will be undertaken if warranted. Essentially the program can be summarized as:

<u>Phase</u>	<u>Activity</u>	<u>Duration</u>
Phase 1	Investigations & surface surveys	2 years
Phase 2	Drilling* and assay	2 years
Phase 3	Compilation & reporting	1 year

The prospecting work program **Table 2** below is schematic and applicable to “virgin territory”. Unforeseen circumstances, e.g., earlier than anticipated identification of mineralization, may necessitate that the prospecting phases or subphases be accelerated for a portion of the prospecting area, while proceeding elsewhere at a slower rate.

Initial prospecting will be carried out by the company itself, utilizing its own in-house geologists and engineers to conduct and oversee the majority of the work. Drilling will be contracted out to service providers. The methods detailed below would be used to investigate the area

It is not possible to give details of the drilling program before the surveys and surface work is completed.



**Table 2: Prospecting Work Program**

Phase	Activity	Skill(s) required	Time frame	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
Phase 1	Site establishment	Site manager	2 Years	Office & staffing	Month 3	Site manager
NON - INVASIVE PROSPECTING	Literature survey	Geologist		All past information & results. Initial report	Month 6	Geologist
	Aerial Survey	Drone operator		Aeromagnetic, EM surveys	Month 9	Geophysicist
	Geological mapping	Samplers, geologist		Geological map of area	Month 15	Geologist
	Geophysical survey	Geophysicist		Follow up survey	Month 18	Geophysicist
	Interpretation	Geophysicist, Geologist		Sections, plans and report	Month 21	Geologist
	Drilling plans	Driller, geologist		Drill locations & orientations	Month 23	Geologist
Phase 2	Drilling	Driller, geologist	2 Years	Drill samples, assay	Month 40	Geologist
INVASIVE PROSPECTING	Assay & results	Chemical analyst Geologist		Lab technician, geologist	Month 41	Assay laboratory manager
	Specialist core studies	Several specialists		Mineralogy, rock mechanics	Month 44	Mineralogist, Mining engineer
	Other minerals investigation	Geologist		Spatial plans of all data	Month 48	Geologist
	Metallurgical test work	Metallurgist, Mineralogist		Information on crushing, milling, recovery and equipment	Month 45	Metallurgist
Interpretation of results	Data technician, geologist, engineers	Technical reports	Month 48	Geologist, Mining engineer		
Phase 3	Completion of all site work, restoration	ECO	1 year	Restoration of site	Month 51	ECO
NON-INVASIVE PROSPECTING	Geological modelling	Geologist		Geological report		Geologist
	Additional studies, resources	Specialized inputs		Modeling, ore resources	Month 52	IT & Resource specialists
	Valuation, financing	Mineral economist		Financial analysis, funding options	Month 55	Mineral economist
	Completion Report / PFS Resource statement	All disciplines		Pre-feasibility report and resource statement	Month 60	Geologist, Mining engineer, Mineral economist.

### 3.1 Listed and specified activities

**Table 3:** Listed and specified activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Prospecting Activities including: Aerial surveys / Imagery Geological Mapping Geophysical & Radiometric Surveys Data Compilation Soil Sampling Drilling Metallurgical Sampling	± 14 976Ha	Activity 20	GNR 983 Listing notice 1 of 2014 as amended by GNR 327 of 7 April 2017 and GNR 517 of 2021 Activity 20 Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in Listing Notice 1 or in Listing Notice 3 of 2014, required to exercise the prospecting right.”	No
The rehabilitation, decommissioning and closure of the sand mining site, which will only be required at final decommissioning and closure.	± 14 976Ha			

Soil samples of less than 0.01m<sup>3</sup> each will be collected instream and off stream and the total samples are estimated at 950 totaling 9.5m<sup>3</sup>.

Each drill pad will be contained to an area of about 160m<sup>2</sup>.

Drill sumps if required will be approximately 2.5m x 2.5m x 1.7m

### 3.2 Description of the activities to be undertaken

#### 3.2.1 Construction phase: Development of infrastructure and logistics

Due to the small scale of operations no permanent infrastructure will be developed and only existing farm tracks will be used. Upgrading of the existing tracks will be done as part of the construction phase. Refer to Figure 2 for the location of the existing farm tracks that provide access off the N7 to the proposed project site.

Equipment will be transported to site via the existing roads (including gravel and jeep track). No new roads will be required.

No buildings and infrastructure will be required as the operation will be run from the company headquarters where all logistics will be available.

No offices and accommodation will be provided onsite that need decommissioning.

No processing plant and services will be developed on the prospecting area.

No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998) without the necessary authorisations from the competent authority (DWAS). Water will be bought direct from another legal source (government/ municipal sources) and trucked onto site, and no water reticulation will be laid-on to the mine work area(s) either.

Domestic waste will be collected in plastic containers and transported regularly to the company headquarters. A temporary storage area for used lubrication products and

other hazardous chemicals will be provided for the collection of the small volume of waste before it is removed to the company headquarters.

A temporary equipment laydown area will form part of the drill pad. This is also the area where the drill rig will be parked when not in use and will include an equipment/materials laydown (storage) area and a chemical toilet.

Oil/grease/diesel management systems will be provided as part of the equipment laydown area. Diesel will be contained in a mobile bowser provided with a drip tray as is the case for all stationary equipment.

### 3.2.2 Operational phase

#### 3.2.2.1 Non-Invasive Investigations & surface surveys:

##### Method: Desk-top Studies

In order to direct the exploration programme in an efficient manner, there will be a review of information and data gathered during the previous exploration on the property (and in the area). This may include approaches to previous explorers with a view to obtaining previous prospecting results and information.

Later in the programme, short economic costing studies may be undertaken to define the mineable depth and critical mass of resources required to ensure that any identified deposits may be classed as resources in terms of their potential for economic extraction (a requirement of the SAMREC/JORC Code states that a 'Mineral Resource' may only be described as such if there are prospects for eventual economic extraction).

##### Method: Mineral Tenure and Environmental Work

This includes mineral rights acquisition, maintenance of existing rights, venture partnerships and legal work associated with the project. The mineral rights acquisition and maintenance is fundamental to the exploration project and has a strong impact on the pace of the exploration programme.

##### Method: Raising Finance

Important in exploration. In order to raise finance for the project regular reporting to the board/or directors/ shareholders is required.

##### Method: Geological Mapping

Geological mapping on a regional and detail basis using photo-geological, satellite imagery and resources as well as other interpretations from the previous stages as a guide. Data and information obtained during previous stages will be ground truth'd. This stage will also allow for initial site investigations relating to the prospecting stages regarding infrastructure and affected party liaison.

Practically this will be probably be done using the photogrammetry study or Google-Earth image as a base with localities positioned using GPS receivers.

Environmental disturbance is kept to a minimum and no environmental rehabilitation is generally required for this method of exploration.

##### Method: Geochemical Soil Sampling

Samples are collected at set intervals (commonly between 10m and 100m intervals) along each sample line and are often composited on a 50m or 100m basis.

Sample pits are dug to a consistent depth of 30cm (this is a typical depth but the depth is dependent on results from orientation survey) and the excavated soil is retained. A sample (in the region of 500g or smaller for Au and PGM) is taken from the bottom of the pit. The pit is then filled in with the retained soil. Soil and/or stream sediment samples collected along traverses will be screened to minus 80# or minus 200# (depending on the results of orientation studies) for analysis.

Indicative sample results may be obtained by doing a systematic handheld XRF assay programme under controlled procedures.

Chosen samples may be bagged in clear plastic bags, duplicate ticketed and dispatched to a commercial sample preparation and assay laboratory. The external sample preparation lab will dry and homogenize the samples. They will then dry screen the sample to 150 microns (or alternative, dependent on the orientation survey), and retain the remaining oversize material. A set weight of this sample material is processed by the laboratory and assayed. The assay methods will vary on the type of mineralisation, the host material of the sample and the orientation study. More than one assay method may be used.

Quality control samples are submitted in a chosen ratio, which is generally a 1 in 20 ratio.

The remaining screened material is stored at the laboratory or core shed for remedial or further work.

Environmental disturbance is kept to a minimum and no environmental rehabilitation is generally required for this method of exploration.

### 3.2.2.2 Invasive Investigations & surveys:

This prospecting work programme does not allow for large excavations, trenching or pitting, nor for bulk sampling. In the event that these methods are required then a Prospecting Work Programme amendment (and related Environmental Authorisation amendments) will be submitted in terms of the relevant legislation.

Drilling is currently the only invasive-prospecting methods planned.

#### Method: Drilling

Drilling to test the more promising geophysical and soil geochemical anomalies may follow. If economic grades of base metals are intersected, follow-up RC and/or diamond drill holes will be drilled for the purpose of delineating the economic zone.

#### RC Drilling

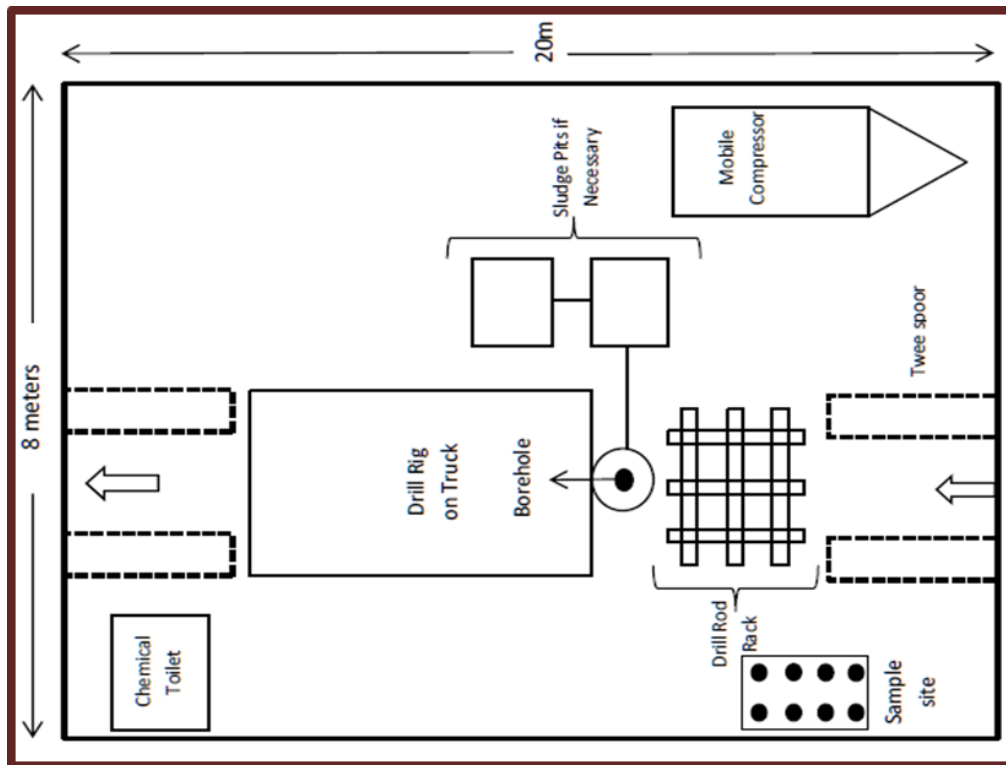
Reverse circulation or RC drilling is possibly the most definitive and powerful exploration tool in this hard rock environment. Under the direct supervision of a resident geologist, holes would be sited over interesting structures and hot spots located from earlier aerial and ground surveys. Cuttings would be collected by cyclone and the material split between the chip tray and sampling. Chippings would be photographed, logged and a sample taken for analysis on a 1m interval from all target horizons.

#### Diamond Core Drilling

Borehole sites are GPS located and pegged with a steel peg. The site is inspected and photographed prior to any disturbance. A drill pad is then cleared, keeping disturbance to the native vegetation to an absolute minimum. Any topsoil removed is stored separately for later reuse. These holes would be drilled in phases, with the first phase of holes being drilled as recce holes or on a wide grid on the target areas identified during Phase 1 and the balance being drilled on a tighter grid as the target becomes more resolved (Infill drilling). If required, each percussion hole would be started as an 8-inch diameter hole to allow for casing to be inserted deep enough to stabilize overburden and thereafter progress to 60m as a 6-inch diameter hole. Diamond drilling may follow the percussion pilot drill or diamond drill will be used from surface with NQ, TNW or BQ core sizes.

Plastic lining to prevent oil spillage is used under the rig. After the drilling operation is complete, each borehole collar is surveyed, and the site is rehabilitated and photographed.

**Figure 3a Typical layout of a diamond drill platform**



**Figure 3b Typical configuration of a diamond drill rig**



### General Drilling Procedures and Drill Sample Preparation

During the drilling phase geological supervision and drill core processing can take place simultaneously. The drilling program may be interrupted occasionally to allow time for assaying, data processing and revision of the structural interpretation. Mineralised drill core will be split with a core splitter. One half of the split drill core will be sent for assay, while the other half is kept for record purposes. All drill cores will be stored after processing is completed. Borehole collars will be surveyed using a

differential GPS Receiver. Down-hole surveys to detect deviation will only be carried out on selected holes. The stand pipe at the collars is kept available for further drilling and other downhole surveys if required but will be sealed and numbered. Collars will be covered with numbered cement slabs until the end of the prospecting period.

Drill cores are logged by skilled personnel and samples chosen, core cut and representative samples would be submitted to a reputable assay laboratory for crushing, milling and assay using the best method as determined by the orientation survey.

For stone chips produced by reverse circulation drilling, drill chips are collected at a set interval, often 1m, in bags directly from the drill-rig, often using a cyclone to collect the whole sample and this reduces the dust. The geologist logs a representative sample for each interval. A split of the sample is then processed for analysis if required. After the drilling operation has been completed, each borehole collar will be surveyed, and the site will be rehabilitated and photographed.

### 3.2.2.3 Compilation & reporting

#### Completion Studies and Pre-feasibility

##### Method: Metallurgical Test work

Metallurgical work may be undertaken using the drill cores obtained during drilling. At this stage only, bench scale test work is considered to define the likely upgrading and hydro-metallurgical process that would be applied to any ore grade material encountered. Other test work will focus on establishing preliminary bond work indices and ore grindability to be used for conceptual plant design.

##### Method: Pre-Feasibility Studies

The purpose of the pre-feasibility study is to determine if the information collected in the previous stages, in combination with other historical information suggests the establishment of a mining operation and confirms that the cost of a full feasibility study is warranted.

It is similar to a full Feasibility Study, except the confidence levels are lower and it is thus seen rather as an internal document where a policy decision is made rather than an external public document such as a full Feasibility Study used for fund raising.

The scope of this stage includes resource calculations and estimates, mine optimisation, layout and design, metallurgical process design, marketing and financial studies.

This stage involves:

- continued digital modelling and evaluation,
- the generation mineralization distribution histograms and
- mine pre-feasibility studies including:
  - Mining method selection and the development of a mining schedule and layout
  - Costing exercises
  - Metallurgical plant design, costing and feasibility.
  - Environmental and social scoping studies
  - Base case evaluation and cashflows

##### Method: Feasibility Studies

Provided the pre-feasibility stage is positive and finance is available, a Feasibility Study detailing the plans for exploitation of the deposit may be undertaken. This will likely fall into the renewal period of the right. This would be done in conjunction with an internationally reputable geological and mining consulting firms who would undertake independent 'sign off' on the studies. This is similar in content to the pre-feasibility study except it is conducted to a higher degree of confidence and

encompasses other associated studies such as EIA, social and other studies that would ultimately form part of a Mining License/Right, should a production decision result. This will include water usage studies and water license applications and other regulatory studies and documentation.

### 3.2.3 Decommissioning phase

Planning for closure and restoration from the beginning of an operation makes the process easier; waste can be removed as it is created, disturbance can be planned so that topography restoration is less complicated, and topsoil can be re-used at shorter intervals. Site rehabilitation can make the land more valuable and attractive for resale. Additionally, establishing a closure strategy (and communicating that activity to the public) can help enhance the company's reputation as a socially-responsible operation. The decommissioning and closure phase at the end of the life of the mine will consist of implementing the Final Rehabilitation, Decommissioning and Closure Plan (attached at Annexure 1).

#### 4. Policy and Legislative Context

**Table 4: Policy and Legislative Context**

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
<b>Legislation</b>		
<p>Constitution of South Africa, specifically everyone has a right;</p> <ul style="list-style-type: none"> <li>a. to an environment that is not harmful to their health or wellbeing; and</li> <li>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:               <ul style="list-style-type: none"> <li>i. prevents pollution and ecological degradation;</li> <li>ii. promote conservation; and</li> <li>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</li> </ul> </li> </ul>	Prospecting activities	<p>The prospecting activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.</p>
<p>Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) section 16 (as amended)</p> <p>MPRDA Regulations as amended by GNR349 of 18 April 2011.</p>	Application to the DMR for a prospecting right in terms of Section 16	<p>The conditions and requirements attached to the granting of the Prospecting Right will apply to the prospecting activities.</p> <p>DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.</p>
<p>Mine Health and Safety Act, 1996 (No. 29 of 1996) (MHSA) and Regulations</p>	Prospecting activities	<p>Mining operations will be governed by the MHSA and associated Regulations.</p>



<p>National Environmental Management Act, No. 107 of 1998 (as amended) (NEMA)</p> <p>Environmental Impact Assessment Regulations, 2014 (EIA Regulations 2014) and Environmental Impact Assessment Regulations Listing notices 1, 2 and 3 published in terms of NEMA in Government Notices 982, 983, 984 and 985 of 4 December 2014 (as amended by GN No. 517 of 11 June 2021)</p> <p>Regulation 16{1}(b)(v) submission of a report generated from the national web based environmental screening tool report will be compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21.</p> <p>"Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Section 24(5) (a) and (h) and 44 of NEMA, 1998, when applying for EA ("the Protocols"), in Government Gazette (GG) 43110 (dated 20 March 2020) and Government Notice (GN) 320. Protocols in GG 43855 of GN No. 1150 dated 30 October 2020 provide for Terrestrial and Animal Plant Species.</p> <p>Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production</p> <p>National Guideline on minimum information requirements for preparing Environmental Impact Assessments for mining activities that require environmental authorisation, published in terms of NEMA in Government Notice 86 of 2018</p>	<p>Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations</p>	<p>An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The application for EA including screening tool report must be acknowledged by the competent authority before the BAR process can start. The listed activities (Listing Notice 1, Activity 21) that are triggered determine the Environmental Authorisation (EA) application process to be followed</p> <p>Where specialist assessments were identified the protocols for compiling the identified specialist assessments for specific environmental themes provided as part of the screening tool will form part of the terms of reference for specialist as this protocol replaces the requirements of Appendix 6 of the EIA Regulations. Refer Section 10.3 Summary of specialist reports</p> <p>These regulations have informed the Final Closure Plan and financial provisioning for the Project. The disturbed area shall be rehabilitated in such a way that is stable, non-polluting, non-eroded, free from alien invasive species and suitable for the agreed post closure land use.</p> <p>The compilation of this Basic Assessment Report including a Final Rehabilitation, Decommissioning and Mine Closure Plan and the Public Participation Process are required in terms of NEMA.</p>
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<p>National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended) National Waste Information Regulations published in GN 625 of 2012 Waste Classification and Management Regulations in GN 634 of 2013 Waste listed activities in GN 921 of 2013 National Norms and Standards for the Storage of Waste, in GN 926 of 2013 National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste, in GN 1093 of 2017</p>	<p>General waste management measures as part of environmental awareness plan</p>	<p>These regulations have informed the planning and management of waste for the Project. No listed activities are triggered or included as part of the Environmental Authorisation (EA) application process. The generation of potential waste will be minimized through ensuring employees of the Applicant are subjected to the appropriate environmental awareness campaign before commencement of operations. All waste generated during the project will be disposed of in a responsible legal manner. Proof of legal disposal will be maintained on site.</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 9 December 2011) Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)</p>	<p>Section 8</p>	<p>The site falls within the Kosiesberg Succulent Shrubland (SKr12), Umdaus Mountains Succulent Shrubland (SKr16), Eenriet Plains Succulent Shrubland (SKr17), Southern Nababiepsberge Mountain Desert (Dg8), Eastern Gariiep Plains Desert (Dg9) and Eastern Gariiep Rocky Desert (Dg10) vegetation units (Mucina and Rutherford, 2006), which is not classified as Critically Endangered, Endangered nor Vulnerable in terms of the NEM:BA listed Ecosystems (GNR 32689). The major part of the prospecting area is located within an CBA 2 and the area adjacent to the Koubank drainage channel is identified as CBA 1. The area also forms part of the provincial Protected area expansion strategy and also form part of an Upstream FEPA (Code 4) sub-catchment as well as FEPA code 1. These areas do not preclude prospecting but it is important that planning and additional controls be put in place to limit impact to an absolute minimum.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regs in GN R827 of 1 November 2013 List of Activities which Result in Atmospheric Emissions, published in GN 893 of 2013 National Ambient Air Quality Standards (NAAQS), in GN 1210 of 2009 National Atmospheric Emission Reporting Reg, in GN 283 of 2015</p>	<p>Section 8</p>	<p>These regulations have informed the planning and management of emissions from the Project. Dust control measures are included in the EMPr</p>

National Heritage Resources Act, 25 of 1999 (“NHRA”)	Section 8	A desktop AIA and PIA were done to identify no go areas during drilling and all mitigation measures and conditions form part of the EMPr. Refer to Annexure 3 for a copy of the PIA and HIA
National Water Act (Act 36 of 2008) Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources in GNR 704 of 1999 Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals in GNR 267 of 2017 Several General Authorisations have been published in terms of Section 39 of the NWA (various dates) Purification of Waste Water or Effluent, published in GNR 991 of 1984 Regulations for the erection, enlargement, operation and registration of Water Care Works, published in GNR 2834 of February 1986	Section 8 for description of water resources in local area,	These regulations have informed the planning and management of water and stormwater arising from the Project A Water Use Authorisation (License or GA) in terms of Sec 21(c) and 21(i) is required for drilling within, or within horizontal distance of 50m of any drainage channels. A Water Use Authorisation (License or GA) in terms of Sec 21(a) is required for abstracting groundwater. None of these activities are planned but if the situation changed the necessary application will be lodged. At this stage any water required for drilling activities will be obtained from a legal source i.e., local authority and brought in via a mobile water tanker.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that “Everyone has the right to administrative action that is lawful, reasonable and procedurally fair”. All administrative actions must be based on the relevant considerations
Protection of Personal Information Act, 2013 (Act No. 14 of 2013) (POPIA) Clarity On Applicability of The Protection of Personal Information Act, 2013 To Requirements of The Environmental Impact Assessment Regulations, 2014 Relating to Registers of Interested and Affected Parties and The Inclusion of Comments in Reports (circulated on 3 September 2021)	Annexure 2: PPP Report	The guidance document provided by the Department of Forestry, Fisheries and the Environment was used to determine the information to be included or excluded from the public domain to protect private or personal information.
Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)	Comments required from the Nama Khoi Local Municipalities.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HAS)		These regulations have informed the planning and management of hazardous substances for the Project.

National Forest Act, 1998 (Act No. 84 of 1998) (NFA)		Permit(s) will be required if any protected species are cut, removed and/or translocated from the Project footprints.
Provincial Environmental Legislation: The Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) (NCNCA)		
National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM:PAA)		These regulations have informed the planning and management of the Project. The Project footprint does not overlap with any existing protected area buffer areas, or any areas identified for protected area expansion.
<b>Municipal Plans and Policies</b>		
Namakwa District Municipality Integrated Development Plan (IDP) 2017/2022	Section 5 & 8	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which are included in the EMPr
Nama Khoi Local Municipality Integrated Development Plan (IDP), 2018/2019	Section 5 & 8	The Need & Desirability of the project is referenced in terms of the IDP, specifically relating to employment creation and sustainable resource utilisation. Relevant mitigation measures are included in the EMPr.
Northern Cape Provincial Spatial Development Framework (NCPSPDF)	Section 5 & 8	Sustainable development is a key consideration as addressed in this impact assessment report.
Northern Cape Provincial Growth and Development Strategy 2004-2014 (NCPGDS)	Section 5 & 8	Sustainable development is a key consideration as addressed in this impact assessment report.
<b>Standards, Guidance and Spatial Tools</b>		
Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline:	Section 5 & 8	The mitigation measures to address and mitigate the potential impacts of the mining are included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5	Refer to Section 5
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs	Section 7	Refer to Section 7
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 9	Refer Impact Assessment Table
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 9	Refer Impact Assessment Table
Namakwa District Biodiversity Sector Plan (2008)	Baseline environmental description	Used during desktop research to identify sensitive environments within the mining right area.
BGIS (www.bgis.sanbi.org)		

SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication	Management / Monitoring measures	Used to set the standard allowable for noise mitigation measures are included in the EMPr.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants		Standard for dust fallout. Dust mitigation measures are included in the EMPr.

## 5. Need and desirability of the proposed activities

### 5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)<sup>1</sup> state that: “Sustainable development is enshrined in South Africa’s Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa”.

DMR, as custodian of South Africa’s mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to “prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”<sup>2</sup>.

The primary environmental objective of the MPRDA is to give effect to the “environmental right”<sup>3</sup> contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa’s mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Prospecting Right area as shown in Figure 4 are: “Category B: Highest Biodiversity Importance” – highest risk to mining, “Category C: High Biodiversity Importance” – high risk to mining; and “Category D: Moderate Biodiversity Importance” – moderate risk for mining with the majority of the area showing zero risk for mining.

These categories have since been super-ceded by the Critical Biodiversity Area (CBA) map (refer to Figure 8b), which would be interpreted as Category B is now CBA 1, Category C is now CBA 2 and Category D is now Ecological support areas. These categories basically require an environmental impact assessment process to address the issues of sustainability.

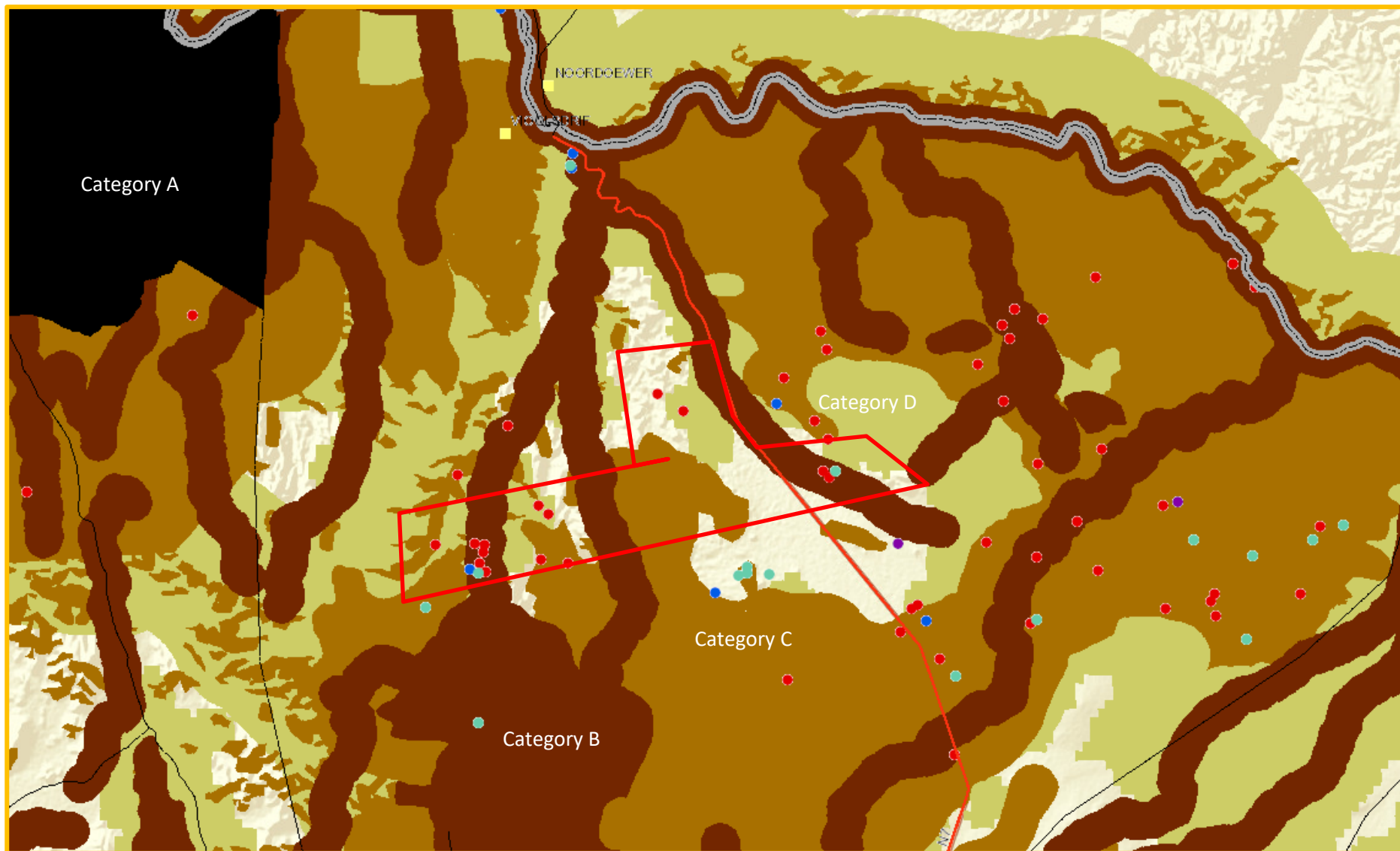
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<sup>1</sup> Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

<sup>2</sup> Constitution of the Republic of South Africa (No. 108 of 1996).

<sup>3</sup> Section 24 of the Constitution states that “everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

**Figure 4: Location of Prospecting area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer**



## 5.2 Employment benefits

The proposed prospecting activity is considered to be a temporary land use, and the area will be rehabilitated in accordance with the Final Rehabilitation, Decommissioning and Closure Plan, attached as Annexure 1. The benefits of the project can be divided into social and economic classifications.

In terms of employment opportunities and job security, the prospecting activities themselves would not directly lead to many job opportunities. Should prospecting activities prove that a feasible resource mineral is present to allow for mining, a new mine may be developed which would generate direct and indirect employment opportunities in an area where employment is needed. The proposed prospecting operation will however assist in providing job security, local employment, local skills transfer and economic upliftment, in a sustainable manner.

## 5.3 Namakwa District Municipality IDP

The vision of the Namaqua District Municipality IDP is: “Namakwa District Municipality, a centre of excellence!”

### **The Mission Statement is:**

- The stimulation of radical economic and social transformation;
- The fostering of partnership with relevant role-players;
- Supporting and capacitating of local municipalities;
- Transparent and accountable processes; and
- Providing of local leadership

### **The Strategic Objectives are**

- Monitor and support local municipalities to deliver basic services which include water, sanitation, housing, electricity and waste management
- Support vulnerable groups
- Improve administrative and financial viability and capability
- Promote and facilitate Local Economic development
- Enhance good governance
  - ✓ Promote and facilitate spatial transformation and sustainable urban development
  - ✓ Improve communication and communication systems
  - ✓ Establish a customer care system
  - ✓ Invest in the improvement of ICT systems
  - ✓ To render a municipal health service
  - ✓ To coordinate the disaster management and fire management services in the district
  - ✓ Implement the climate change response plan
  - ✓ Caring for the environment

### **Values**

- The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.
- Caring for the environment and the effects of climate change, such as flood events, on the proposed prospecting project will be mitigated as per the measures contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the prospecting activities are addressed in the EMPr.



#### 5.4 Nama Khoi Local Municipality IDP

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under “section 152. (1) The objects of local government are-

- (a) to provide democratic and accountable government for local communities;
- (b) to ensure the provision of services to communities in a sustainable manner;
- (c) to promote social and economic development;
- (d) to promote a safe and healthy environment; and
- (e) To encourage the involvement of communities and community organisations in the matters of local government”.

The vision of the Nama Khoi Local Municipality is: “To proudly deliver sustainable local economic development & climate resilient quality services to the Nama Khoi Municipality”

The IDP states that it is important that economic opportunities are expanded in local areas, in a way that takes both people and biodiversity into account to ensure sustainable livelihoods.

The report highlights that the Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.

The IDP identifies its strengths which include high quality & unspoiled environment, diversity of scenic landscapes and vast amounts of open land, a large labour pool and solar energy; weaknesses which include undiversified economy: over-dependence on mining and government services sectors, lack of jobs and economic development, lack of skills and poor quality of education; opportunities which include unexploited mineral opportunities’ and Eco-tourism initiatives; and threats as water supply, water quality and brain-drain as individuals from the Northern Cape migrate from scarcity of business, finance and technical skills.

#### 5.5 Northern Cape Provincial Spatial Development Framework (NCPSPDF)

The NCPSPDF states that the: “Cape is not one of South Africa’s richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state”. The NCPSPDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province. The NCPSPDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned.”

The potential for job security, employment and skills transfer are identified as positive environmental impacts in this impact assessment.

#### 5.6 Northern Cape Provincial Growth and Development Strategy (NCPGDS)

The NCPGDS has the following vision for the province: “Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development.” The strategy for the growth and development of the province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;
- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

### 5.7 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines “evaluation” as “the process of ascertaining the relative importance or significance of information, in the light of people’s values, preferences and judgements, in order to make a decision.” In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, “need and desirability” must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering “need and desirability”, it must also be informed by the sum of all the impacts considered holistically. In this regard “need and desirability” also becomes the impact summary with regard to the proposed activity.

These Guidelines state that: “In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved”.

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this environmental assessment as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and interested and affected parties. Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 7 in this report.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective

mitigation measures have been proposed to ensure that the impact is mitigated, and these are detailed and included in the EMPr.

- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site mainly includes portions identified as CBA 2 except area kouwbank FEPA 1 (refer Figure 8a and 8b).

The vegetation type found on site is identified as least threatened according to (Mucina and Rutherford, 2006). The prospecting area does not include areas listed in the "National List of Threatened Ecosystems that are threatened and in Need of Protection" in GN 1002 dated 9/12/2011, with the closest endangered ecosystem the Lower Gariep Alluvial Vegetation along the Orange River (Figure 8c). The area is located within the Nababiep Steinkopf Harasberg primary focus area.

Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. The prospecting process that only include limited drilling is considered to be a relatively benign type of operation. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the activities progress. This EMPr and Closure Plan (Annexure 1) proposes mitigation measures which will minimise the impacts of the mining on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations are detailed in the EMPr, and Closure Plan (Annexure 1) to ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been detailed in the EMPr and Closure Plan (Annexure 1) to ensure that the impacts are mitigated. For example, landscape disturbance impacts associated with the development of drill pads, erosion and dust have been identified and detailed mitigation measures are included in the EMPr to minimise the impacts.
- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into the EMPr and the Closure Plan (Annexure 1).
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures have been included in the EMPR and the Closure Plan (Annexure 1).
- **Interests, needs and values of Interested and Affected Parties** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and interested and affected parties (I&APs). Comments received from I&APs on this Draft Basic Assessment Report will be included as part of the **Final Basic Assessment Report** as summarised in Section 7, Table 5.
- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the DBAR. They were also notified of having

the opportunity to register as an I&AP and registered I&APs have been kept informed of the commencement of the Basic Assessment process.

- **Promotion of community well-being and empowerment** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and registered I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Adequate and appropriate opportunity is being provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

## **6. Motivation for the overall preferred site, activities and technology alternative.**

- The preferred and only location of the prospecting activity is on the earmarked sections.
- The preferred and only activity is the prospecting for Base Metals.
- The preferred and only technology is the use of drilling equipment for the location of potential Base Metal Ore bodies.
- The Site Plan or layout of the activity on the site is shown in Figure 1 and 2.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

## **7. Details of the Public Participation Process Followed**

### **7.1 Introduction**

The public participation process was conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended).

The formal public participation process, which meets the requirements of the NEMA EIA Regulations and the MPRDA were followed and include the following activities: (Annexure 2 Public Participation Summary to be included as part of the Final BAR)

- Potential I&APs were notified about the project and of commencement of the Basic Assessment (BA) process and invited to register as stakeholders by means of:
  - Written and/or personal notification to directly affected landowners and neighbouring landowners together with a Background Information Document (BID);
  - Written notifications to other potential stakeholders including, Relevant Government Department, Local and District Municipalities (including ward councillor and traditional authorities where applicable) together with a Background Information Document (BID); and
  - Media advertisements and site notices.
- Registered I&APs including relevant Government Department were given the opportunity to review and comment on the Draft Basic Assessment Report.
- Registered I&APs will be notified of the outcome of the environmental authorisation, and if required the appeal process to be followed.

7.2 Summary of issues raised by I&Aps

**Table 5: Summary of issues raised by I&Aps – to be included in the Final Basic Assessment Report**

Interested and Affected Parties, persons consulted is marked with an X	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Reference in this report where the issues and or response were incorporated.
<b>ORGANS OF STATE</b>				
<b>Landowners or Lawful occupier/s of the land</b>				
<b>Landowners or lawful occupiers on adjacent properties</b>				
<b>Other Interested Parties</b>				

## **8. Process to reach the proposed preferred alternative**

### **8.1 Site alternatives**

#### **8.1.1 Location**

No site or technology alternatives have been considered for this prospecting application. The areas included in the prospecting right application were identified through historical prospecting and production records for the area and from designated research. Copper exploitation and exploration in the general area has been ongoing for many years. The area applied for is located within close proximity to historic copper mines, which is therefore considered highly prospective. The rural nature of the area effectively means that the proposed activities will not disturb any local communities. There are no reasonable or feasible location alternatives for further consideration.

Until such time that the non-invasive activities have been completed the exact location of the invasive sampling sites cannot be confirmed. However, the following restrictions will be applied to the final site selection:

- No invasive sampling site will be positioned within 100m of a structure.
- No invasive sampling site will be positioned within 100m of a graveyard.
- No invasive sampling site will be positioned within 50m of a water course.
- Where possible existing access roads will be utilised to access the invasive sampling sites.

#### **8.1.2 Type of activity**

The Applicant is not the land owner, so it would not be realistic for this company to propose another type of activity, as their core business is the mining of base metals. The applicant is required to rehabilitate the environment affected by prospecting to its natural state or to another predetermined land use. The prospecting activity takes place over a relatively short time period, so the selection of the best post-mining long term land use is an important consideration. The objective of the rehabilitation process is to restore as much as possible of the area disturbed during the prospecting activities to a land use as close as possible to that previously practiced before prospecting. The rehabilitation activities proposed in Addendum 1 will ensure that the land reverts back to its original state upon closure of the prospecting activities. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to explore the area for base metals as indicated. The only other activity required to be assessed in terms of NEMA is the “do-nothing” alternative, as detailed further below.

#### **8.1.3 Design or Layout of activity**

The outcomes of the non-invasive Phase 1 prospecting activities will inform Phase 2 and the layout of the sample sites may therefore be refined based on the detailed findings of the ongoing desktop review and mapping exercises.

Site establishment is done with closure in mind to ensure that only the required size is disturbed. No camp site will be erected on site, as existing establishments will be used for accommodation in the nearby town(s).

The design or layout of an exploration project is determined by the shape, position and orientation of the mineral resource. Geophysical methods have been proven to be very useful in detecting potential targets and will therefore be used to identify optimal locations of potential mineralisation of economic interest within the prospecting area prior to invasive sampling.

- The preferred and only location of the prospecting activity is on the earmarked section.
- The preferred and only activity is the prospecting for any potential mineralisation.

- The preferred and only technology is the use of drilling equipment for the location of potential mineralisation.

The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar, therefore layout alternatives have not been assessed.

#### 8.1.4 The technology to be used in the activity;

Regarding technologies, evaluation of a base mineral deposit is the process followed to establish economic viability and to identify the “footprint” of the deposit.

The methods detailed Table 2 above would be used to investigate the area and it is not possible to give details of the position of sample sites before the surveys and surface work is completed. The prospecting activities proposed in the Prospecting Work Program (PWP) follow a phased approach, whereby the preceding phase determines if further work is warranted and as a result no alternatives are available to complete the proposed prospecting activities.

A risk decision is made each time a project moves or does not move from one phase to the next. A risk decision may be made to skip phases of the process for example the project may proceed to feasibility and mining directly from this preliminary evaluation stage. The way risk decisions are managed is to enter the available geological data into economic models with variables such as operating costs, capital costs, recovery factors, dilution, stripping ratios, etc. In this way, projects that are most likely and least likely to be viable can be prioritised, held or abandoned. The effect of changes in parameters such as mineral values, new technology, royalties, etc., can then be recognised in terms of their effect on the potential return on investment for the project.

The prospecting methodologies have been chosen based on the applicant’s past experience with prospecting, and is considered to be standard practice.

#### 8.1.5 Operational alternatives

The non-invasive prospecting component will enable the applicant to clearly delineate areas which are regarded as suitable for further investigation without unnecessarily disturbing the prospecting area through invasive means.

During the invasive prospecting component of the project, the following key site activities related to collection of samples will be undertaken:

- Accommodation will not be provided on site but in one of the nearby towns.
- Establishment of sample sites with equipment laydown area
- Establishment of access to sample sites where necessary
- Invasive Sampling operations (e.g., soil sampling and drilling)
- Rehabilitation activities (e.g., backfilling of drill holes and scarifying disturbed areas)

Alternative time frames can be made to ensure that the impact on the day to day running of the inherent land use are minimised, for example invasive sampling on cultivated land can be rescheduled post harvesting or not to coincide with breeding or hunting seasons or during raining season due to access problems. Prospecting activities will be conducted during daylight hours to minimize exposure to light and noise pollution. If necessary certain invasive sampling can be timed to occur during school terms or holidays as may be required in certain instances by stakeholders. The time of implementing invasive sampling activities during the course of the day may also be reconsidered in consultation with landowners. Ideally invasive sampling

activities will occur continuously until such time that sample is completed and area rehabilitated, with no operations during the night.

At present, no feasible alternatives to soil sampling and drilling are available and impacts associated with the sampling operations will be monitored and managed in terms of the EMPr.

There are no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

#### 8.1.6 The No-go Alternative

The no-go alternative will mean that no prospecting activities are undertaken and the status quo remaining.

Invasive sampling is required in order to investigate the potential and feasibility of a resource and also to generate a SAMREC compliant mineral resource statement. There is no potential for any future investment in a mine without the confirmation of the mineral resources which can only be obtained through invasive sampling activities. Should the prospecting right be refused, effectively a potential mineral resource will be sterilised. The socio-economic benefit and most notably the future employment potential of a mine development will also be lost if the prospecting activities are not implemented in order to determine the feasibility of any mineralisation within the area. This will mean that the possible existence of economically exploitable minerals will not be known, and in turn none of the benefits associated with the project will be realised (e.g., job creation and stimulation of the local economy). The applicant would also not have the opportunity to utilise (exploit) the possible mineral reserves. Should the prospecting activities not be permitted, then the potential environmental impacts associated with site establishment and invasive sampling would not occur, and the status quo would be maintained.

### 8.2 Site sensitivity (Baseline Environment)

#### 8.2.1 Regional setting

The project site is located within the Succulent Karoo Biome. The Succulent Karoo Biome is found mostly west of the western escarpment from the Luderitz District of Namibia through the western belt of the Northern Cape and Western Cape Provinces, and inland of the Fynbos Biome to the Little Karoo. Much of the terrain is flat to gently undulating, such as the western coastal platform, Knersvlakte and Tanqua Karoo. Hilly and more rugged topography occurs in Namaqualand, the Robertson Karoo and Little Karoo and parts of the western escarpment. The extreme altitudinal range is from sea level to about 1 500m, but most of the area lies below 800m.

The desert of South Africa borders the Nama-Karoo Biome in its eastern parts (summer-rainfall region) and the Succulent Karoo Biome in its western parts (winter-rainfall region). Some of the poorly researched high mountain peaks mapped as desert may show both climatic and floristic affinity to either the Succulent Karoo or Nama-Karoo Biomes.

The site-specific altitudinal range is from 480m to 1000m.



### 8.2.2 Geology

The area is characterized by typical granitic / gneissic terrain with a semi-arid land surface with dry river valleys and steep granitic hills. For the most part it forms a flat sandvlei terrain, with occasional rocky outcrops of hard resistant gneiss becoming more common towards the West before it disappears under the plateau cover beyond Groendoorn. Elevations range from 900m to occasionally 1200m above sea level. The surrounding country rock to the pegmatites is the Namaqualand metamorphic suite of migmatites, schist, gneiss and grey granitic gneiss with occasional dolerite dykes. The main pegmatite is emplaced within these rocks and is visible in the sidewall of the excavations from historic small-scale mining operations in the area.

Blesberg or Noumas as it is known, is a long (1.5 km), dyke like pegmatite body which has a sub-vertical orientation. It is known to occur over a vertical interval of some 50m on the hillside and the body has a maximum width of around 40m.

It is a heterogenous pegmatite and displays strong zonation from the sidewalls to the central core. Mineralogy is highly dependent upon the beach zone with several species being located only in specific zones. This applies to the economic potential as for instance mica is only found in the wall zone and spodumene only in the intermediate zone. Essentially the outer margins are more highly feldspathic and there is a greater concentration of rare elements increasingly towards the center of the orebody. However, the most central unit, the core, is nearly pure quartz and does not contain any valuable minerals.

There is a parallel and similar body some 50m separate from the main pegmatite. This and the surrounding sand cover suggests that there may be additional orebodies in the area but masked by sand. Refer to Diagram below for regional geology of the study area (Refer Figure 5)



### 8.2.3 Soil and land capability

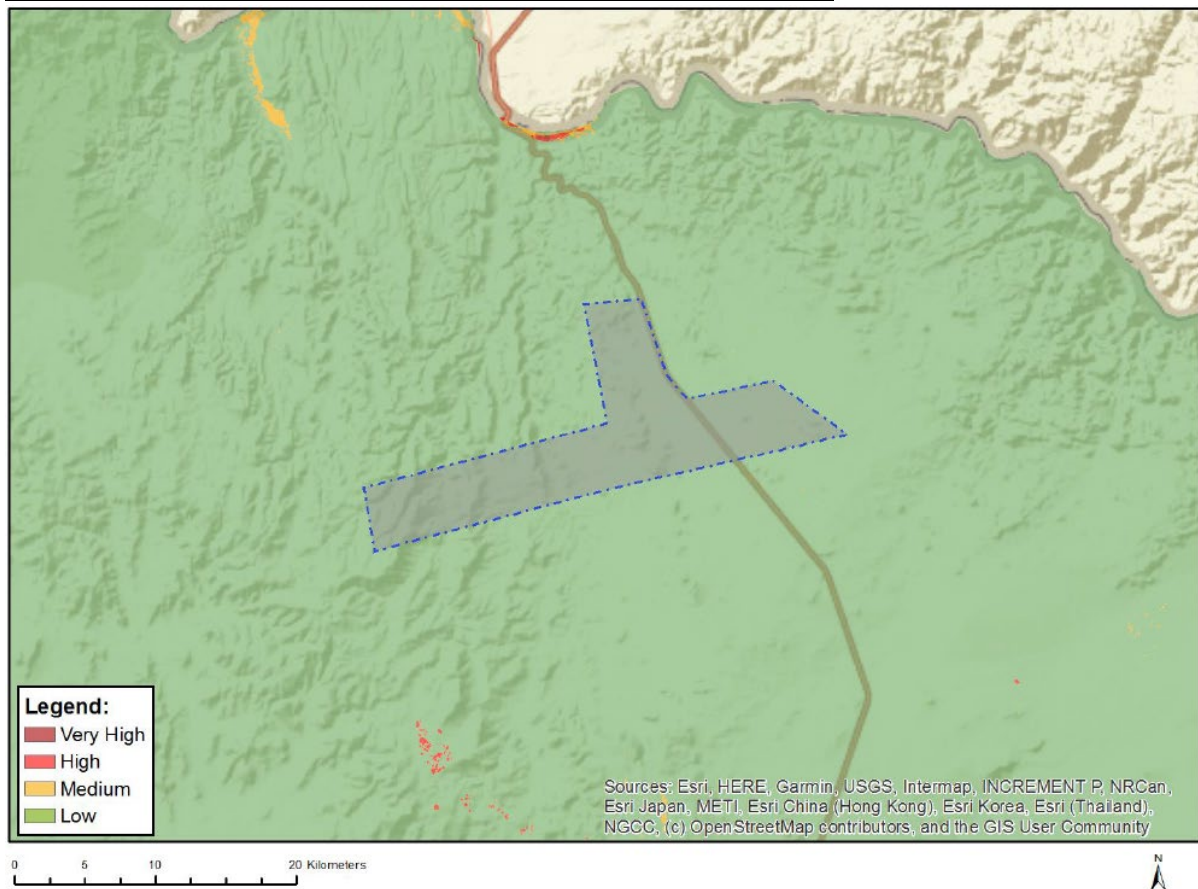
According to the screening report (DEA) no nearby wind or solar developments found with an approved Environmental Authorisation or applications under consideration are present within 30 km of the proposed area.

For the Agriculture Theme the sensitivity of the area is regarded as low and is used for livestock grazing and production (Refer Figure 6a, 6b and Table 6a)

**Table 6a: Agriculture theme Sensitivity Features**

Sensitivity	Feature(s)
Low	Land capability;01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05. Low

**Figure 6a: Map of relative agriculture theme sensitivity**

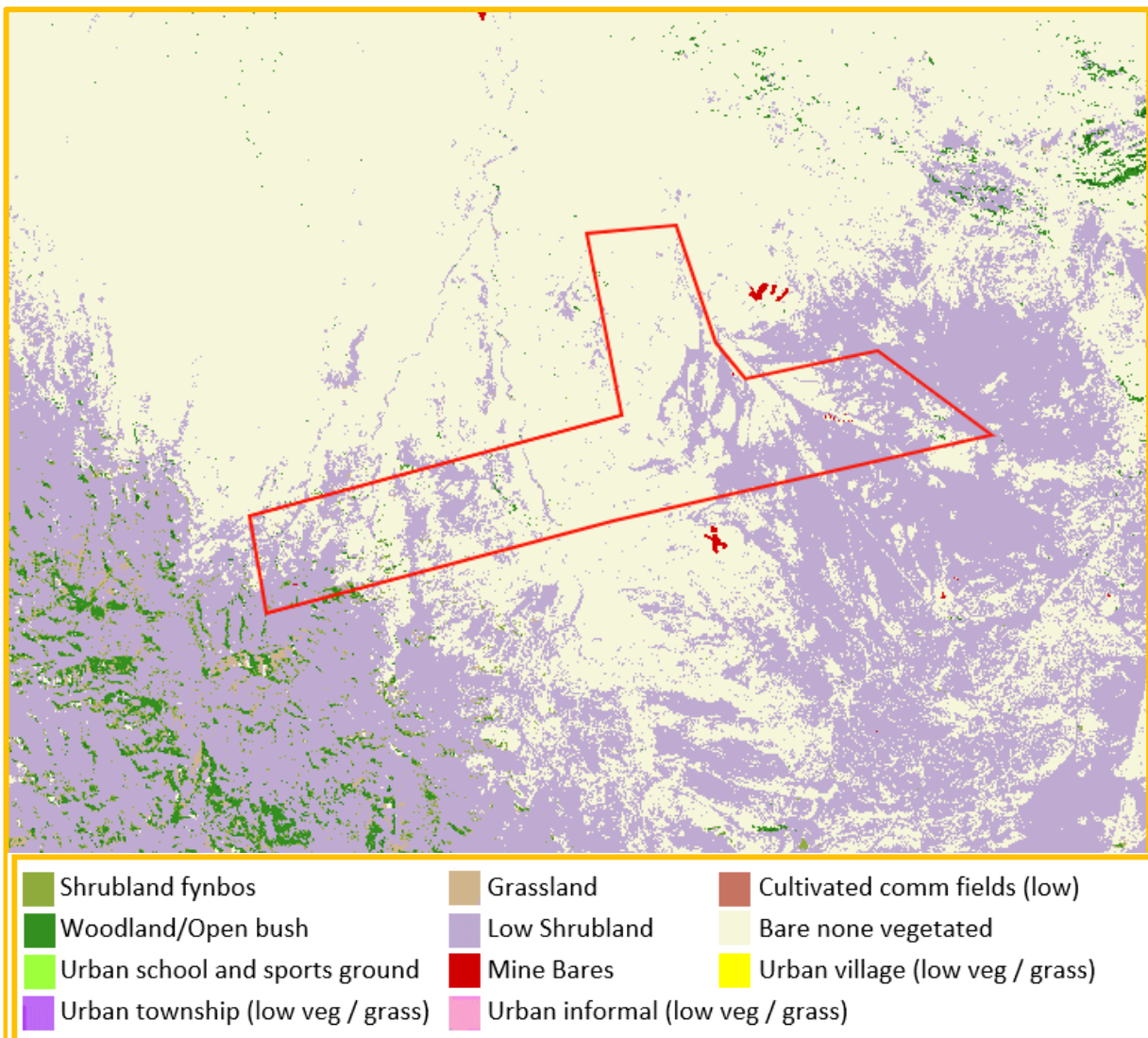


Note that current land cover indicators do not take into account degradation due to, for example, spread of alien plants, secondary impacts of mining (e.g., sand mobilization) or overgrazing by livestock. The Land Capability map is provided as Figure 6b.

**Table 6b.** A summary of the extent (% of total LM area) of different land cover categories for local municipalities based on 2005 SPOT5 satellite imagery.

LM Name	Natural	Cultivated Dryland	Cultivated Irrigated	Mining	Settlement
DMA Bushmanland	99.75	0.17	0.02	0.04	0.02
DMA Tankwa	98.69	1.06	0.24	0	0.01
Hantam	97.71	2	0.21	0.01	0.07
Kamiesberg	97.35	2.14	0	0.43	0.07
Karoo Hoogland	99.49	0.32	0.13	0.01	0.06
Khâi-Ma	99.63	0.02	0.18	0.07	0.11
Nama Khoi	98.85	0.36	0.08	0.52	0.19
Richtersveld	97.7	0	0.06	2.15	0.09

**Figure 6b: Location of Prospecting area in terms of Land Cover sourced off SANB BGIS Map Viewer**



No Agro-Ecosystem Specialist Assessment is therefore required when the areas to be disturbed by drilling has been identified due to the fact that no areas were identified as being of “very high” or “high” sensitivity for agricultural resources during the site visit.

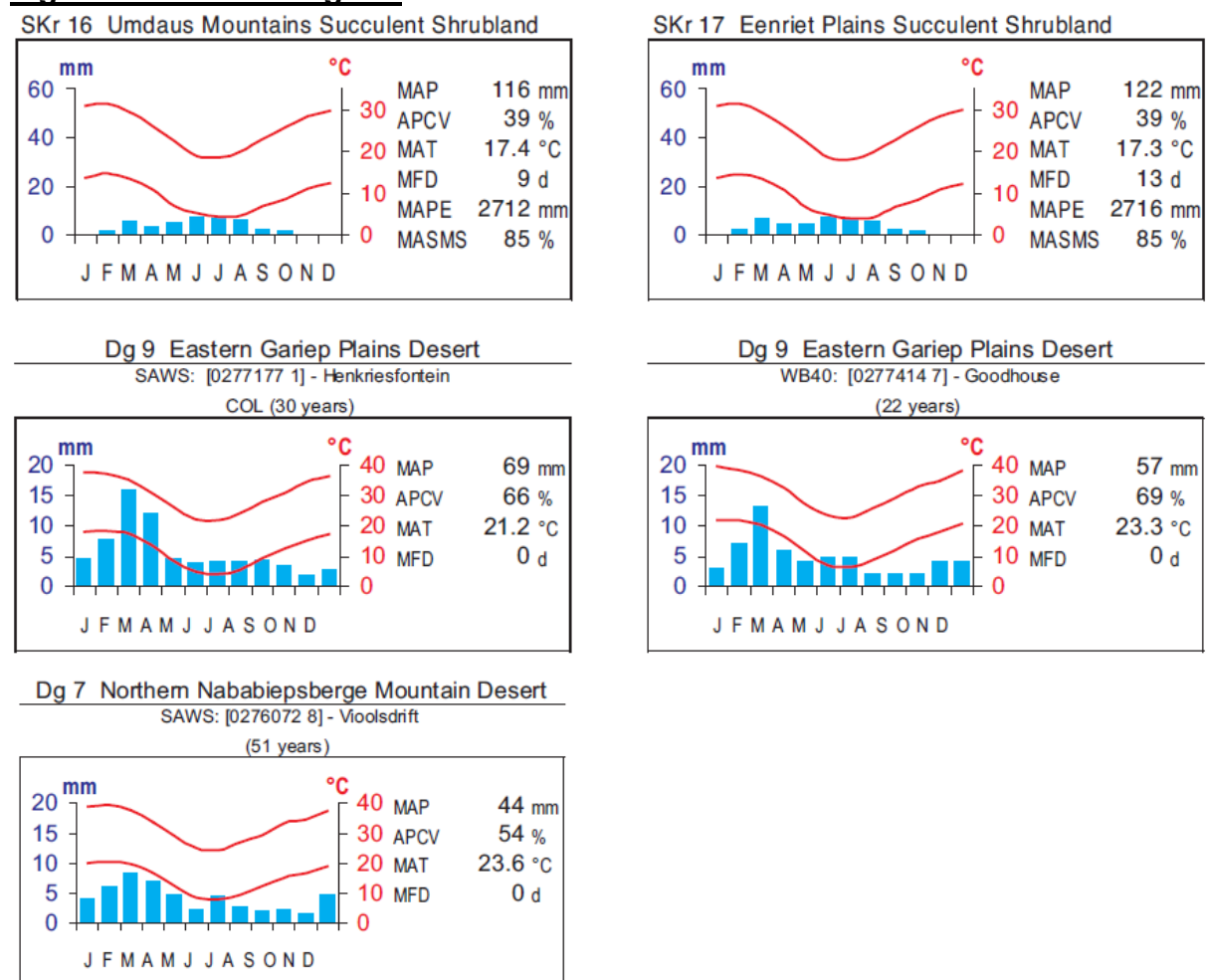
#### 8.2.4 Landscape - Topography

Refer to Figure 2 which shows the contours at 20-meter intervals located between 200m and 1100m (Mucina and Rutherford, 2006) above mean sea level.

#### 8.2.5 Climate

The area generally lies in the Succulent Karoo and Nama Karoo with a small part covered in Desert conditions. The Succulent Karoo Biome is primarily determined by the presence of low winter rainfall and extreme summer aridity. Rainfall varies between 20 and 290 mm per year. Because the rains are cyclonic, and not due to thunderstorms, the erosive power is far less than of the summer rainfall biomes. During summer, temperatures in excess of 40°C are common. Fog is common nearer the coast. Frost is infrequent. Desiccating, hot, Berg Winds may occur throughout the year. The Desert climate is characterized by occasional summer rainfall, but high levels of summer aridity. Mean annual rainfall is from approximately 10mm in the west, to 70 or 80mm on the inland margin of the desert. In reality, the rainfall is highly variable from year to year. (Figure 7).

**Figure 7: Climate diagram**



## 8.2.6 Biodiversity, Flora and Fauna

### **Biodiversity**

According to the screening report (DEA) the prospecting area is regarded as very high sensitivity with regard to Terrestrial Biodiversity as it is located within Critical Biodiversity Areas and form part of the National Protected Areas Expansion Strategy (NPAES) (**Refer Table 7 and Figure 8a**).

The site falls within the Kosiesberg Succulent Shrubland (SKr12), Umdaus Mountains Succulent Shrubland (SKr16), Eenriet Plains Succulent Shrubland (SKr17), Southern Nababiepsberge Mountain Desert (Dg8), Eastern Gariep Plains Desert (Dg9) and Eastern Gariep Rocky Desert (Dg10) vegetation units (Mucina and Rutherford, 2006), which is not classified as Critically Endangered, Endangered nor Vulnerable in terms of the NEM:BA listed Ecosystems (GNR 32689).

According to the 2016 Northern Cape Critical Biodiversity Areas the majority of the prospecting area is located in a Critical Biodiversity Area Two (Figure 8b).

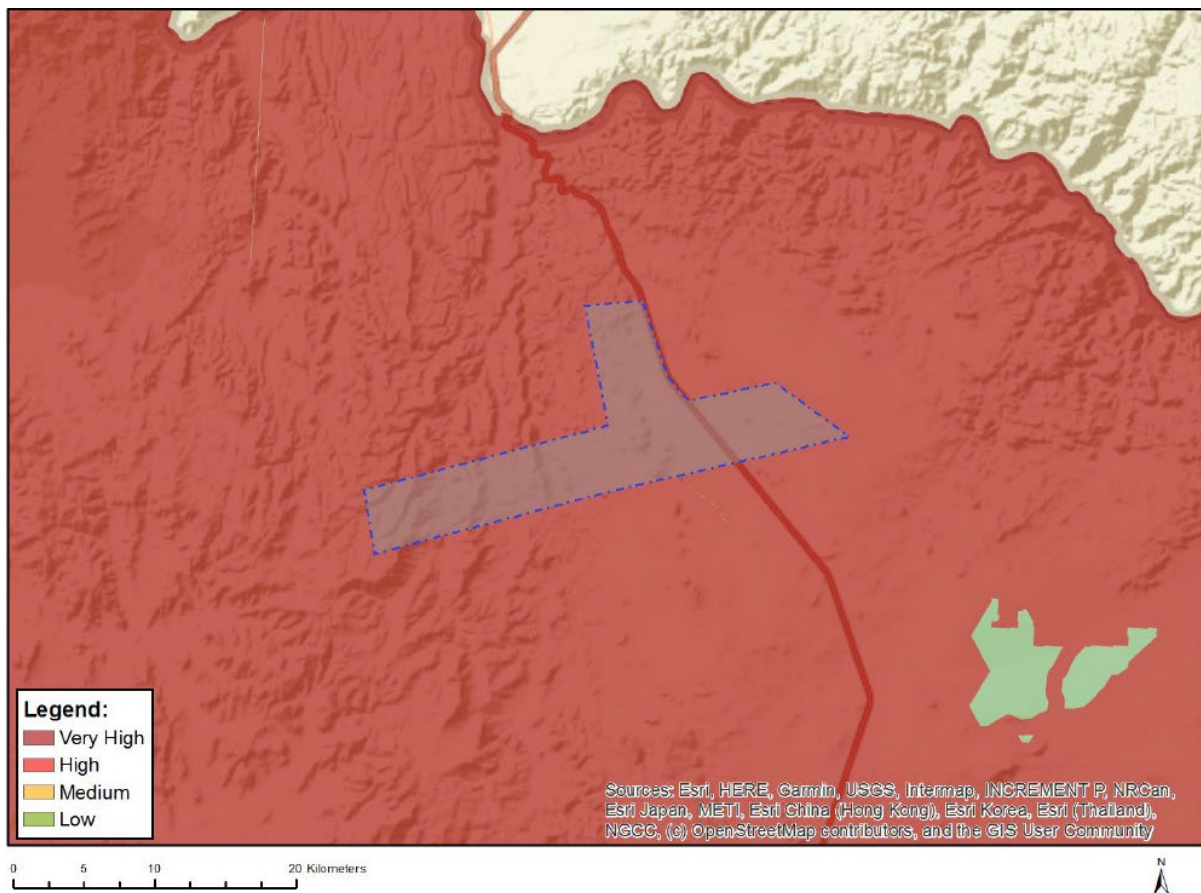
As listed in table 7 another very-high sensitive area within this prospecting area is the Koubank River regarded as having a very high sensitivity regarding Aquatic biodiversity due to its FEPA status refer section 8.2.7, and the area around the drainage channel is also identified as a CBA 1.

According to the Northern Cape PAES the area is also identified for protected area expansion within the Nababiep Steinkopf Harasberg primary focus area. (Refer Figure 8c). No formal protected areas are located within 5Km of the prospecting area with the Nababiep Nature Reserve and Richtersfeld World Heritage Site 20Km to the northwest.

**Table 7: Terrestrial biodiversity theme Sensitivity Features**

<b>Sensitivity</b>	<b>Feature(s)</b>
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	FEPA Subcatchments
Very High	Protected Areas Expansion Strategy

**Figure 8a:** Map of relative terrestrial biodiversity theme sensitivity



The criteria for the very high sensitivity rating with regard to Terrestrial Biodiversity is based on the CBA status and provincial protected area expansion strategy focus area. This does not mean that CBA's and PAES focus areas need to be fenced off from human use, but rather that they should be supported by good planning, decision-making and management to ensure that human use does not impact on the condition of the ecosystem.

No terrestrial biodiversity specialist assessment is required as less than 1 Ha will temporary be disturbed by drilling and the clearance of less than 1 Ha of vegetation is not a listed activity in terms of the NEMA EIA regulations and the locality of drill sites will only be determined after Phase 1. It must be pointed out that the 2016 Northern Cape Critical Biodiversity Areas has not been approved and still need some ground truthing.

**Figure 8b: Critical Biodiversity Areas**





**Figure 8c: Sensitive Ecosystems due to NC PAES and aquatic features refer figure 11b**



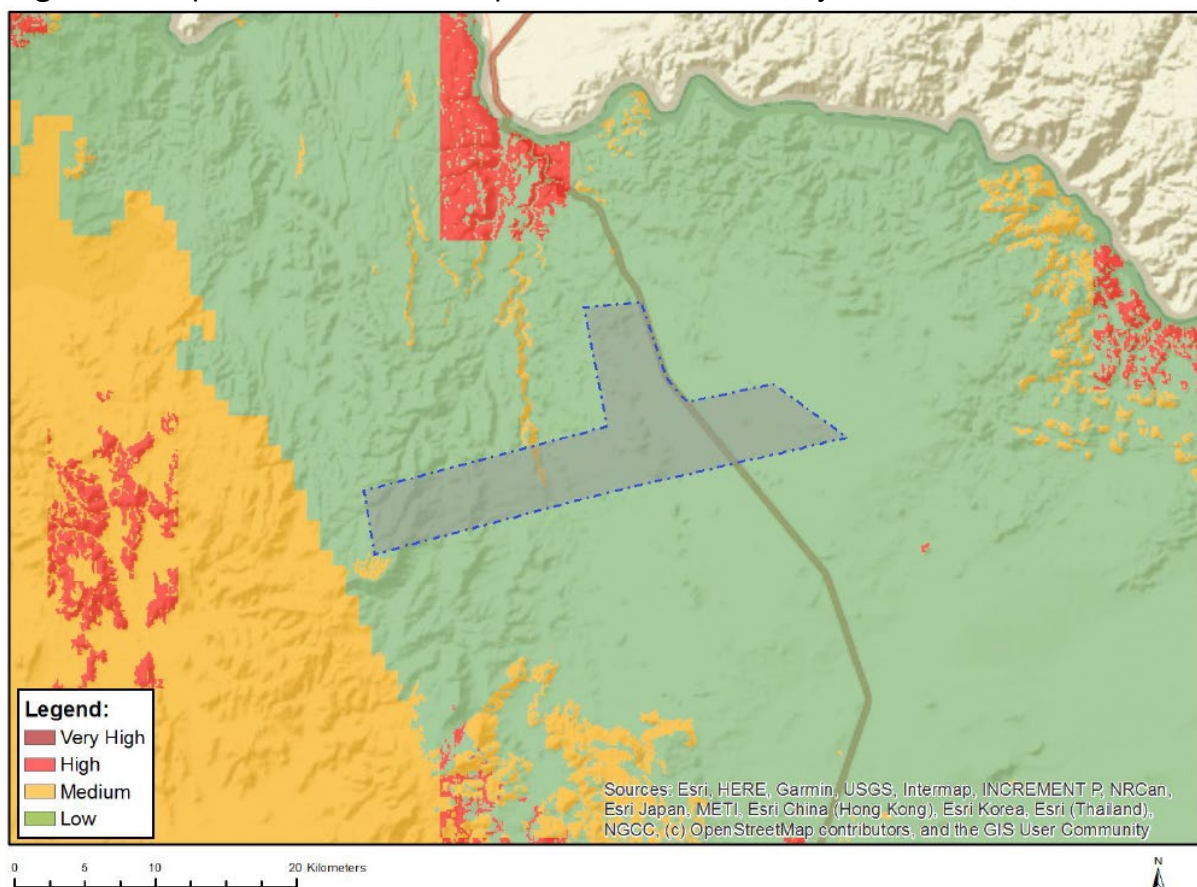
## Fauna

According to the screening report (DEA) the prospecting area is regarded as medium sensitivity with regard to Animal Species (Refer Table 8 and Figure 9)

**Table 8:** Animal Species theme Sensitivity Features

Sensitivity	Feature(s)
Low	Subject to confirmation
Medium	Aves-Ciconia nigra
Medium	Aves-Afrotis afra

**Figure 9:** Map of relative Animal Species theme sensitivity



With reference to Table 8 the only species listed as medium sensitivity is the two Aves species *Ciconia nigra* (Black Stork), not on the TOPS 2015 list and regarded as Least Concerned according to the IUCN Red List, and *Afrontis afra* (Southern Black Bustard) also not on the TOPS 2015 list but regarded as Vulnerable according to the IUCN Red List.

No terrestrial animal species specialist assessment is necessary as the potential distribution range of these birds are less than 1% of the total study area. These birds also have a wide distribution range and prospecting activities will have no impact on this species and if a nesting site is discovered it will be avoided. Drilling activities will have a medium significant impact on these species due to the small areas to be disturbed and short duration of activities. Mitigation of the disturbance is also possible

and after mitigation the impact will be regarded as very low.

### **Flora**

The prospecting area is dominated by the Kosiesberg Succulent Shrubland (SKr12), Umdaus Mountains Succulent Shrubland (SKr16), Eenriet Plains Succulent Shrubland (SKr17), Southern Nababiepsberge Mountain Desert (Dg8), Eastern Gariep Plains Desert (Dg9) and Eastern Gariep Rocky Desert (Dg10) vegetation units. (Figure 10b). According to the screening report (DEA) the prospecting area is regarded as medium sensitivity with regard to Plant Species (Refer Table 9 and Figure 10a).

#### **Kosiesberg Succulent Shrubland (SKr12)**

The conservation status of the Kosiesberg Succulent Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 28%. None conserved in statutory conservation areas. Not transformed, but the major threat is the expansion of small stock farming, especially at the northern and southern ends of the unit. A major part is relatively protected due to the steep and inaccessible landscape. The unit is not well studied and includes a large number of species, including rare and endemic ones. Therefore, parts of the unit, including at least a part of the escarpment slopes, should be conserved.

#### **Umdaus Mountains Succulent Shrubland (SKr16)**

The conservation status of the Umdaus Mountains Succulent Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 28%. None conserved in statutory conservation areas. A number of rare, interesting and a few endemic species point to a relatively high conservation value. The expansion of small stock farming from the south and southwest and a few mining activities in the eastern region of the unit are viewed as main threats.

#### **Eenriet Plains Succulent Shrubland (SKr17)**

The conservation status of the Eenriet Plains Succulent Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 28%. None conserved in statutory conservation areas. No obvious major threats. Small stock grazing is of low intensity. An analysis of the biodiversity of the inselbergs is recommended.

#### **Southern Nababiepsberge Mountain Desert (Dg8)**

The conservation status of the Southern Nababiepsberge Mountain Desert, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 34%. None conserved in statutory conservation areas. Large parts are inaccessible.

#### **Eastern Gariep Plains Desert (Dg9)**

The conservation status of the Eastern Gariep Plains Desert, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 34%. None conserved in statutory conservation areas. Few intact examples of this vegetation remain. Heavy grazing and arid climate combined with the ease of accessibility of the vegetation to stock mean that pastoral activities in the past have significantly altered the structure and composition of vegetation of this unit. In some areas Prosopis shows potential to become a serious problem, especially around natural springs or aquifers. Some very restricted areas are cultivated, mainly with date palms and grape vines.

#### **Eastern Gariep Rocky Desert (Dg10)**

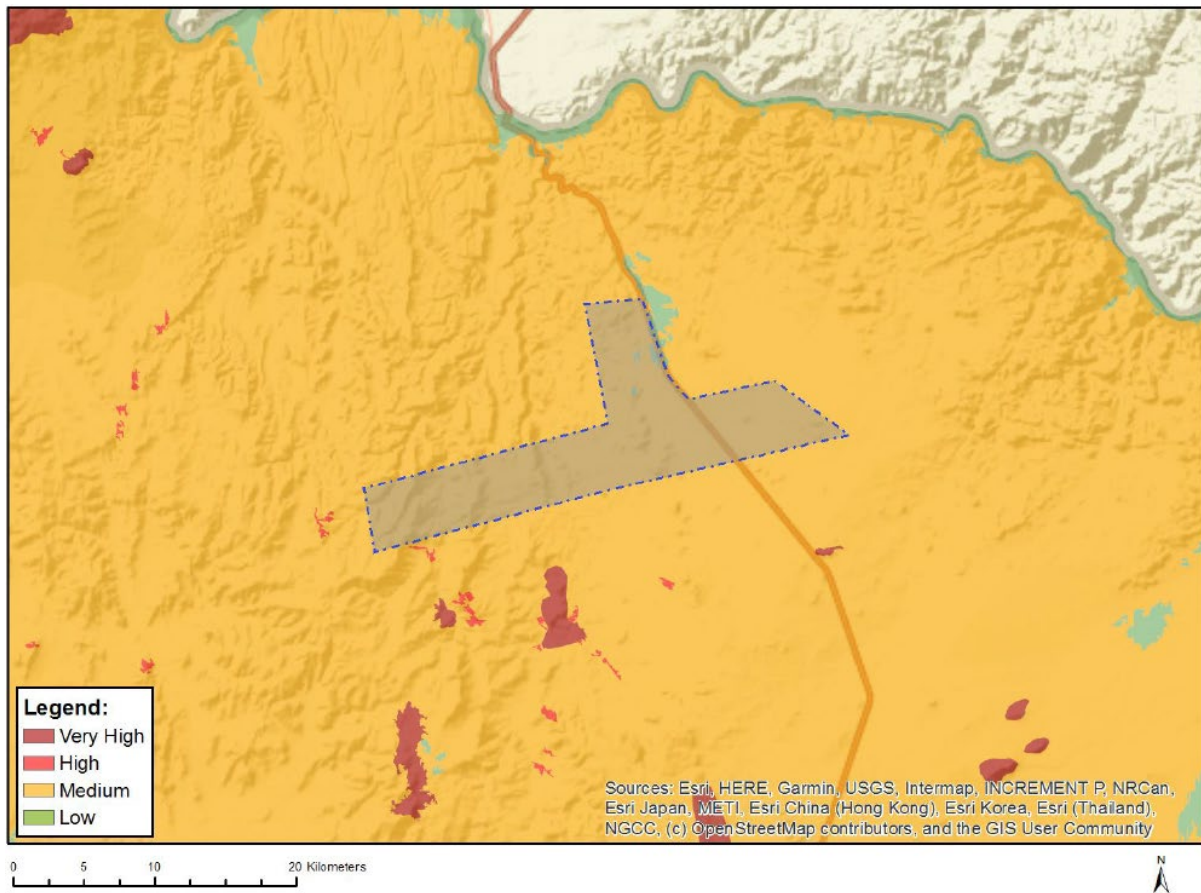
The conservation status of the Eastern Gariep Rocky Desert, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. The conservation target is 34%. None conserved in South Africa in statutory conservation areas. This unit also

occurs north of the Orange River in Namibia where it is potentially conserved through the ownership of the Farm Tsams by the Namibian Ministry of Environment and Tourism.

**Table 9:** Plant Species theme Sensitivity Features

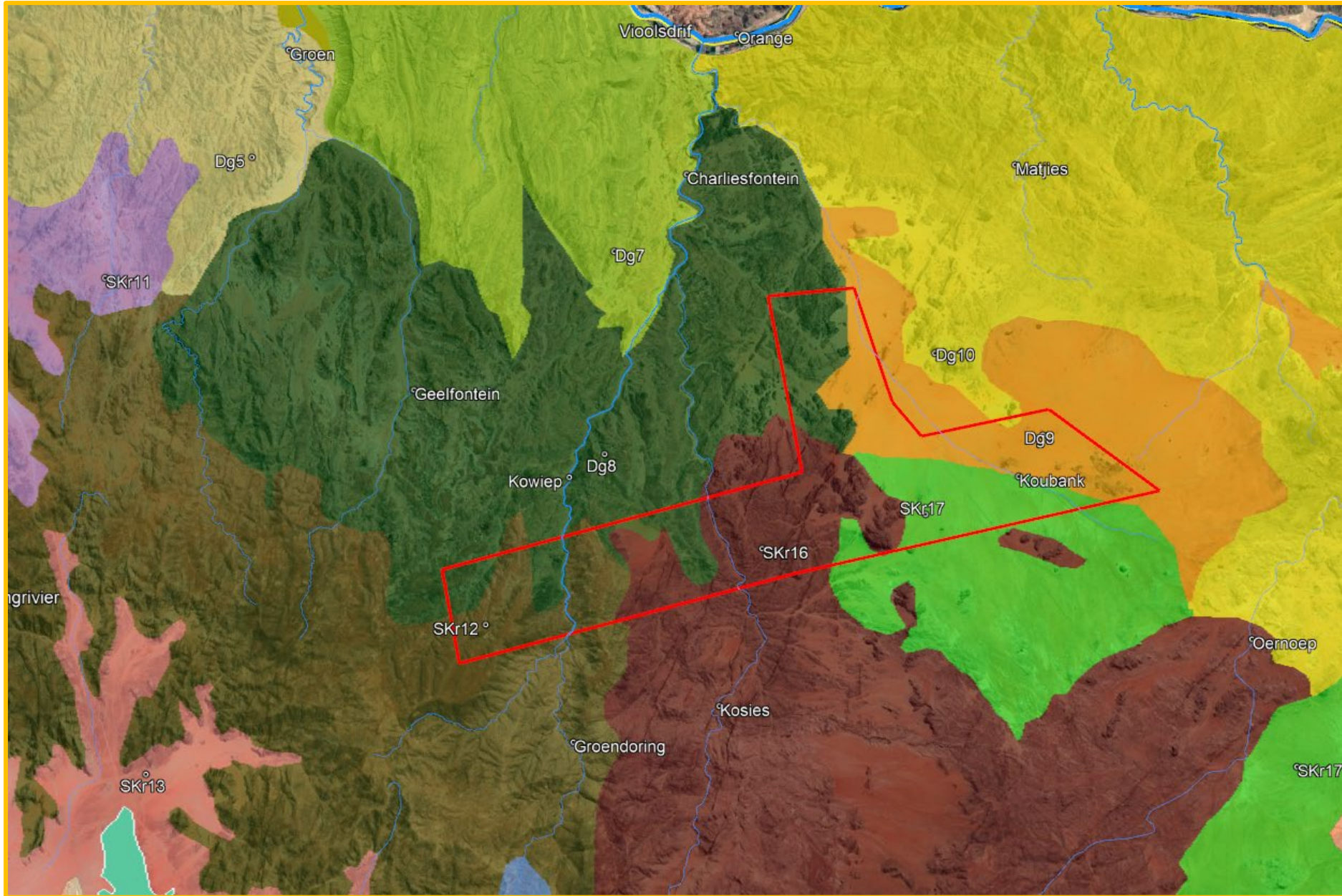
Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 435
Medium	Sensitive species 940
Medium	Sensitive species 1130
Medium	Sensitive species 1224
Medium	Sensitive species 525
Medium	Sensitive species 412
Medium	Sensitive species 253
Medium	Sensitive species 428
Medium	<i>Cephalophyllum herrei</i>
Medium	<i>Leobordea anthylloides</i>
Medium	<i>Tritonia marlothii</i> subsp. <i>marlothii</i>
Medium	Sensitive species 230
Medium	Sensitive species 394
Medium	Sensitive species 422
Medium	Sensitive species 462
Medium	Sensitive species 1049
Medium	Sensitive species 992
Medium	Sensitive species 345
Medium	Sensitive species 1017
Medium	Sensitive species 821
Medium	<i>Acanthopsis glandulopalmata</i>
Medium	Sensitive species 122
Medium	Sensitive species 144

**Figure 10a:** Map of relative Plant Species theme sensitivity



No terrestrial plant species specialist assessment is required as no plants were identified as having a “very high” or “high” sensitivity. Except for *Aloidendron dichotomum* (Quiver Tree) that is Vulnerable, none of the listed species are legally protected in terms of the listed threatened or protected species (TOPS) regulations in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Invasive sampling activities will avoid Quiver Trees therefore, the project will have a medium significant impact with regard to Flora due to the small areas to be disturbed and short duration of activities. Mitigation of the disturbance is also possible and after mitigation the impact will be regarded as very low. It must also be noted that less than 1 Ha will temporary be disturbed by drilling and therefore the clearance of less than 1 Ha is not a listed activity in terms of the NEMA EIA regulations.

**Figure 10b: Vegetation**



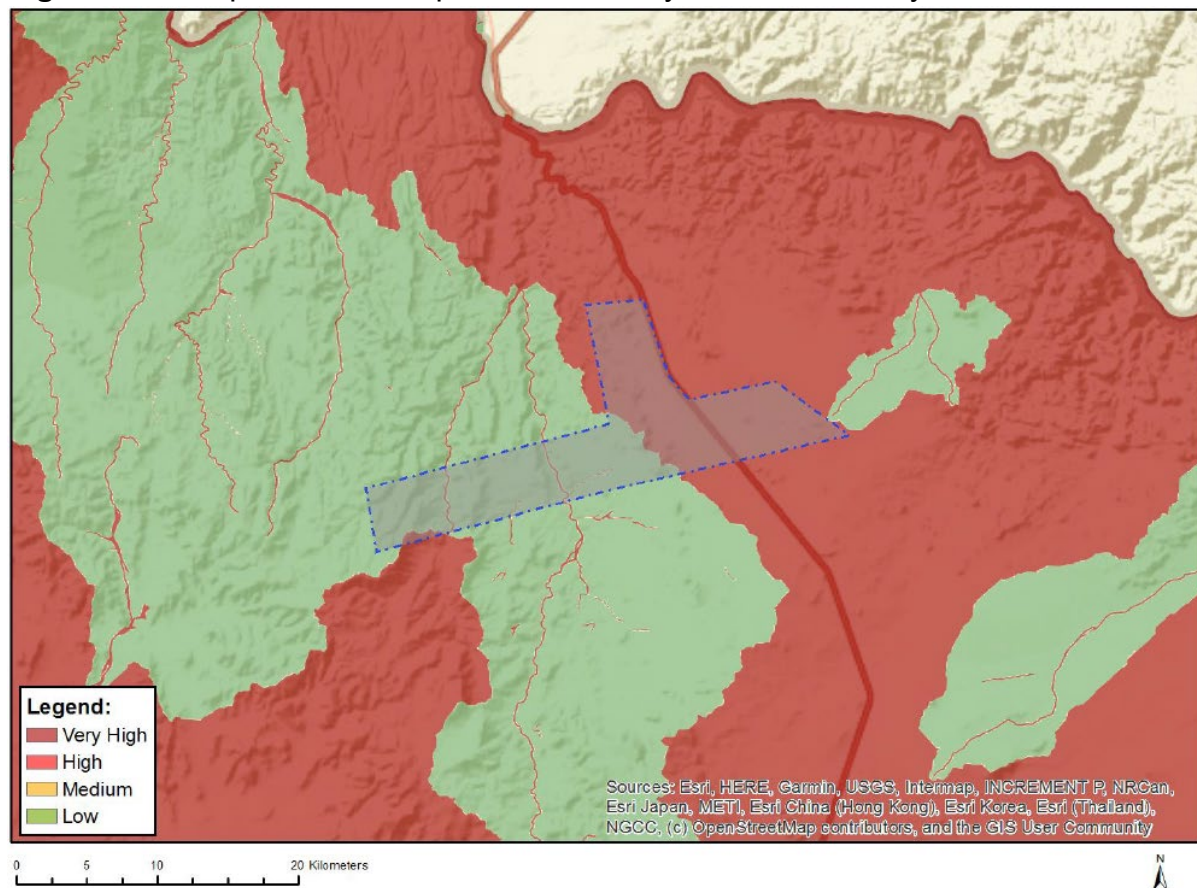
### 8.2.7 Aquatic Biodiversity and Water Resources

According to the screening report (DEA) the prospecting area is rated as having a very high sensitivity regarding Aquatic biodiversity (Table 10 & Figure 11a).

**Table 10:**

Sensitivity	Feature(s)
Low	Low sensitivity
Very High	Rivers
Very High	Wetlands and Estuaries
Very High	Freshwater ecosystem priority area quinary catchments

**Figure 11a:** Map of relative Aquatic biodiversity theme sensitivity



The very high sensitivity rating is due to the presence of three of the 7 Aquatic Ecosystems namely rivers, wetlands and Freshwater Ecosystem Protected Areas (FEPA).

The Koubank and Kosies River classified as a NFEPAs River (FEPA 1) as well as the Kowiep River classified as NFEPAs River (FEPA 2) is present or close to the prospecting area. River FEPAs achieves biodiversity targets for river ecosystems and threatened/near-threatened fish species, and were identified as rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicates that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources.

The nearest wetland is approximately 15Km away from the study area.

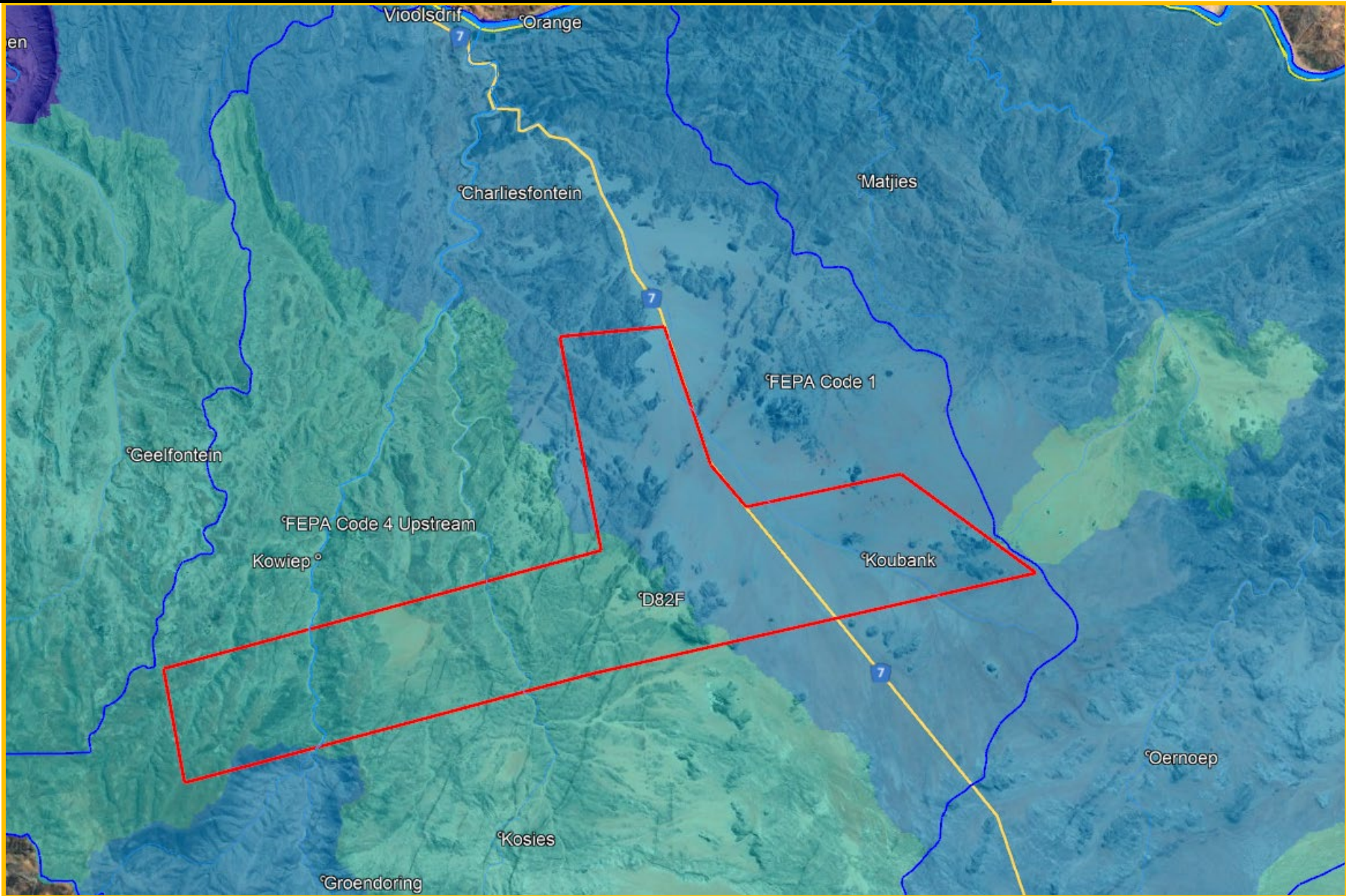
The prospecting area is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14) and quaternary drainage area D82F. No other Aquatic Ecosystems are present but half of the prospecting area is located in an upstream Freshwater Ecosystem Priority Area (FEPA Code 4) regarded as low sensitivity. The other half of the prospecting area is located in a Freshwater Ecosystem Priority Area (FEPA Code 1). No Strategic Water Source Area (SWSA) is present and the nearest one is the Port Nolloth Cluster for underground water to the south west (about 59Km away). (Figure 11b).

Due to the shallow nature of operations the impact on the groundwater is considered insignificant and surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off for some of the Richtersveld units (SKr) adjoining the Namib and Gariiep Deserts as well as part of the Tanqua Karoo (SKv 5) and part of some west coast units, for example Namaqualand Coastal Duneveld (SKs 8), is in any event very low given the low rainfall average is below 100 mm, occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils. The surface water quality (when available) is suitable for animal consumption but not for potable water.

As part of good planning, decision-making and management, a Water Use Authorisation (License or GA) in terms of Sec 21 of the National Water Act (Act 36 of 2008) for Impeding or diverting the flow of water in a watercourse (Sec 21c) and Altering the Bed, Banks, Course or Characteristics of a Watercourse (Sec 21i) is required for invasive sampling within, or within 50m of FEPA rivers. A Water Use Authorisation in terms of Sec 21(a) is also required for abstracting groundwater. None of these activities are planned but if the situation changes, the necessary application will be lodged together with an aquatic biodiversity specialist assessment.



**Figure 11b: Location of Prospecting area in relation to Aquatic biodiversity and Water Resources**



### 8.2.8 Emissions

#### Air Quality

Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of semi-desert dust generation is high under windy conditions (dust storm). Prospecting activities will take place in a very remote area and dust generation will be limited to a small radius around the operation.

#### Noise

Traffic-generated noise occurs in the area and such noise levels are low (observed estimate at  $\pm 55$  dBA). Noise from earth moving equipment and machinery associated with the prospecting operation will be within the norm and due to the remote locality of the operation will have a negligible impact.

### 8.2.9 Socio-economic

The Namaqua District is sparsely populated, with a population of 115 842 and is the least populated district in the Northern Cape Province (and Country, although geographically the largest) with a population comprising 10,11% of the province's total population.

- The average growth rate for GGP in the area from 1996-2011 was 5.4 % and in 2007-2011 this has slowed down slightly to an average growth rate of 4.8%.
- The largest contributing sector to employment in the local economy (21.12% of total employment in the formal sector) is the Retail, Catering and accommodation sector

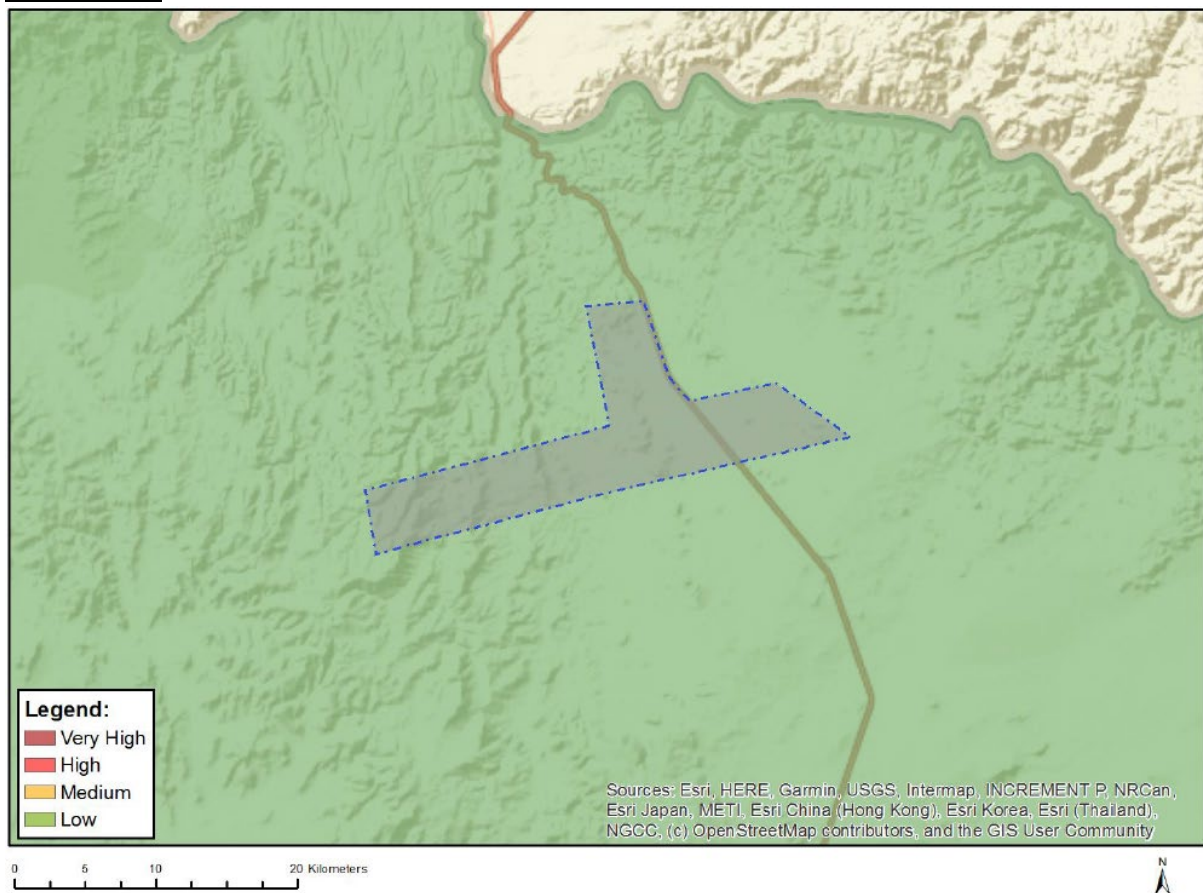
### 8.2.10 Paleontological, Archaeological and Cultural and Heritage Resources

All aspects of the proposed development are relevant, since excavations/sumps and or clearing may impact on archaeological and/or palaeontological remains, while all above-ground aspects create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive. According to the screening tool the relative archaeological and cultural heritage sensitivity is rated as low (Refer Table 11 and Figure 12a).

**Table11:** Archaeological and Cultural and Heritage theme Sensitivity Features

Sensitivity	Feature(s)
Low	Low sensitivity

**Figure 12a: Map of relative Archaeological and Cultural and Heritage theme sensitivity**



The desktop HIA Annexure 3a review notes that Stone Age sites tend to be very rare in this landscape. Occupation sites and rock art could possibly occur, but most archaeology is expected to take the form of isolated stone artefacts. More recent traces include the remains of stock posts. Mining-related heritage resources are not expected to occur. The landscape has cultural significance for its aesthetic value and the N7 is regarded as a locally significant scenic route.

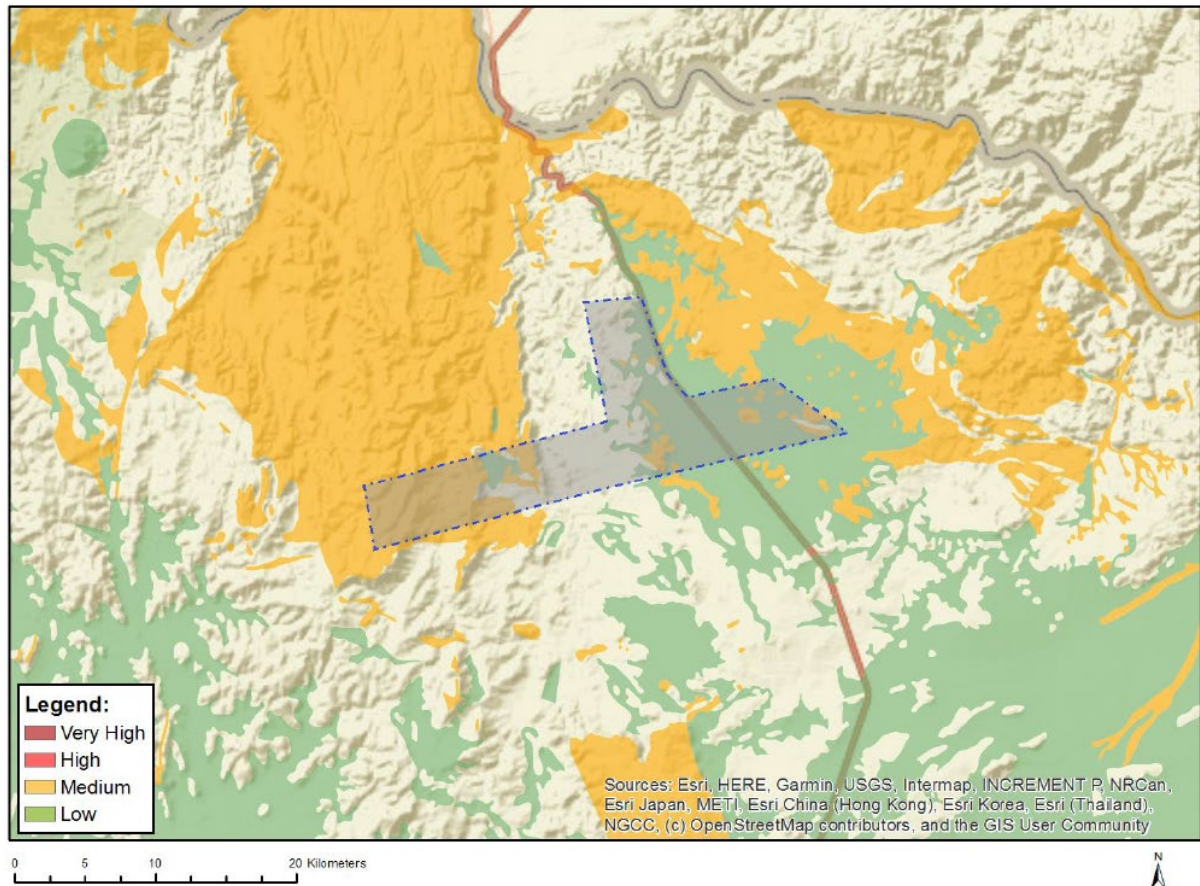
Due to the nature of the proposed activity and the expected distribution of heritage resources, significant impacts are highly unlikely, but could still occur. These would be to fossils, archaeology and/or graves, but the probability of negative impacts is very small. The recommendations and mitigating measures proposed in the HIA are included in the EMP.

According to the screening tool the relative paleontological sensitivity is rated as medium (Figure 12b) and the SAHRIS Palaeosensitivity map shows the study area to be of largely zero palaeontological sensitivity (Refer Table 12 and Figure 12b & 12c).

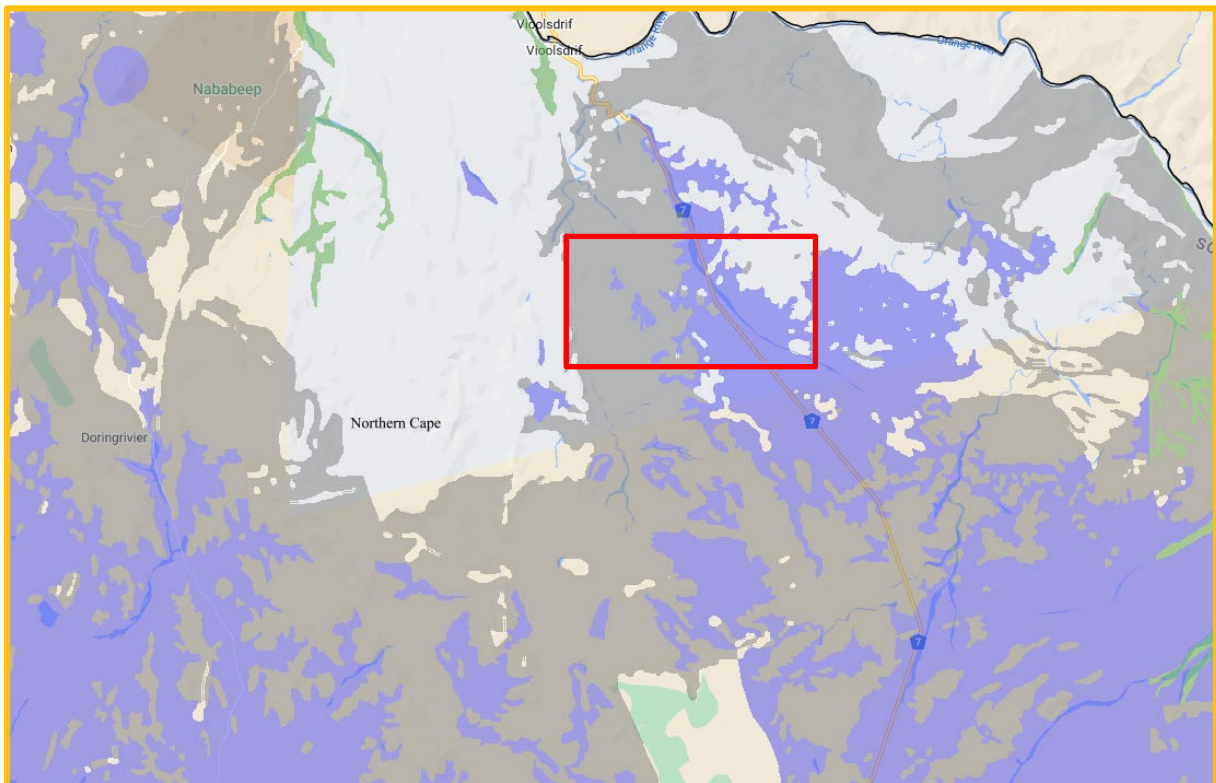
**Table 12: Palaeontological sensitivity theme Features**

Sensitivity	Feature(s)
Low	Features with a Low paleontological sensitivity
Medium	Features with a Medium paleontological sensitivity

**Figure 12b: Map of relative Palaeontological theme Sensitivity**



**Figure 12c: Extract from the SAHRIS Palaeosensitivity map showing the study area to be of low (blue shading) and zero (grey shading) palaeontological sensitivity.**



The desktop PIA Annexure 3b noted that the proposed site lies on the non-fossiliferous granites and gneisses of the Namaqualand Metamorphic Belt, indicated as having unknown to zero to insignificant palaeosensitivity on the SAHRIS map. There are smaller areas indicated as having low (blue) palaeosensitivity and this applies to the fluvial sands and alluvium along the ephemeral watercourses. It is extremely unlikely that any fossils would be found in the sands and alluvium because these are transported sediments or in the unknown areas because there is no source for fossils. Nonetheless, a Fossil Chance Find Protocol should be added to the EMP. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, geologist or other designated responsible person once excavations, drilling or trenching activities have commenced. Since the impact on the palaeontology is zero to low, as far as the palaeontology is concerned, the project should be authorised. The recommendations and mitigating measures proposed in the PIA are included in the EMP.

**8.2.11 Description of specific environmental features and infrastructure on the site**  
Based on the outcomes of the initial prospecting phases (non-invasive activities), the location of any invasive activities such as drilling will be determined and the impacts on the identified themes with a high to very high sensitivity will subsequently be determined. It is expected that for the invasive activities (drilling), only localised clearing of shrubs  $\pm 160\text{m}^2$  may be required in order to prepare a drill pad. The farmstead dwellings and other farm infrastructure will be avoided. The area also has a number of farm tracks that traverse the site from the N7. The invasive activities will seek to use existing roads in order to access the property and it is not expected that any new access roads will be opened up. The map Figure 2 above gives an overview of the prospecting area, settlements and roads that traverse the site.

**8.2.12 Environmental and current land use maps**  
Refer section 8.2.3 as part of the specific attributes.

## **9. Risks and associated Impacts identified**

As described earlier in this report, the prospecting activities will comprise of desktop and geophysical activities and dependant on the outcome of these phases, targets will be selected for invasive sampling activities. The impact assessment therefore focuses only on the invasive sampling aspects (soil sampling, drilling and associated activities) as these will have the potential to impact on the biophysical and social environment. The impact assessment (Table 16) is furthermore separated into three distinct phases, namely:

- Construction phase (Site establishment);
- Operational phase (Soil sampling and Drilling), and.
- Decommissioning

### **9.1 Potential Risks/impacts**

#### **9.1.1 Potential risks associated with Soil (contamination, erosion, compaction) & Land capability (viable and sustainable land)**

- Uncontrolled expansion of prospecting footprint by not restricting the area disturbed by prospecting and the associated activities/infrastructure, resulting in loss of land with agricultural potential.
- Uncontrolled development of roads, where existing farm roads are not used for prospecting operations and redundant internal roads are left behind.

- Post-prospecting landform not compatible with the surrounding landscape and not capable of productive land use that achieves a land capability equal to that of pre-prospecting conditions.
- The post-prospecting landscape increases the requirement for long-term monitoring and management.
- Sub-surface infrastructure remaining behind, limiting the intended post-closure land use including drill casings, headworks, footings and foundations, power supply and water installations including pumps and pipelines.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Equipment and other items used during the prospecting operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Long term changes in land use are caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of the annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-prospecting land use options.
- Rehabilitated areas could be too unstable to support post-prospecting land use objectives compatible with surrounding areas.
- Increased soil erosion causing loss of topsoil.

#### 9.1.2 Change in topography

- Change in topography due to spoils from excavations/sumps and drill fluid remaining after invasive sampling.
- Potentially dangerous areas like excavations/sumps and headworks at drill holes incorrectly rehabilitated including uncontrolled access to potentially unsafe post-prospecting areas.

#### 9.1.3 The potential Risks associated with Biodiversity, Flora & Fauna

- Disturbance to sensitive environments such as Critical Biodiversity areas and any associated biodiversity corridors, land with historical or conservation value part of NPAES, Wetlands and other Aquatic Ecosystems, terrestrial habitats for species of conservation concern (SCC) and high potential agricultural land.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas.
- Inadequate control of alien invasive vegetation species can result in the establishment of populations or seed sources that threaten adjacent areas.
- Loss of indigenous vegetation due to disturbed footprints at sample areas.

#### 9.1.4 The potential Risks associated with Aquatic biodiversity & Water Resources

- Inadequate topsoil restoration or creation of unnatural surface topography or slope which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from infrastructure areas is erosive, causing sheet, rill and donga erosion features.
- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Potential contamination of groundwater from unmanaged use of hydrocarbons on-

site, and incorrect storage of hazardous substances.

- Oil fuel leaks onto soil through the earthmoving and transport equipment and machinery or spillage of fuel during the transfer from fuel bowser to equipment.
- Chemical contaminants impacting surface and/or groundwater quality or resulting in discharge that exceeds the concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Waste classes are not kept in separate streams and incomplete removal of waste.

#### 9.1.5 Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions.

- Terrain morphology plays a critical role in defining the visual envelope of prospecting developments and can either reduce or enhance visual impact. Apart from visual intrusion, there is also the risk of a reduced sense of place. The visual intrusion impact of prospecting activity would be on nearby roads, homesteads, settlements, tourist accommodation, and along tourism routes or corridors.
- The visual disturbance would be caused by prospecting activities such as excavations. Buildings provide a colour contrast, as do disturbed areas against adjacent natural areas.
- Nuisance effects of air emissions due to a lack of implementation of dust suppression activities could impact on communities.
- Dust generated on haul roads reduces visibility, representing a safety hazard.
- Dust can retard vegetation growth and reduce the palatability of vegetation.
- The cumulative effect of a rise in the ambient noise levels or high noise levels in specific areas that exceed specified levels would impact on communities in close proximity.
- Noise disturbance and light pollution would result from night-time activities (if applicable) in areas that are in close proximity to communities.

#### 9.1.6 Potential Risks associated with the socio-economic environment.

- Disturbance of local communities in urban and rural areas caused by noise and dust emissions and increase in heavy vehicles along transport routes.
- Safety of personnel operating large earth-moving equipment.
- Dust, noise and vibration associated with prospecting activities, in relation to surrounding communities.
- An influx of people into the local communities looking for work, with an increase in demand for housing, schooling and services. Such an influx of workers into a community often results in a change in social dynamics.
- Positive impacts include, for example, the creation of both formal and informal businesses to supply additional needs, whilst negative social impacts include, for example, an increase in substance abuse, HIV transmission and unwanted pregnancies.
- Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income.
- Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
- Lack of compliance with the approved EMP and a lack of auditing of the EMP.

- Closure stalled due to non-compliance with relevant legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

#### 9.1.7 Potential Risks associated with regard archaeological, cultural heritage or paleontological sites

- Disturbance of identified surface, or unknown sub-surface sites, if mitigation and monitoring is not implemented as per mitigating measures in the Heritage and Palaeontology Impact Assessment
- Progressive development can encroach upon or disturb identified sites.

#### 9.1.8 Potential Risks associated with the Preferred Alternative.

Refer to Section 3, Section 5 and Section 6 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the preliminary result of having a preferred and only alternative. The potential impact from this preferred and only alternative are listed in Table 13 below.

#### 9.1.9 Potential Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The No-Go Alternative implies that the Applicant would forgo an opportunity to provide employment opportunities in an area and sector identified for opportunities for job provision and economic growth, and the sourcing of minerals. This potential would not be reached with the "no-go" option.



**Table 13: Preferred Alternative: Potential Risks per Phase and Activity**

Phase	Activities	Potential Risks
Construction Phase Site establishment	Access & Haul Roads	Dust generation from vehicles using existing access roads Soil compaction from repeated use of tracks to access sample sites
	Site Establishment Activities (Including associated infrastructure, Water and wastewater infrastructure, Electricity infrastructure, Waste management, Storm water control)	Topsoil stripping and stockpiling, soil erosion and soil compaction
		Soil compaction from repeated use of access tracks to invasive sampling sites (twee-spoor) and soil erosion from exposed areas
		Soil contamination and lack of waste management
		Localized change in ecological functioning (processes and services) due to invasive sampling footprint.
		Removal of existing vegetation and habitat destruction of species of conservation concern (SCC) due to site clearance.
		Destruction of Aquatic biodiversity from activities within drainage channels and wetlands
		Altering Water Resources (Quality & Quantity) and water abstraction
		Emissions (Dust and light), Noise and Vibration causing nuisance from topsoil stripping, site establishment activities and vehicles & visual intrusion from development
		Disruption of Socio- economic standards
Destruction of archaeological and paleontological resources		
Operational Phase Sampling	Collection of samples and Sample Analysis (Including: excavations, drilling, refueling, waste generation & management, spoils and overburden dumps)	Change in topography due to excavations and spoil stockpiles
		Erosion control or runoff diversion structures
		Soil compaction, contamination and lack of waste management
		Biodiversity (wildlife and vegetation) disturbance from vehicles and offroad driving
		Destruction of Aquatic biodiversity from activities within drainage channels and wetlands
		Altering Water Resources (Quality & Quantity) water abstraction and groundwater pollution from hydrocarbons.
		Emissions (Dust and light), Noise and Vibration causing nuisance from topsoil stripping, site establishment activities and vehicles & visual intrusion from development
		Disruption of Socio- economic standards
Destruction of archaeological and paleontological resources		
Decommissioning Phase	Rehabilitation of the prospecting right area: backfilling shaping landscape profile; scarifying compacted areas and vehicle tracks; replacing topsoil, etc.	Closure stalled due to non-compliance with relevant legislation (national, provincial and local).
		Insufficient funds for complete rehabilitation
		Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income.
		Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.

## 9.2 Methodology used in assessing the potential environmental impacts

Refer to Table 14 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed prospecting activity for the Preferred and Only Alternative.

**Table 14:** Impact Assessment Criteria

ASSESSMENT CRITERIA	
<b>Nature</b>	
Rating	Criteria
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
<b>Severity</b>	
Rating	Criteria
6 Very High	The impact is result in a complete loss of all resources. Irreparable damage to highly valued species, habitat or ecosystem.
5 High	The impact will result in significant loss of resources. Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate.. Very serious widespread social impacts. Irreparable damage to highly valued items.
4 Medium	The impact will result in marginal loss of resources. Serious medium term environmental effects. Environmental damage can be reversed in less than a year. On-going social issues. Damage to structures/items of cultural resources of low significance, mostly repairable.
3 Low	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires no intervention of external specialists and can be done in less than a month. On-going social issues. Some damage to insignificant cultural resources.
2 Very low	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Low-level repairable damage to commonplace historical structures
1 None	The impact will not result in the loss of any resources. Limited damage to minimal area of low significance, (e.g. ad hoc spills within plant area). Will have no impact on the social environment. Cultural functions and processes not affected.
<b>Spatial Scale</b>	
Rating	Criteria
6 Very High	Will affect areas across international boundaries
5 High	Will affect the entire country
4 Medium	Will affect the entire province or region
3 Low	Will affect the local area or district
2 Very low	The impact will only affect the site
1 None	The impact will only affect portions of the site
<b>Duration</b>	
Rating	Criteria
6 Very High	Permanent no mitigation possible
5 High	Permanent but mitigation possible
4 Medium	Long term (6-15 years)
3 Low	Medium term (1-5 years)
2 Very low	Short term (Less than 1 year)
1 None	Immediate (Less than 1 month)

Probability																	
Rating	Criteria																
6 Very High	Certain/Definite Impact will certainly occur (100% probability of occurring)																
5 High	Almost certain/ High probability Impact will occur (>75% probability of occurring)																
4 Medium	Impact likely to occur (50 - 75% probability of occurring)																
3 Low	Impact may occur (25-50% probability of occurring)																
2 Very low	Unlikely/ Low probability. Impact unlikely to occur (0 - 25% probability of occurring)																
1 None	Highly Unlikely/ None Impact unlikely to occur (0% probability of occurring)																
SIGNIFICANCE Consequence x Probability Presented as a score out of 108																	
Rating	Criteria																
84-108 High	Long-term environmental change with great social importance.																
50-83 Medium	Medium to long term environmental change with fair social importance.																
27-49 Low	Short to medium term environmental change with little social importance.																
12-26 Very low	Short-term environmental change with no social importance																
3-11 None	No environmental change																
Unknown	Due to lack of information																
Consequence = Severity + Spatial Scale +Duration Presented as a score out of 18																	
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Probability	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	2	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36
	3	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54
	4	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72
	5	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
	6	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108
CUMULATIVE EFFECTS																	
Rating	Criteria																
High	The impact would result in significant cumulative effects																
Medium	The impact would result in moderate cumulative effects																
Low	The impact would result in minor cumulative effects																
REVERSIBILITY																	
Rating	Criteria																
Reversible	Impacts can be reversed through the implementation of mitigation measures																
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures																
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED																	
Rating	Criteria																
High	The impact could be significantly avoided/managed/mitigated.																
Medium	The impact could be fairly avoided/managed/mitigated.																
Low	The impact could be avoided/managed/mitigated to a limited degree.																
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact																

### 9.3 Positive and negative impacts of proposed activity and alternatives

#### 9.3.1 Positive impacts

- Creation of employment with economic spin-offs.
- Provision of minerals for local and international markets.

#### 9.3.2 Negative impacts

- Potential Impacts on other land uses
- Potential Impacts on Soil (contamination, erosion, compaction) & Land capability
- Potential Impacts on topography
- Potential Impacts on Biodiversity, Flora & Fauna
- Potential Impacts on Aquatic biodiversity & Water Resources
- Potential Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation)
- Socio - economic impact
- Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources

### 9.4 The mitigation measures and the level of risk

Refer to Table 16 for the impact assessment and the key measures to mitigate the potential impacts.

#### 9.4.1 Soil and Land Capability:

The impacts of soil and land capability have been assessed as being of low significance even before mitigation.

The activities and actions associated with achieving a stable, free draining post prospecting landform, which is compatible with the surrounding landscape and which is capable of a productive land use that achieves a land capability equal to that of pre-prospecting conditions are discussed below. It is important to note that for the operation to meet the key objective of economically viable and sustainable grazing, it is imperative that its other key objectives, viz. a safe post-prospecting area with limited residual impacts and optimal post-mining social opportunities are met.

The building block of viable and sustainable small stock production on the disturbed areas created by drilling is the shaping of the slope and ripping of compacted areas. The above soil preparation will be combined with sound management practices through application of the land use principles, guidelines and recommendations with regard to carrying capacity. These actions should mitigate the risks of erosion and inferior agricultural results due to improper farming practices.

The objectives of decommissioning a borehole include removing trip/fall hazards, preventing the borehole acting as a conduit, stopping the mixing of water from different aquifers and to stop the wastage of borehole water from the overflow from artesian boreholes.

The mitigation associated with trip/fall hazards includes removing of the headworks and casing. Drill hole collars needs to be cut below surface and capped to prevent access by humans and animals. This process ensures the well is free from any obstructions that could interfere with the sealing of the borehole itself at final decommissioning according to the closure plan.

The risks associated with stability are the formation of erosion gully's and a collapsing slope of any remaining drill sumps. The risk can be regarded as insignificant given the extremely low rainfall in the area (outside forces) and small size and even slope of any remaining drill sump. The risk will be mitigated by the shaping of the sump and backfilling or capping of drill collars and ripping of compacted areas due to drill platforms to facilitate natural re-vegetation. Furthermore, no drill spoils will remain on site.

The impact on soil contamination can be reduced to very low by the mitigating measure applicable to waste management. In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes. Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure.

Implementation of the following tasks to manage the risks associated with exploration activities will ensure that waste management practices do not create and/or leave legacies and will limit the residual impact of mine closure. Regular inspections and audits will be used as management system to ensure compliance.

All equipment and other items used during the exploration operation needs to be removed from the site.

Waste material of any description, including receptacles, scrap, rubble and tires, will be removed entirely from the prospecting area and disposed of at a recognised landfill facility. It will not be buried or burned on the site.

Implementing screening as part of the cleaning activities before materials are moved from the mine. The infrastructure/laydown area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. Any compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.

Redundant structures will be removed for use elsewhere or demolished and discarded. All steel structures and reinforcing will be discarded or sold as scrap. All equipment and other items used during the prospecting operation needs to be removed from the site. Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.

Final walk through of sampling areas to ensure no mining related waste and re-usable infrastructure remain on site.

The impact on soil compaction can be reduced to very low by limiting the activities and clearance of the invasive sampling site to the smallest area that is necessary. No clear scraping (dozing) will be carried out unless absolutely necessary and in this case the compacted area will be scarified and any topsoil stockpiled removed will be spread over the disturbed area immediately after completion of the activity. Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. Where clear scraping (dozing) or removal of vegetation cannot be avoided areas should be kept to an absolute minimum. All compacted areas that are not required for aftercare access shall be scarified. All tracks and drill traverses (twee-spoor) will be scarified and any topsoil stockpiled removed to be spread over the disturbed area. Dual use access roads must be handed back to the landowner in a good state of repair taking into account the general condition of other roads.

The impact can be further reduced by only using existing farm roads and tracks. Where new access tracks are required to get the sampling site, the impact can be reduced if no vegetation will be cleared. Leaving roots intact will prevent soil loss and enable vegetation to coppice and regrow.

#### 9.4.2 Topography

The impacts of topography have been assessed as being of very low significance before mitigation.

As part of ensuring slope stability re-shaping of the drill sump will be done where required and the land-use plan will be to create an even depression and prepare the area for natural re-vegetation by implementing erosion control measures including waterways, drainage lines and storm water infrastructure if necessary.

Another potential risk arising from the mining area after mine closure are changes in the quantity of surface water compared to pre-mining quantities that may negatively affect the area. To prevent significant negative effects arising from changes in post-mining surface water quantities, the post-mining topography at the drill platforms will be adjusted where possible to minimise the effect on water flow and increase potential for re-vegetation. Actions to mitigate the risk of erosion will be through implementation of practices such as leaving the profiling contours. Having these actions in place should ensure that there is no negative effect on surface water flow and will assist in achieving the aim of limited residual impact.

The impact can also be reduced by backfilling of excavations/sumps whereafter the change in topography from prospecting activities would be a slight depression created in the landscape.

All spoils need to be returned to the excavations/sumps for backfilling. Drilling muds will be contained in lined drill sumps and this material will be removed from site and disposed in a licensed disposal facility.

After results are logged the sample area will be rehabilitated immediately for security and safety reasons, that will also ensure that in case of sudden closure of the project there will be limited sample areas to be dealt with as part of final decommissioning and rehabilitation.

The focus of topographic rehabilitation may not be obvious at the time of project planning and must be addressed as the project develops and the Final Rehabilitation, Decommissioning and Closure Plan must be reviewed periodically for continued relevance in the light of changed prospecting path or long-term plans.

#### 9.4.3 Biodiversity Flora and Fauna:

The impacts of invasive sampling (sump excavation, drill pad clearing and soil compaction) have been assessed as being of medium significance before mitigation.

The impact can be reduced to very low significance by prior delineation of the area via using previous prospecting results to minimise the areas that need to be disturbed in order to limit the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible.

The concomitant impacts on soil, land capability, topography and vegetation will be addressed through the reshaping of the landscape and the protection of the area until fully re-vegetated. Unnecessary destruction of vegetation should be avoided by ensuring that traffic and personnel movement be restricted to demarcated areas. No traffic should be allowed on areas undergoing rehabilitation.

Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. Rather than surface vegetation be cleared to make way for the drilling rig, leaving the roots intact will ensure that vegetation can coppice and regrow. Sample sites where clear scraping were required must be rehabilitated by scarifying trampled and compacted areas to a depth of  $\pm 300\text{mm}$ . Windrows created by scarifying needs to be left in place to create a rough surface that can act as seed trap and create a micro-habitat to promote natural re-vegetation. Vehicle's speed must take into account the possibility of collisions with fauna.

#### 9.4.4 Aquatic Biodiversity and Water Resources:

Potential Impacts on Aquatic biodiversity & Water Resources is assessed as being of insignificance even before mitigation.

The impact can be avoided by ensuring that measures are put in place to prevent contamination of surface and groundwater with hydrocarbons and not undertaking any invasive sampling activities within 50m from a water course.

The project will not produce any residue that could lead to water contaminated. Should the attenuation measures for prevention of soil pollution as described be implemented, the effect on surface water will be insignificant. The most important of these is that any oil or fuel leaks caused during operations must be removed immediately with the saturated soil and placed in bags or drums for disposal at a suitable site.

Fuel storage must be contained in mobile bowzers and refuelling will be done with care to minimise the chance of spillages. Only re-fuel machines at fuelling station if possible and construct structures to trap fuel spills at fuelling station. Oils and lubricants must be stored within sealed containment structures and minimise storage of hazardous substances onsite.

Only emergency repairs to mechanical equipment will take place onsite. Maintaining all equipment as per supplier specification and using drip trays or UPVC sheets to prevent spills/ leaks onto the soil. When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. Ensure vehicles and equipment are in good working order and regularly inspected for leaks and drivers and operators are properly trained. Any spillages will be cleaned up immediately and dispose contaminated material (soil, etc.) at licensed sites only. A spill kit will be available on each site where prospecting activities are in progress. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998) without the necessary authorisations.

#### 9.4.5 Emissions (Air quality, visual intrusion & Noise Generation):

The impact of emissions is assessed as being of very low significance before mitigation. If the mitigation measure below is put in place the significance rating can be reduced to insignificant.

It is important to note that people experience dust deposition as a nuisance effect, and that there are no direct human health implications because the dust is not inhaled. Heavy dust deposition can have detrimental effects on plants if the leaves are smothered to the extent where transpiration and photosynthesis are affected.

The proposed operation falls within the boundaries of the Namakwa District Municipality's and the company may be required to operate within the air quality requirements of the Municipality's Air Quality Management Plan.

The impact of dust generated by vehicles travelling over unpaved areas can be readily mitigated by enforcement of low vehicle speeds and wet suppression. Separation of distance of minimum 100m, but preferably 500m to be maintained between sample sites and dwellings will also reduce the impact of dust fall.

Acceptable dust fall rates in terms of the National Dust Control Regulations (GN R. 827 of 1 November 2013) are presented in the table below. In terms of these regulations, the local air quality officer may prescribe a dust fall monitoring programme, the implementation of dust control measures and continuous ambient air quality monitoring.

The method to be used for measuring dust fall rate and the guideline for locating invasive sampling points shall be ASTM D1739: 1970, or equivalent method. Acceptable dust fall rates are provided in the table below.

Restriction Areas	Dust fall rate (D) (mg/m <sup>2</sup> /Day, 30- day average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1 200	Two within a year, not sequential months

The nuisance (visual) impact of the prospecting activities is also assessed as being of Medium Significance. The nuisance (visual) impact can be reduced by taking into account available vegetation screening, the locations of visual receptors on the prospecting areas and adjacent properties and locating the equipment in a way that it is screened from points of visual reception wherever possible.

Visual impact can be reduced to one of insignificance by appropriate location of the drilling rig and other visually prominent items on the site and placement in consultation with the landowner.

The noise impact caused by the operation of the drilling rig, vehicles travelling to and from each drilling site and the voices of the drilling crew is assessed as being of low significance. Taking into account the existing background noise levels of the general area which is rural in nature, the significance of the noise caused by the earth moving equipment, vehicles going to and from each sampling is also low before mitigation.

Typical noise levels generated by various types of construction equipment are listed in the table below.

Equipment	Typical operational Noise level at given offset (dBA)							
	5m	10m	25m	50m	100m	250m	500m	100m
Air compressor	91	85	77	71	65	57	51	46
Crane (mobile)	93	87	79	73	67	59	53	47
Dozer	95	89	81	75	69	61	55	49
Pump	86	80	72	66	60	52	46	40
Rock Drill	108	102	94	88	82	74	68	62
Trucks	87	81	73	67	64	60	57	54



In South Africa, the noise impact on human receptors is evaluated in terms of the SANS 10103 guidelines for sound pressure levels as listed in the table below.

Type of District	Equivalent continuous rating level for ambient noise - dBA					
	Outdoors			Indoors with windows open		
	Day-night	Daytime	Night	Day-	Daytime	Night-
Rural districts	45	45	35	35	35	25
Suburban district	50	50	40	40	40	30
Urban traffic	55	55	45	45	45	35
Urban districts	60	60	50	50	50	40
Central business district	65	65	55	55	55	45
Industrial district	70	70	60	60	60	50

*Daytime and night-time refer to the hours from 06h00 to 22h00 and 22h00 to 06h00 Respectively*

Mitigation if required will include limiting the site establishment activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays, as well as by applying a separation distance of a minimum 100m, but preferably 500m between invasive sample sites and any dwellings. If drilling after hours or on Sundays and public holidays cannot be avoided then agreements with any potential noise recipient must be put in place at least 7 days before activities. The vehicles on site will be limited to the absolute minimum required. It must be noted that the speed limit for driving on non-public roads and tracs shall be limited to 40Km/h. If significant intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.

#### 9.4.6 Socio- economic impact

Job creation and local economic spin offs through increased income earned, and through purchasing of local materials is a positive impact and outweigh the insignificant negative impacts below. The prospecting sites are located in a rural farming area with farm dwellings.

Some landowners cherish the peaceful and quiet lifestyle of the area and friction between local residents and a crew of strangers is very possible. Conflict with other mining companies or land users on the same property is also a possibility. The impact can be mitigated by taking appropriate social management measures.

All access will be arranged beforehand with landowners and a supervisor will be present at all times, if requested by the land owner, and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property to protect the landowner against claims regarding personal loss and injury.

Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner.

Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation.

The Socio- economic impact is of medium significance and with mitigation, the impact will be reduced to one of insignificant due to the impact off job losses at the time of closure of mining operations.

Other impacts like not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management systems as well as insufficient funds for complete rehabilitation can however be mitigated to some degree as follow.

A review of the final rehabilitation, decommissioning and closure plan must be done annually to ensure all outstanding environmental liabilities are covered and sufficient funds is available to implement the closure plan.

Maintain positive and transparent relationships with stakeholders as well as maintaining communication channels and undertaking environmental management in accordance with the approved EMPr and Closure Plan.

#### 9.4.7 Palaeontological, Archaeological and Cultural Heritage Resources

The impact on Cultural and Heritage Resources is assessed as being of medium significance before mitigation. The impact can be avoided by ensuring that recommendations from specialist studies listed below are implemented.

- Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Regardless of the above recommendations, all sample sites should be carefully inspected by project staff to ensure that no heritage features are present. Equipment moving on site will, where ever possible, be confined to established roads and tracks. Where this is not possible, access routes will be walked prior to entry of equipment to ensure that there are no graves present. Should graves be identified, the access route will be realigned to avoid such heritage resources, which will then be clearly demarcated to minimise risk of accidental damage

If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Any identified heritage feature will be cordoned off and measures put in place to prevent any activities within 100m. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them. Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.

No-go areas of particular palaeontological sensitivity are not identified in the Project Area. The only requirement according to the desktop PIA (Annexure 3b) is that the Environmental Control Officer (ECO) for the project must inform staff of the need to watch for potential fossil occurrences at the sample sites and implementing the fossil Chance Finds Procedure in the event of any chance finds of fossils.

In the context under consideration, it is improbable that fossil finds will require delineation of “no go” zones. At most a temporary pause in activity at a limited locale may be required. The strategy is to rescue the fossil material as quickly as possible. The procedures below are in general terms, to be adapted as befits a context and is only required if fossils are seen on the surface and when drilling/excavations/trenching commence.

- When excavations begin the rocks and sand must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 13). This information will be built into the EMP's training and awareness plan and procedures. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/contractor then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

**Figure 13:** Photographs of fossils that have been recovered from other parts of South Africa from Quaternary rivers, pans and abandoned channels. Note the fragmentary nature of these robust fossils.



#### 9.4.8 Assessment of potential cumulative impacts

Cumulative impacts are the successive, incremental and combined impacts of one, or more, activities on society, the economy and the environment. Cumulative impacts result from the aggregation and interaction of impacts on a receptor and may be the product of past, present or future activities.

In this case the potential cumulative impacts will be insignificant due to the small scale of operations. The total prospecting area is  $\pm 14976\text{Ha}$  but the total footprint of all disturbance planned is less than  $1\text{Ha}$  at the end of the prospecting operation.

#### 9.5 Motivation where no alternative sites were considered.

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives are not likely to be considered in the Impact Assessment Phase, reasons have been provided in Section 6 above.

## 9.6 Statement Motivating the Preferred Sites

As discussed in previous sections, each of the prospecting phases is dependent on the results of the preceding phase. The location and layout of drill sites will be determined based on information derived from the non-invasive activities and the final site layout will be finalised on completion of these initial prospecting activities. Proposed drill sites will be selected so as to avoid known heritage sites, water courses, dwellings and infrastructure where practicable.

## 10. ENVIRONMENTAL IMPACT ASSESSMENT

### 10.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

This BAR and EMPr were compiled through a detailed desktop investigation in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process also assist the EAP in the identification of any additional impacts associated with the proposed prospecting activities. The methodology described in Section 9.2 above was used to assess the significance of the potential impacts of the prospecting activities. The assessment of impacts is based on the experience of the EAP with similar projects. The applicant also has practical experience through exploration geologists and therefore the identification of impacts and assessment of their significance is informed by first-hand experience of exploration activities. The mitigation measures proposed in Table 16 are considered to be reasonable and based on the location of the prospecting area and must be implemented in order for the outcome of the assessment to be accurate.

### 10.2 Assessment of each identified potentially significant impact and risk The supporting impact assessment is provided in Table 16.

### 10.3 Summary of specialist reports.

The Screening Report in terms of Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014 was developed to allow a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity and enable the applicant to manipulate the development footprint on a site to avoid environmental sensitivities before submitting the application. The Screening Report also identifies specialist assessments for inclusion in the assessment report based on the environmental sensitivities of the proposed development footprint. It is however the responsibility of the EAP to confirm the list of specialist assessments and to motivate in the assessment report, the reason for not including any of the identified specialist studies. The site sensitivity assessment report form part of section 8.2 in this BAR and the specialist studies identified is listed in table 15.

For mining and prospecting operations, the position of the mineral resource is fixed therefore the Screening Report required to accompany any application for Environmental Authorisation is not applicable as there are no alternative footprints for screening and comparison. For small scale mining and prospecting operations where there will be no permanent infrastructure development and where the location of development is often informed by historical prospecting and production records for the area, as well as the most likely position of potential mineral deposits no reasonable and feasible alternatives can be investigated.

In the case of prospecting the location of these invasive sample sites will also not be known at the time that the application for EA is lodged. For prospecting areas, that normally cover a large area it is accepted that some areas will often be of high or even very high sensitivity and no specialist assessments are needed to verify this. For this reason, prospecting operations which are a short-term change in land use, must provide mitigation measures and financial provision to return the site to its pre-prospecting or similar state during the closure phase not applicable to other development types.

For mining operations, the initial list of environmental attributes will be compiled based on experience of the EAP in similar development types and through site visits and appraisals, desktop screening via Geographical Information System (GIS) and aerial photography, incorporating existing information from previous studies, and input received from authorities and I&APs.

Further to this, the Screening Tool identifies related exclusions e.g., industrial development zones that is not applicable to minerals as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.

**Table 15:** Summary of specialist studies

<b>List of studies undertaken</b>	<b>Recommendations of specialist reports</b>	<b>Reference to applicable section of report where recommendations have been included.</b>
<p>Heritage impact assessment: proposed prospecting on plot 226 Vioolsdrift settlement, Namakwaland magisterial district, Northern Cape Province</p> <p>Palaeontological Impact Assessment for the proposed Prospecting Right application for Kaalbeen, near Vioolsdrif, Northern Cape Province</p>	<p>With regard to Heritage, it is recommended that SAHRA allow the prospecting project to proceed as planned, but subject to the following recommendations: Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed;</p> <p>With regard to palaeontology it is also recommended that SAHRA allow the prospecting project to proceed as planned. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.</p>	<p>Table 15 and Section 9.3 The possible mitigation measures that could be applied and the level of risk.</p> <p>Section 13.1 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act</p>

**Table 16: Impact assessment**

<b>Site Access and Site Establishment - Impacts on other land uses</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>No Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area were identified and no intersections with Environmental Management Framework areas are present.</p> <p>Development incentives, restrictions, exclusions or prohibitions and their implications are not applicable to prospecting operations as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.</p> <p>The impact on Civil Aviation and Defence is also not applicable to this application as no high structures will be constructed and no defence installations or test areas are present in close proximity to this project.</p> <p><b>Potential impacts:</b></p> <p>None</p> <p><b>Indirect impacts:</b></p> <p>None</p> <p><b>Residual impacts:</b></p> <p>None</p> <p><u>Mitigation</u></p> <ul style="list-style-type: none"> <li>• None as prospecting will only be a temporary change in land use</li> </ul>	<b>Nature</b>	Neutral	Neutral
	<b>Severity</b>		
	<b>Spatial Scale</b>		
	<b>Duration</b>		
	<b>Consequence</b>	NA	NA
	<b>Probability</b>		
	<b>Significance</b>	NA	NA
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		NA
<b>Site Access and Site Establishment - Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>Regarding Land capability for Agriculture the sensitivity for the area is regarded as low and is used for livestock grazing and production. Due to the limited extend of invasive prospecting activities &lt;1Ha the proposed prospecting activities will not lead to a loss of agricultural production.</p> <p><b>Potential impacts:</b></p> <p>Potential contamination of soil from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances.</p> <p>Accidental spills not cleaned up immediately.</p> <p>The clearing of areas for drill platforms and logistics will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall.</p> <p>Soil compaction will result from ongoing repeated use of access tracks.</p> <p><b>Indirect impacts:</b></p> <p>Windblown litter will cause visual blight. . Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning. A lack of waste food management encourages vermin.</p> <p>Dust impacting on adjacent vegetation and causing a nuisance to workers or residents.</p> <p>Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates.</p> <p><b>Residual impacts:</b></p> <p>Recycling of waste material creates employment.</p> <p>Potential loss of invertebrates that live in the top layers of the soil.</p> <p>Current land cover indicators do not take into account degradation due to, for example, spread of alien plants, secondary impacts of prospecting (e.g., sand mobilization) or overgrazing by livestock.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	2	1
	<b>Spatial Scale</b>	1	1
	<b>Duration</b>	1	1
	<b>Consequence</b>	4	3
	<b>Probability</b>	4	4
	<b>Significance</b>	16	12
	<b>Cumulative Effects</b>	Low	Very Low
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

### Mitigation

- Existing farm roads and tracks must be used as far as possible. In case of new tracks, no clear scraping (dozing) or removal of topsoil will be carried out if possible. Leaving roots intact will prevent soil loss and enable vegetation to coppice and regrow. Where clear scraping (dozing) or removal of vegetation cannot be avoided areas should be kept to an absolute minimum and incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.
- Remove and stockpile  $\pm 300$ mm topsoil prior to construction for use to restore disturbed areas. The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis.
- Topsoil storage areas must be convex and should not exceed 2m in height and turn soil or re-use every six months..
- Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction.
- In particular, topsoil must not be subject to compaction greater than 1 500 kg/m<sup>2</sup> and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles.
- After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff.
- Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and potential stormwater run-off. Stabilized areas shall be demarcated accordingly.

- Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum vegetation coverage.
- Soil erosion is to be regularly monitored and repaired.
- Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required.
- Petrochemical spillages to be collected in a container and store excavated spill affected soil for disposal at a registered facility or onsite treatment.
- Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages
- The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants.



Waste Management

- Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, people will be trained on the different waste classes. Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment.
- All waste should be stored in a temporary waste storage area with pollution prevention measures and unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard.
- Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company.
- All waste in the temporary storage area for used lubrication products and other hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company.
- Mobile generators or fuel bowser to be supplied with bunded facility or necessary pollution control measures (drip trays).
- Clean out content of oil traps and dispose of waste at registered and purpose designed landfill sites.
- Tyres to be returned to supplier or a company that uses old tyres for making door mats, shoes, swings, etc.
- Batteries to be return to supplier or dispose at a permitted hazardous waste facility.
- Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility.
- Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities).
- Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. These liquid wastes cannot be disposed of on the waste dumps.
- Domestic waste (i.e., waste that is generated from the accommodation and offices) separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). Domestic waste generated by workers needs to be sorted and all biodegradable waste must be stored in separate drums. This biodegradable waste will be dumped in a landfill provided for onsite.
- Disposal non-biodegradable waste at a registered and officially permitted commercial or municipal landfill site is the most cost-effective option for materials that cannot be recycled.

**Site Access and Site Establishment - Impacts on topography**

No change in topography during Site Access and Site Establishment

**Potential impacts:**

None

**Indirect impacts:**

None

**Residual impacts:**

None

<b>Significance</b>	<b>Before</b>	<b>After</b>
<b>Nature</b>	Neutral	Neutral
<b>Severity</b>		
<b>Spatial Scale</b>		
<b>Duration</b>		
<b>Consequence</b>	NA	NA
<b>Probability</b>		
<b>Significance</b>	NA	NA
<b>Cumulative Effects</b>		
<b>Reversibility</b>		Reversible
<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

Mitigation

- None

Site Access and Site Establishment - Impacts on Biodiversity, Flora & Fauna	Significance	Before	After
<p>Destruction of CBA,s as the major portion of the study area is identified as CBA 2 and a small portion around the Koubank river as a CBA1. According to the Northern Cape PAES the area is also identified for protected area expansion within the Nababiep Steinkopf Harasberg primary focus area. No formal protected areas are located within 5Km of the prospecting area with the Nababiep Nature Reserve and Richtersfeld World Heritage Site 20Km to the northwest.</p> <p>Regarding Fauna the species of conservation concern the only species with a potential distribution within the study area and regarded as medium sensitivity is the two Aves species <i>Ciconia nigra</i> (Black Stork), not on the TOPS 2015 list and regarded as Least Concerned according to the IUCN Red List, and <i>Afrontis afra</i> (Southern Black Bustard) also not on the TOPS 2015 list but regarded as Vulnerable according to the IUCN Red List.</p> <p>Population decline for larger bird species is mainly due to collisions with power lines. No large structures will be erected during prospecting that can cause collisions and as these are wide-ranging arid specialist and due to the small scale of invasive prospecting (&lt;1Ha) there will be no impact on habitat.</p> <p>Regarding Flora all of the vegetation units present are regarded as Least threatened and the only SCC is <i>Aloidendron dichotomum</i> (Quiver Tree) that is Vulnerable in terms of TOPS. Invasive sampling activities will avoid Quiver Trees.</p> <p><b>Potential impacts:</b> Destruction of sensitive ecosystems and habitats for SCC. The clearing of areas for invasive sampling will result in the removal of existing vegetation. Soil compaction slowing natural re-vegetation will result from ongoing repeated use of movement areas and driving off-road.</p> <p><b>Indirect impacts:</b> Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation. Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.</p> <p><b>Residual impacts:</b> Parts of the project area has been heavily impacted by over grazing.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	2
	<b>Spatial Scale</b>	1	2
	<b>Duration</b>	3	2
	<b>Consequence</b>	9	6
	<b>Probability</b>	6	2
	<b>Significance</b>	54	12
	<b>Cumulative Effects</b>	Medium	Very Low
	<b>Reversibility</b>	Reversible	
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>	Medium	
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>• Mitigation measures for soil erosion &amp; soil compaction will also be applicable to promote natural revegetation:</li> <li>• The sampling sites will be informed by the findings of non- invasive prospecting and must be clearly demarcated, and no activities may take place outside of demarcated areas.</li> <li>• Movement of vehicles and machinery will be restricted to demarcated areas and roads with no off-road driving permitted. Vehicles speed must take into account the possibility of collisions with fauna. .</li> <li>• Provide all workers with environmental awareness training.</li> <li>• Ensure all workers comply with the requirements of the EMPr.</li> </ul>			

<b>Site Access and Site Establishment - Impacts on Aquatic biodiversity &amp; Water Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>The project footprint is located within an arid region with a relatively low rainfall. As a result, natural wetland features are very scarce and only include ephemeral drainage lines. The Koubank and Kosies River classified as a River FEPA 1 as well as the Kowiep River classified as River FEPA 2 is present or close to the prospecting area.. The eastern half of the prospecting area is identified as an National Freshwater Ecosystem Priority Area (NFEP Code 1) regarded as high sensitivity. No Strategic Water Source Area (SWSA) is present and the nearest one is the Port Nolloth Cluster for underground water to the south west (about 59Km away).</p> <p><b>Potential impacts:</b>            Potential surface and Ground water use            Potential contamination of groundwater from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances.            Accidental spills not cleaned up immediately.</p> <p><b>Indirect impacts:</b>            Rainfall is very seldom and evaporation rate is very high.            Indirect impacts on surface water are very unlikely.</p> <p><b>Residual impacts:</b>            Mitigation</p> <ul style="list-style-type: none"> <li>• No water will be abstracted in terms of section 21(a) of the National Water Act, 1998 (Act no. 36 of 1998) without the necessary permission. Potable and process water to be obtained from legal source and brought on site.</li> <li>• Prevent any invasive prospecting activities within 50m from a water course.</li> <li>• A Water Use Authorisation (License or GA) in terms of Sec 21 of the NWA for Impeding or diverting the flow of water in a watercourse (Sec 21c) and Altering the Bed, Banks, Course or Characteristics of a Watercourse (Sec 21i) is required for invasive sampling within, or within 500m of FEPA rivers.</li> <li>• Implement and follow water saving procedures and methodologies.</li> <li>• Provide mobile ablution facilities and take care that temporary onsite sanitation facilities are well maintained and serviced regularly.</li> <li>• Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials and ensure that good housekeeping rules are applied.</li> <li>• Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.</li> <li>• Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages</li> <li>• Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevents spills/ leaks onto the soil.</li> <li>• A spill kit will be available on each site where prospecting activities are in progress.</li> </ul> <ul style="list-style-type: none"> <li>• Minimise storage of hazardous substances onsite</li> <li>• Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling.</li> <li>• Provide all workers with environmental awareness training and comply with the requirements of the EMPr.</li> <li>• By keeping contaminated and clean water separate and establishing controlled runoff at washing bays, the flow and end destination of decontamination washing water will be controlled.</li> <li>• Storm water diversion and erosion control contour berms will separate clean and contaminated water systems around the sample areas.</li> <li>• Slow storm water runoff with contoured, low-gradient drains and channels and although erosion and runoff are natural processes it should be managed by maintaining maximum existing vegetation coverage.</li> <li>• Stormwater must be diverted around the drill hole to prevent ingress of stormwater.</li> </ul>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	2	1
	<b>Spatial Scale</b>	1	1
	<b>Duration</b>	2	1
	<b>Consequence</b>	5	3
	<b>Probability</b>	2	2
	<b>Significance</b>	10	6
	<b>Cumulative Effects</b>	Insignificant	Insignificant
	<b>Reversibility</b>	Reversible	
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>	High	

Site Access and Site Establishment -Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation)	Significance	Before	After
<p>Caused by machinery (drill rig), cleared areas, and movement of trucks on site during preparation of site establishment.</p> <p><b>Potential impacts:</b></p> <p>Noise and dust will be created by mining equipment and vehicles,</p> <p><b>Indirect impacts:</b></p> <p>The site is mountainous, with views obstructed by hills in most places, effectively screening the interspersed sampling areas.</p> <p>Carbon emissions from vehicle exhausts have a negative impact on the ozone layer.</p> <p>Users on the main road through the project sitewould be temporarily impacted by noise, dust and vehicle emissions.</p> <p><b>Residual impacts:</b></p> <p>Good housekeeping will ensure a neat and well-maintained construction area reducing visual impact.</p> <p>Carbon emissions have impact on climate change.</p>	<p><b>Nature</b></p> <p><b>Severity</b></p> <p><b>Spatial Scale</b></p> <p><b>Duration</b></p> <p><b>Consequence</b></p> <p><b>Probability</b></p> <p><b>Significance</b></p> <p><b>Cumulative Effects</b></p> <p><b>Reversibility</b></p> <p><b>Degree to which the impact can be avoided, managed or mitigated:</b></p>	<p>Negative</p> <p>2</p> <p>3</p> <p>1</p> <p>1</p> <p>6</p> <p>4</p> <p>24</p> <p>Low</p> <p>Reversible</p> <p>High</p>	<p>Negative</p> <p>1</p> <p>1</p> <p>3</p> <p>2</p> <p>6</p> <p>Insignificant</p> <p>Reversible</p> <p>High</p>
<p>Mitigation</p> <ul style="list-style-type: none"> <li>• Separation distance of minimum 100m, but preferably 500m to be maintained between invasive activities and inhabited dwellings and if not possible agreements with occupants needs to be put in place.</li> <li>• The site shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.</li> <li>• The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations and limit noise levels (e.g. install and maintain silencers on machinery).</li> </ul> <p>The provisions of SANS 1200A Sub clause 4.1 regarding “built-up” area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas.</p> <ul style="list-style-type: none"> <li>• Activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise on neighbours. No amplified music shall be allowed on site. Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods.</li> <li>• All prospecting activities will be limited to daylight hours during weekdays and no activities on Sundays and public holidays or if necessary then agreements with any potential noise recipient must be put in place at least 7 days before activities.</li> <li>• Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition.</li> <li>• Minimise use of reverse alarms by proper route planning</li> <li>• If significant intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.</li> <li>• On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. At the prospecting area a speed limit of 40km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. The wetting of the roads helps reduce dust generation as will applying dust suppression and/or hardening compound.</li> <li>• Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material and incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.</li> <li>• Temporarily halt material handling and drilling in windy conditions.</li> <li>• Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.</li> <li>• Health and safety equipment is required for workers.</li> <li>• The earth moving or sampling equipment and other visually prominent items on the site will be located in consultation with the landowner.</li> <li>• If necessary, make use of existing vegetation as far as possible to screen the prospecting operations from view.</li> <li>• If necessary, the operations can be screened from view by erecting a shade cloth barrier.</li> <li>• Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material.</li> </ul>			

<b>Site Access and Site Establishment - Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<b>Potential Impacts:</b>	<b>Nature</b>	Negative	Negative
Conflict with landowner and other land users	<b>Severity</b>	5	1
Temporary settlements and translocation	<b>Spatial Scale</b>	5	1
Creation of Employment with Local And Regional Economic Spin-Offs	<b>Duration</b>	6	1
<b>Indirect impacts:</b>	<b>Consequence</b>	16	3
Upskilling	<b>Probability</b>	4	1
Local economic spin-offs through increased income earned, and through purchasing of local materials	<b>Significance</b>	64	3
Income generation for landowners in a time of severe drought where livestock farming is not sustainable.	<b>Cumulative Effects</b>	Medium	Insignificant
<b>Residual impacts:</b>	<b>Reversibility</b>		Reversible
The upliftment of unemployed people, with positive impact on standard of living for their families.	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High
Local and regional economic spin-offs.			
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>• All access will be arranged beforehand with landowner and a supervisor will be present at all times and will report to the landowner when accessing and leaving the property.</li> <li>• Where required indemnity will be signed by all prospecting personnel entering the property to cover the landowner against any claims regarding injuries or damage to equipment.</li> <li>• Any other mining companies or land users operating legally will be regarded as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed or agreements regarding environmental liabilities need to be put in place.</li> <li>• Agreements between any existing mining operations or other land users and landowner will be respected and adopted as part of this operation, provided the right holder is effectively consulted on these agreements and their contents.</li> </ul>			
<b>Site Access and Site Establishment - Impacts on Palaeontological, Archaeological and Cultural Heritage Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<b>Potential Impacts:</b>	<b>Nature</b>	Negative	Negative
Direct impacts to archaeological resources would occur primarily during the construction phase y (e.g. if mine machinery drives beyond the demarcated area during construction).	<b>Severity</b>	5	1
Impacts to graves could occur during the construction phase.	<b>Spatial Scale</b>	5	1
The impact on paleontological resources are possible during all earthmoving activities.	<b>Duration</b>	6	1
<b>Indirect impacts:</b>	<b>Consequence</b>	16	3
Loss of archaeological resources, graves and precolonial cultural landscape	<b>Probability</b>	4	1
The material fossil evidence of “deep time” is embedded in the creation of the sacred landscape and contributes to the “sense of place” cultural aesthetic of the region. The loss of fossils and concomitant interpreted knowledge impoverishes the tangible testimony of the prehistoric landscape and ecological context of ancient humans.	<b>Significance</b>	64	3
<b>Residual impacts:</b>	<b>Cumulative Effects</b>	Medium	Insignificant
Negative residual impact arises from the unavoidable loss of fossils of unknown significance in spite of mitigation efforts. Positive residual impact arises from the successful rescue of fossil material for posterity, resulting in material for future research, employment opportunities for budding, young researchers and enhanced insights into the prehistory of the Northern Cape.	<b>Reversibility</b>		Irreversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High

<u>Mitigation</u>				
The impact can be avoided by ensuring that recommendations from specialist studies and general mitigation measures listed below are implemented.				
<ul style="list-style-type: none"> <li>Once the sampling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby invasive sample sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not sampling may proceed;</li> <li>Where necessary, directional drilling will be practised to assess samples situated below identified resources.</li> <li>All sample sites should be carefully inspected by project staff to ensure that no heritage features are present;</li> <li>The fossil Chance Finds Procedure must be implemented in the event of any chance finds of fossils, and</li> <li>If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the State and may require excavation and curation in an approved institution.</li> </ul>				
<ul style="list-style-type: none"> <li>A safe distance of at least 100 metres will be maintained between the identified heritage resource and sampling or any other development associated with the prospecting activities.</li> <li>Any identified heritage feature will be cordoned off with stakes and Chevron tape or similar items. All personnel including contractors involved in the construction activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them.</li> <li>Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.</li> <li>The best mitigating measure is to try and avoid as many archaeological sites as possible, so mitigation as described here will only be required for those sites that cannot be avoided.</li> </ul>				
Management measures are also required like careful planning by the developer of the project layout. Maps should be prepared showing all areas that will require disturbance.				
<b>Operational Phase - Impacts on other land uses</b>		<b>Significance</b>	<b>Before</b>	<b>After</b>
No Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area identified.		<b>Nature</b>	Neutral	Neutral
No intersection with Environmental Management Frameworks relevant to the application		<b>Severity</b>		
Development incentives, restrictions, exclusions or prohibitions and their implications are not applicable to mining operations as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.		<b>Spatial Scale</b>		
The impact on Civil Aviation and Defence is also not applicable to this application as no high structures will be constructed and no defence installations or test areas are present in close proximity to this project.		<b>Duration</b>		
<b>Potential Impacts:</b>		<b>Consequence</b>	NA	NA
None		<b>Probability</b>		
<b>Indirect impacts:</b>		<b>Significance</b>	NA	NA
None		<b>Cumulative Effects</b>		
<b>Residual impacts:</b>		<b>Reversibility</b>		
None		<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<u>Mitigation</u>				
• None				

<b>Operational Phase - Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Regarding Land capability for Agriculture the sensitivity for the area is regarded as low and is used for livestock grazing and production. Due to the limited extend of invasive prospecting activities <1Ha the proposed prospecting activities will not lead to a loss of agricultural production.	<b>Nature</b>	Negative	Negative
<b>Potential Impacts:</b>	<b>Severity</b>	4	2
Potential contamination of soil from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances.	<b>Spatial Scale</b>	1	1
Accidental spills not cleaned up immediately.	<b>Duration</b>	3	1
The clearing of areas for drill platforms and logistics will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall.	<b>Consequence</b>	8	4
Soil compaction will result from ongoing repeated use of access tracks.	<b>Probability</b>	4	4
<b>Indirect impacts:</b>	<b>Significance</b>	32	16
Windblown litter will cause visual blight. Hydrocarbons are toxic and will cause vegetation die-back and soil poisoning. A lack of waste food management encourages vermin.	<b>Cumulative Effects</b>	Low	Very low
Dust impacting on adjacent vegetation and causing a nuisance to workers or residents.	<b>Reversibility</b>		Reversible
Compaction of topsoil where vehicles drive outside demarcated areas damages seed bank and habitat for invertebrates.	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium
<b>Residual impacts:</b>			
Recycling of waste material creates employment.			
Potential loss of invertebrates that live in the top layers of the soil.			
<b>Mitigation</b>			
The same mitigating measures as for Site Access and Site Establishment and topography below will be applicable as well as the following:			
• Any stockpiles left or oversize boulders must be removed and used to backfill excavations and or sumps.			
• Spoils to be used as backfill or landscaping or otherwise dealt with responsibly.			
• To ensure long-term stability, the restored topsoil cover should attempt to mimic the pre-prospecting distribution of soil texture and thickness.			
<b>Operational Phase - Potential Impacts on topography</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
With mitigation the change in topography from prospecting activities (drilling sumps) would be slight depressions created in the landscape.	<b>Nature</b>	Negative	Negative
<b>Potential impacts:</b>	<b>Severity</b>	2	1
Change in topography due to excavations (drill sumps) if not backfilled.	<b>Spatial Scale</b>	1	1
<b>Indirect impacts:</b>	<b>Duration</b>	1	1
None	<b>Consequence</b>	4	3
<b>Residual impacts:</b>	<b>Probability</b>	6	1
Very slight visual change in landscape and topography following rehabilitation.	<b>Significance</b>	24	3
	<b>Cumulative Effects</b>	Very low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium

<u>Mitigation</u>			
<ul style="list-style-type: none"> <li>• All spoils need to be returned to the excavations/sumps for backfilling.</li> <li>• After results are logged the sample area will be rehabilitated immediately for security and safety reasons, this will also ensure that in case of sudden closure of the project there will be the minimum sample areas to be dealt with as part of final decommissioning and rehabilitation.</li> <li>• After results are logged the invasive sample site will be rehabilitated before the project is moved to the next sample site. In case of sudden closure of the project there will only be one sample site to be dealt with as part of final decommissioning and rehabilitation.</li> </ul>			
<b>Operational Phase - Impacts on Biodiversity, Flora &amp; Fauna</b>			
<p>The invasive sampling footprint although &lt;1Ha will have a potential impact on localized ecological functioning</p> <p><b>Potential impacts:</b></p> <p>Destruction of sensitive ecosystems and habitats for SCC.</p> <p>The clearing of areas for invasive sampling will result in the removal of existing vegetation.</p> <p>Soil compaction slowing natural re-vegetation will result from ongoing repeated use of movement areas and driving off-road.</p> <p><b>Indirect impacts:</b></p> <p>Soil disturbance caused by vegetation clearing will provide suitable conditions for the establishment and spreading of alien invasive vegetation.</p> <p>Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.</p> <p><b>Residual impacts:</b></p> <p>The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g., snakes). These will move away whilst operations are in progress.</p>	<b>Significance</b>	<b>Before</b>	<b>After</b>
	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	2
	<b>Spatial Scale</b>	1	2
	<b>Duration</b>	3	2
	<b>Consequence</b>	9	6
	<b>Probability</b>	6	2
	<b>Significance</b>	54	12
	<b>Cumulative Effects</b>	Medium	Very low
	<b>Reversibility</b>		Reversible
<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium	
<u>Mitigation</u>			
<ul style="list-style-type: none"> <li>• Mitigation measures for soil erosion &amp; soil compaction will also be applicable to promote natural revegetation:</li> <li>• The invasive sampling sites will be informed by the findings of non-invasive prospecting and must be clearly demarcated, and no activities may take place outside of demarcated areas.</li> <li>• Demarcate areas for invasive sampling and ensure that all other adjacent areas are regarded as no-go areas.</li> <li>• Demarcate the sections of existing tracks that may be used to access sample sites including the area for turning circles of vehicles.</li> <li>• Movement of vehicles and machinery will be restricted to demarcated areas and roads with off-road driving not encouraged. . Vehicles speed must take into account the possibility of collisions with fauna. .</li> <li>• Provide all workers with environmental awareness training and ensure all workers comply with the requirements of the EMP.</li> <li>• Conduct a “search and rescue” operation to identify any species of conservation concern (SCC) prior to clearing sampling sites, no indigenous plants outside of the demarcated work areas may be damaged.</li> <li>• The noise and vibration caused by the earthmoving equipment will disturb mobile fauna that should move away when activities commence. Should any animals be encountered these should be relocated by a suitably trained nature conservation officer.</li> <li>• Remove alien invasive vegetation if required and ensure ongoing alien vegetation control .</li> <li>• Disturbed areas that are no longer required shall be scarified after use as part of the annual rehabilitation plan.</li> <li>• Excavations (sumps and drill holes) must be backfilled as soon as is practically possible after invasive sampling is completed.</li> <li>• Sample sites where clear scraping were required must be rehabilitated by scarifying trampled and compacted areas to a depth of ±300mm</li> <li>• Windrows created by scarifying needs to be left in place to create a rough surface that can act as seed trap and create a micro-habitat to promote natural re-vegetation.</li> <li>• Invasive sampling activities will be aligned in consultation with landowner.</li> </ul>			



<b>Operational Phase - Impacts on Aquatic biodiversity &amp; Water Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>The project footprint is located within an arid region with a relatively low rainfall. As a result, natural wetland features are very scarce and only include ephemeral drainage lines. The Koubank and Kosies River classified as a River FEPA 1 as well as the Kowiep River classified as River FEPA 2 is present or close to the prospecting area.. The eastern half of the prospecting area is identified as an National Freshwater Ecosystem Priority Area (NFEP A Code 1) regarded as high sensitivity. No Strategic Water Source Area (SWSA) is present and the nearest one is the Port Nolloth Cluster for underground water to the south west (about 59Km away).</p> <p><b>Potential impacts:</b>            Potential surface and Ground water use            Potential contamination of groundwater from unmanaged use of hydrocarbons on-site, and incorrect storage of hazardous substances.            Accidental spills not cleaned up immediately.</p> <p><b>Indirect impacts:</b>            Rainfall is very seldom and evaporation rate is very high.            Indirect impacts on surface water are very unlikely.</p> <p><b>Residual impacts:</b>  <u>Mitigation</u>            The same mitigating measures as for Site Access and Site Establishment will be applicable especially waste management.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	2	1
	<b>Spatial Scale</b>	1	1
	<b>Duration</b>	2	1
	<b>Consequence</b>	5	3
	<b>Probability</b>	2	2
	<b>Significance</b>	10	6
	<b>Cumulative Effects</b>	Insignificant	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		High
<b>Operational Phase - Impacts from Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p>Caused by machinery (drill rig), cleared areas, and movement of trucks on site during invasive prospecting methods.</p> <p><b>Potential impacts:</b>            Noise and dust will be created by the prospecting activities (drilling) and from vehicles that also emit Greenhouse Gases.</p> <p><b>Indirect impacts:</b>            The site is mountainous, with views obstructed by hills in most places, effectively screening the interspersed sampling areas.            Carbon emissions from vehicle exhausts have a negative impact on the ozone layer.            Users on the main road through the project sitewould be temporarily impacted by noise, dust and vehicle emissions.</p> <p><b>Residual impacts:</b>  <u>Mitigation</u>            Good housekeeping will ensure a neat and well-maintained area reducing visual impact.            Dust settling on adjacent vegetation can impact on vegetative growth, which is a short-term impact until the rainfall season.</p> <p><u>Mitigation</u>            •Temporarily halt material handling in windy conditions and or reduce drop height of material to a minimum.            • Minimise use of reverse alarms by proper route planning            • Incremental clearing of ground cover should take place to minimise exposed surfaces.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	2	1
	<b>Spatial Scale</b>	3	1
	<b>Duration</b>	1	1
	<b>Consequence</b>	6	3
	<b>Probability</b>	4	2
	<b>Significance</b>	24	6
	<b>Cumulative Effects</b>	Very low	Insignificant
	<b>Reversibility</b>		Reversible
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium

<b>Operational Phase - Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p><b>Potential impacts:</b> Conflict with landowner and other land users Creation Of Employment during Operational Phase with Local And Regional Economic Spin-Offs</p> <p><b>Indirect impacts:</b> Upskilling Local economic spin-offs through increased income earned, and through purchasing of local materials required for operational activities. Income generation for landowners in a time of severe drought where livestock farming is less sustainable.</p> <p><b>Residual impacts:</b> The upliftment of unemployed people, with positive impact on standard of living for their families. Local and regional economic spin-offs from investment.</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	1
	<b>Spatial Scale</b>	5	1
	<b>Duration</b>	6	1
	<b>Consequence</b>	16	3
	<b>Probability</b>	4	1
	<b>Significance</b>	64	3
	<b>Cumulative Effects</b>	Medium	Insignificant
	<b>Reversibility</b>	Irreversible	
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>	High	
<p><u>Mitigation</u></p> <ul style="list-style-type: none"> <li>• Co-ordinate invasive activities with existing mining activities or land uses to reduce the time of disturbances</li> <li>• Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner.</li> <li>• All operations will be carried out under the guidance of strong, experienced manager and ECO with proven skills in public consultation and conflict resolution.</li> <li>• All personnel will be made aware of the local conditions and sensitivities in the prospecting area and the requirements of the local residents.</li> <li>• There will be a strict requirement to treat local residents with respect and courtesy at all times.</li> <li>• Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)</li> </ul>			
<b>Operational Phase - Impacts on Paleontological, Archaeological and Cultural and Heritage Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<p><b>Potential Impacts:</b> The impact on Cultural and Heritage Resources as well as paleontological resources takes place during all earthmoving activities.</p> <p><b>Indirect impacts:</b> Loss of archaeological resources, graves and precolonial cultural landscape The material fossil evidence of “deep time” is embedded in the creation of the sacred landscape and contributes to the “sense of place” cultural aesthetic of the region. The loss of fossils and concomitant interpreted knowledge impoverishes the tangible testimony of the prehistoric landscape and ecological context of ancient humans.</p> <p><b>Residual impacts:</b> Negative residual impact arises from the unavoidable loss of fossils of unknown significance in spite of mitigation efforts. Positive residual impact arises from the successful rescue of fossil material for posterity, resulting in material for future research, employment opportunities for budding, young researchers and enhanced insights into the prehistory of the Northern Cape</p>	<b>Nature</b>	Negative	Negative
	<b>Severity</b>	5	1
	<b>Spatial Scale</b>	5	1
	<b>Duration</b>	6	1
	<b>Consequence</b>	16	3
	<b>Probability</b>	4	1
	<b>Significance</b>	64	3
	<b>Cumulative Effects</b>	Medium	Insignificant
	<b>Reversibility</b>	Reversible	
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>	High	
<p><u>Mitigation</u></p> <p>The same mitigating measures as for Site Access and Site Establishment will be applicable.</p>			

<b>Decommissioning and closure - Impacts on other land uses</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
No Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed area identified.	<b>Nature</b>	Neutral	Neutral
No intersection with Environmental Management Frameworks relevant to the application	<b>Severity</b>		
Development incentives, restrictions, exclusions or prohibitions and their implications are not applicable to mining operations as the state is the custodian of all minerals and is responsible for the screening process as part of the acceptance process of applications taking into account any section 53 applications by other land users.	<b>Spatial Scale</b>		
The impact on Civil Aviation and Defence is also not applicable to this application as no high structures will be constructed and no defence installations or test areas are present in close proximity to this project.	<b>Duration</b>		
<b>Potential Impacts:</b>	<b>Consequence</b>	NA	NA
None	<b>Probability</b>		
<b>Indirect impacts:</b>	<b>Significance</b>	NA	NA
After closure certificate has been issued the area will once again be available for other land uses	<b>Cumulative Effects</b>		
<b>Residual impacts:</b>	<b>Reversibility</b>		
<b>Mitigation</b>	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		NA
• None			
<b>Decommissioning and closure - Potential Impacts on Soil (contamination, erosion, compaction) &amp; Land capability</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<b>Potential Impacts:</b>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<b>Indirect impacts:</b>	<b>Duration</b>		
None.	<b>Consequence</b>	0	0
<b>Residual impacts:</b>	<b>Probability</b>		
Increase in natural habitat following rehabilitation processes.	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>• Compacted areas that are not required for aftercare access shall be scarified. Dual use access roads must be handed back to the landowner in a good state of repair.</li> <li>• Implementing screening as part of the cleaning activities before materials are moved from the mine. The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. Any compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.</li> <li>• Redundant structures will be removed for use elsewhere or demolished and discarded.</li> <li>• All steel structures and reinforcing will be discarded or sold as scrap.</li> <li>• All equipment and other items used during the prospecting operation needs to be removed from the site.</li> <li>• Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.</li> <li>• Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site.</li> </ul>			

<b>Decommissioning and closure - Impacts on topography</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<b>Potential Impacts:</b>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<b>Indirect impacts:</b>	<b>Duration</b>		
Historic disturbances rehabilitated	<b>Consequence</b>	0	0
<b>Residual impacts:</b>	<b>Probability</b>		
Increase in natural habitat following rehabilitation processes.	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>All mitigation will be addressed as part of the annual rehabilitation plan as part of the operational phase.</li> <li>The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Final Rehabilitation, Decommissioning and Closure Plan must be reviewed periodically for continued relevance in the light of changed prospecting path or long-term plans.</li> </ul>			
<b>Decommissioning and closure - Impacts on Biodiversity, Flora &amp; Fauna</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
Implementation of Rehabilitation, Decommissioning and Mine Closure Plan	<b>Nature</b>	Positive	Positive
<b>Potential Impacts:</b>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<b>Indirect impacts:</b>	<b>Duration</b>		
Removal of alien invasive vegetation is a positive impact, and will benefit the ecological functioning.	<b>Consequence</b>	0	0
<b>Residual impacts:</b>	<b>Probability</b>		
Increase in natural habitat following rehabilitation processes.	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>All outstanding rehabilitation not completed as part of the Annual Rehabilitation plan needs to be completed as part of the final Rehabilitation, Decommissioning and Mine Closure Plan</li> </ul>			

<b>Decommissioning and closure - Impacts on Aquatic biodiversity &amp; Water Resources</b>		<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities		<b>Nature</b>	Neutral	Neutral
<b>Potential Impacts:</b>		<b>Severity</b>		
None		<b>Spatial Scale</b>		
<b>Indirect impacts:</b>		<b>Duration</b>		
None		<b>Consequence</b>	0	0
<b>Residual impacts:</b>		<b>Probability</b>		
None		<b>Significance</b>	0	0
		<b>Cumulative Effects</b>		
		<b>Reversibility</b>		
		<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<u>Mitigation</u>				
None				
<b>Decommissioning and closure - Impacts from Emissions (Air Quality, Visual intrusion &amp; Noise Generation)</b>		<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities or less than for operational phase		<b>Nature</b>	Neutral	Neutral
<b>Potential Impacts:</b>		<b>Severity</b>		
None		<b>Spatial Scale</b>		
<b>Indirect impacts:</b>		<b>Duration</b>		
None		<b>Consequence</b>	0	0
<b>Residual impacts:</b>		<b>Probability</b>		
None		<b>Significance</b>	0	0
		<b>Cumulative Effects</b>		
		<b>Reversibility</b>		
		<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<u>Mitigation</u>				
None				

<b>Decommissioning and closure - Impacts on Socio-economic features</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
<b>Potential Impacts:</b>	<b>Nature</b>	Negative	Negative
Staff losing their jobs	<b>Severity</b>	4	4
Contractual agreements with service providers surpassing mine closure date	<b>Spatial Scale</b>	3	3
Poorly defined transition from mining to farming activities within different legislation	<b>Duration</b>	3	3
Not undertaking environmental management according to approved EMPr and plans and no auditing of the environmental management system.	<b>Consequence</b>	10	10
Insufficient funds for complete rehabilitation	<b>Probability</b>	3	3
<b>Indirect impacts:</b>	<b>Significance</b>	30	30
Job losses of secondary industries, businesses and contractors	<b>Cumulative Effects</b>	Low	Low
Mine closure stalled due to non-compliance with South African legislation (national, provincial and local)	<b>Reversibility</b>		Irreversible
<b>Residual impacts:</b>	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		Medium
Closure standards not accepted and/or are changing Mine closure being jeopardised by other land uses			
<b>Mitigation</b>			
<ul style="list-style-type: none"> <li>Contract durations with service providers will be limited to address the risk of contractual agreements with service providers surpassing the mine closure date.</li> <li>Maintain positive and transparent relationships with stakeholders and maintaining communication channels.</li> <li>Undertaking environmental management in accordance with the approved EMPr and Closure Plan.</li> </ul>			
<b>Decommissioning and closure - Impacts on Paleontological, Archaeological and Cultural and Heritage Resources</b>	<b>Significance</b>	<b>Before</b>	<b>After</b>
None during decommissioning activities or less than for operational phase	<b>Nature</b>	Neutral	Neutral
<b>Potential Impacts:</b>	<b>Severity</b>		
None	<b>Spatial Scale</b>		
<b>Indirect impacts:</b>	<b>Duration</b>		
None	<b>Consequence</b>	0	0
<b>Residual impacts:</b>	<b>Probability</b>		
None	<b>Significance</b>	0	0
	<b>Cumulative Effects</b>		
	<b>Reversibility</b>		
	<b>Degree to which the impact can be avoided, managed or mitigated:</b>		
<b>Mitigation</b>			
None			

## 11. Environmental impact statement

### 11.1 Summary of the key findings of the environmental impact assessment

The majority of the prospecting activities are non-invasive and hence will have no environmental or social impact. The invasive activities will only entail drilling which will have a minimal environmental and social impact. The total anticipated area for disturbance is anticipated at less than 1 Ha which need to be viewed in the context of the entire prospecting area under application which covers ±5000 hectares. The assessed impact ratings are as follows:

#### Site Access and Site Establishment

- Potential Impacts on other land uses - No impact (Neutral)
- Potential Impacts on Soil (contamination, erosion, compaction) & Land capability - Low significance, reduced to Very Low with mitigation
- Potential Impacts on topography - No impact (Neutral)
- Potential Impacts on Biodiversity, Flora & Fauna - Medium significance, reduced to Very Low with mitigation
- Potential Impacts on Aquatic biodiversity & Water Resources - Insignificant, stay at insignificant with mitigation
- Potential Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation) - Low significance, reduced to Insignificant with mitigation
- Socio - economic impact - Medium significance, reduced to Insignificant with mitigation
- Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources – Medium significance, reduced to Insignificant with mitigation

#### Operational Phase

- Potential Impacts on other land uses - No impact (Neutral)
- Potential Impacts on Soil (contamination, erosion, compaction) & Land capability - Low significance, reduced to Very Low with mitigation
- Potential Impacts on topography - Very Low, reduced to Insignificant with mitigation
- Potential Impacts on Biodiversity, Flora & Fauna - Medium significance, reduced to Very Low with mitigation
- Potential Impacts on Aquatic biodiversity & Water Resources - Insignificant, stay at insignificant with mitigation
- Potential Impacts from Emissions (Air Quality, Visual intrusion & Noise Generation) - Very Low significance, reduced to Insignificant with mitigation
- Socio - economic impact - Medium significance, reduced to Insignificant with mitigation
- Potential Impacts on Paleontological, Archaeological and Cultural Heritage Resources – Medium significance, reduced to Insignificant with mitigation

All of the identified impacts will occur for a limited period and the extent of the impacts will be localised. All of the identified impacts can be suitably mitigated with the residual impact ratings being of Insignificant to Very Low.

The main impacts associated with the invasive sampling activities (site disturbance) can be suitably mitigated. After invasive sampling activities have been completed and sample sites rehabilitated, the impacts will cease to exist

#### 11.2 Final Site Map

Please refer to **Figure 4 to 12** for the Environmental Sensitivities Map including the target area of interest for proposed prospecting activities

#### 11.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

##### 11.3.1 Positive Impacts

This application is for prospecting activities. Should favourable results be obtained from exploration, and it is believed that mining will be economically viable; such mining would contribute to one of the main employment sectors of the Local Municipality. The prospecting activities themselves would not directly lead to job opportunities.

##### 11.3.2 Negative Impacts

- Noise Generation from construction / set-up and operational activities;
- Visual intrusion caused by the invasive sampling activities in the largely rural setting;
- Dust fall & nuisance from construction and site establishment;
- Wildlife and vegetation disturbance from drill pad preparation during the construction / set-up and operational phase as contractors rehabilitate one site and move to the next site and prepare it;
- Surface water and groundwater contamination from hydrocarbons during the construction/set-up and operational activities which include drill rig operation and use of vehicles on site; and
- Socio-Economic impact due to conflicting land uses during the construction / set-up and operational phase.

#### 11.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMP

- Provide sufficient information to affected parties and strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts.
- Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce impacts (both social and environmental) as far as practically possible.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management and closure plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social & environmental impacts can be managed and mitigated effectively.
- Through the implementation of the mitigation and management measures it is expected that: Heritage/cultural resources can be managed by avoidance of known resources and through consultation with landowners/stakeholders. Contractor personnel will also be briefed of these sensitivities and consequences of any damage/removal of such features;



- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary;
- Visual intrusion can be managed through consultation with landowners /stakeholders and by suitable siting of drill pads and use of screens (natural vegetation or shade cloth etc);
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads and the use of water during drilling;
- Wildlife disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and disturbed areas will be prepared to facilitate natural re-vegetation with locally indigenous species as soon as possible;
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refuelling with care to minimise the chance of spillages and by having a spill kit available on each site where prospecting activities are in progress;
- Socio - economic impact can be managed by employing strong, experienced personnel with proven skills in public consultation and conflict resolution during stakeholder consultation phases. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and that they treat local residents with respect and courtesy at all times.

#### 11.5 Description of any assumptions, uncertainties and gaps in knowledge.

This report has been completed to the best of the EAPs ability, based on his experience and on information currently available to the EAP as well as provided by the applicant.

Comment received on the draft BAR were reviewed and incorporated into this finalised BAR. As such, the public perception of the proposed activity is known. In addition, comments and inputs received from the authorities and public provided additional information which has been considered.

Mitigation measures are proposed which are considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.

The location of drill sites is not yet known and will be identified through the phased approach of the prospecting programme. This assessment is therefore based on a desktop approach at a broad scale and assuming that drilling could occur anywhere around the anomalies identified for this programme.

In addition, landowners will be re-engaged at this stage to communicate the company's intent to progress to drilling and to discuss the proposed drilling activities and identified locations with the interested and affected parties at that point in time.

#### 11.6 Reasoned opinion as to whether the proposed activity should or should not be authorized

##### 11.6.1 Reasons why the activity should be authorized or not.

It is the opinion of the EAP that the proposed prospecting activities should be authorised. In reaching this conclusion the EAP has considered that;

- Based on historical prospecting results, there is a good possibility of encountering mineral deposits in the area

- The exploration program will be developed in a stepwise manner commencing with non-invasive activities to bring refinement to understanding of the geological anomaly.
- Should the exploration program advance to include the need for exploration drilling, the environmental impacts associated with the limited drilling activities are deemed to be minimal provided that the proposed mitigation is implemented;
- The spatial extent of the physical impact is less than 1Ha over a prospecting right application area of ±5000 hectares;
- With appropriate care and consideration, the impacts resulting from drilling can be suitably avoided, minimised or mitigated;
- With implementing the appropriate rehabilitation activities, the impacts associated with the drilling activities can be reversed.
- Without implementation of prospecting activities, the knowledge concerning the potential mineral resource within the prospecting right area will not be confirmed.

#### 11.6.2 Conditions that must be included in the authorisation

It is the opinion of the EAP that the following conditions should form part of the authorisation:

- Maintain a buffer for invasive activities of 50m from a water course;
- Maintain a minimum 100m (preferably 500m) buffer for invasive activities from any infrastructure or dwelling;
- Landowners and land occupiers as well as SAHRA should be engaged (re-consulted) at least 21 days prior to any site activities being undertaken once drill sites are known.

#### 11.6.3 Period for which the Environmental Authorisation is required.

The authorisation is required for the duration of the prospecting right which is an initial 5 years plus a potential to extend the right by an additional 3 years. Normally there is also a time delay in the granting of applications for renewal therefore a total period of 10 years may be required.

#### 11.6.4 Undertaking

An undertaking is provided at the end of this report.

## 12. Financial Provision

### 12.1 Legal Framework

Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.

According to the Financial Provisioning regulations, 2015 as amended (Reg. 7) the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11.

In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure

plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

## 12.2 Calculation

Financial provision in terms of Regulation 6 of the Financial Provisioning Regulations, 2015 as amended, is covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan attached as Annexure 1.

## 12.3 Explain how the aforesaid amount was derived.

According to regulation 6 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— (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report (Refer Annexure 1).

## 12.4 Confirm that this amount can be provided for from operating expenditure.

The amount needed for the implementation of the final rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the Nema Financial Provisioning Regulations 2015 as amended.

Provision for implementation of annual rehabilitation plan to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) will be provided as part of the operational budget and proof of access to the necessary fund were provided as part of the PWP together with proof of access to the necessary financial resources.

## **13. Specific Information required by the competent Authority**

### 13.1 Compliance with sections 24(4)(a) and (b) of NEMA

According to the National Environmental Management Act (Act 107 of 1998). the EIA report must include the impact on:

#### The socio-economic conditions of any directly affected person.

A full consultation process has been implemented during the environmental authorisation process. The purpose of the consultation was to provide affected persons the opportunity to raise any potential concerns. Concerns raised has been captured and addressed within the public participation section of this report to inform the decision-making process.

As the final positioning of the drill sites cannot be confirmed without completion of phase 1 of the prospecting work programme, a recommendation has been made to ensure that the directly affected landowners are re-consulted a minimum of 21 days prior to drilling. The purpose of the re-consultation is to allow for socio-economic impacts on directly affected persons to be raised and where possible addressed.

Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

A desktop HIA and PIA were conducted by a suitably qualified specialist in order to identify any sensitive areas and resources of significance to be avoided when planning the drill traverses. According to the desktop HIA and PIA, the only aspect that may cause physical damage to heritage resources is drilling.

The desktop assessment recommended that SAHRA allow the prospecting project to proceed as planned, but subject to the following recommendations that were also included as part of the mitigation measures:

- Once the drilling locations are known, a map should be provided to an archaeologist for desktop analysis. If any potentially sensitive areas cannot be avoided then a brief site visit should be carried out to confirm sensitivity and, in consultation with the prospecting geologists, propose alternative nearby drill sites. An opinion should then be expressed in a letter that should be submitted to SAHRA confirming whether or not drilling may proceed;
- Regardless of the above archaeological opinion, all drill sites should be carefully inspected by project staff to ensure that no heritage features are present;
- A fossil Chance Finds Procedure must be included in the project EMP and implemented in the event of any chance finds of fossils, and
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

13.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act.

Reasonable and feasible alternatives were not investigated as the prospecting location has been informed by historical prospecting and production records for the general area.

The proposed prospecting right area holds potential because of the presence of known mineral occurrences in the area as well as the copper mining activities. The prospecting location has been informed by historical prospecting and production records for the area, as well as the most likely position of potential mineral deposits. As such the applicant believes there is a possibility of encountering further mineral ore bodies within the prospecting area. The area included in this prospecting application is therefore regarded as the preferred site and alternative sites are not considered. The preferred site is informed by the most likely location of mineral deposits.

The proposed prospecting activities requested as part of this authorisation is the only current viable manner in which a mineral resource can be evaluated to determine its economic viability.

## **14. Environmental Management Program**

### 14.1 Details of the EAP,

This has already been covered. Refer Section 1 of this document

### 14.2 Description of the Aspects of the Activity

This has already been covered. Refer Section 3 of this document

### 14.3 Composite Map

This has already been covered. Refer Figure 1 & 2.

### 14.4 Description of Impact management objectives including management statements

The main management objectives for the invasive drilling activities are:

- Avoid potential impacts by positioning the drill sites in a manner which avoids /minimise potential impacts. This can be achieved by implementing appropriate buffer zones;
- Reduce impacts through implementing realistic operational management measures such as imposing restrictions on the time of day when drilling can take place and adherence to the site EMPr; and
- Ensure that chemical and hydrocarbon spillages are avoided, where they cannot all together be avoided minimised and mitigated.
- Establish appropriate waste management system
- Restore the physical impact of drilling through implementation of concurrent rehabilitation as and when drilling at one site is completed.

### 14.5 Determination of closure objectives.

- Objective 1 - To create a safe and healthy post-prospecting environment with no residual environmental impact.
  - Safe mining area
  - Limited residual environmental impact
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
- Objective 3 – To provide optimal post-prospecting social opportunities
  - Optimised benefits for the social environment
  - Minimal negative aesthetic impact

### 14.6 Volumes and rate of water use required for the operation.

The water that will be used for the prospecting activities if required will be sourced on agreement from an existing authorized water user which could be either the land owner or local municipality. No water will be abstracted without first obtaining the necessary permits or licenses, in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).

### 14.7 Has a water use license has been applied for?

No – Based on the limited water needs of the proposed prospecting activities, water from a legal source will be brought to the drill sites by mobile water tanker as and when required.

The department responsible for water resources shall be consulted when a WUL is required.

14.8 Impacts to be mitigated in their respective phases

**Measures to rehabilitate the environment affected by the undertaking of any listed activity**

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES Refer Table 16 for complete EIA with mitigation measures	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Non-invasive activities	Pre-Construction	±14976Ha	<ul style="list-style-type: none"> <li>• All operations will be carried out under the guidance of a strong, experienced manager with proven skills in public consultation and conflict resolution, including environmental coordinator where applicable.</li> <li>• All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area.</li> <li>• There will be a strict requirement to treat local residents with respect and courtesy at all times.</li> </ul>	Environmental Awareness Plan	Before and during prospecting activities
Site Access Access Roads (temporary, jeep track roads less than 4m wide)	Construction	±2 600m <sup>2</sup>	<ul style="list-style-type: none"> <li>• Existing farm roads and tracks must be used as far as possible;</li> <li>• Where new access tracks are required to get the drill rig to the drilling site, such tracks must be scarified during decommissioning;</li> <li>• Vehicle's speed must take into account the possibility of collisions with fauna.</li> <li>• All compacted roads and drill traverses will be scarified and any topsoil stockpiled to be spread over the disturbed area.</li> </ul>	Approved PWP Environmental Authorisation; NEMA Section 2 Principles.	Upon cessation of the individual activity

<p>Site establishment activities:</p> <ul style="list-style-type: none"> <li>- Vegetation clearance</li> <li>- Topsoil stripping &amp; stockpiling</li> <li>- Drill pad compaction</li> <li>- Placement of temporary portable toilets and resting place.</li> </ul>	<p>Construction</p>	<p>160m<sup>2</sup> per drill site Max ±3 200 m<sup>2</sup> for 20 holes</p>	<ul style="list-style-type: none"> <li>• Avoid cultural/heritage impacts by maintaining 100m buffer from any identified heritage feature and demarcation.</li> <li>• Any buried artefacts that may be uncovered during site activities will require such activities to stop to assess their significance and determine appropriate mitigation measures</li> <li>• The minimal area required for site establishment must be provided.</li> <li>• The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and will not be dozed or scraped with vegetation roots left intact for later re-growth.</li> <li>• Topsoil must be kept aside for rehabilitation;</li> <li>• The design of the drill fluid sump must be such that it prevents fauna from gaining access to site and becoming trapped.</li> <li>• Storm water must be diverted around the drill site stockpile to prevent erosion, if necessary.</li> </ul>	<p>Heritage Act Environmental Authorisation; NEMA Section 2 Principles</p>	<p>Before and during drilling activities Upon cessation of the individual activity</p>
<p>Exploration drilling:</p> <ul style="list-style-type: none"> <li>- Drilling</li> <li>- Core or chip sample collection &amp; storage</li> </ul>	<p>Operational phase</p>	<p>Estimated 20 drill holes 165mm diameter and average depth of 200-400m Equipment laydown area &amp; Sanitation requirements &lt; 1Ha</p>	<ul style="list-style-type: none"> <li>• The drilling rig and other visually prominent items on the site will be located in consultation with the landowner;</li> <li>• Make use of existing vegetation as far as possible to screen the prospecting operations from view; and</li> <li>• If necessary, the operations can be screened from view by erecting a shade cloth barrier.</li> <li>• Low vehicle speeds will be enforced on unpaved surfaces.</li> <li>• Maintain a buffer of 100m between drill sites and dwellings.</li> </ul>	<p>SANS 10103 guideline GN R. 827 (NEM:AQA) GN R. 704 (NWA) NEMA</p>	<p>Upon cessation of the individual activity</p>

<p>Exploration drilling:  - Drill maintenance &amp; refuelling  - Vehicle movements  - Waste generation &amp; management</p>	<p>Operational phase</p>	<p>Sludge from drilling activities &lt;5m<sup>3</sup>  Hydrocarbon storage &lt;30m<sup>3</sup></p>	<ul style="list-style-type: none"> <li>• Oils and lubricants must be stored within sealed containment structures.</li> <li>• Fuel storage must be contained in mobile bowzers.</li> <li>• All chemicals and hydrocarbons shall be stored within 110% bund wall capacity.</li> <li>• Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevents spills/ leaks onto the soil.</li> <li>• Refuelling will be done with care to minimise the chance of spillages.</li> <li>• A spill kit will be available on each site were prospecting activities are in progress; and any spillages will be cleaned up immediately.</li> <li>• Underneath the drill rig or any equipment with potential oil spillages shall be lined with plastic liner to prevent soil and water contamination.</li> <li>• When not in use, a drip tray must be placed beneath mechanical equipment and vehicles.</li> <li>• Avoid hydrocarbon spills by employing proper vehicle maintenance.</li> <li>• A lined sump (with sufficient capacity) will be constructed to receive drill fluids and allow for evaporation should clays be intersected in the borehole.</li> <li>• Storm water must be diverted around the drill site to prevent ingress of storm water.</li> <li>• Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling.</li> <li>• Drill muds to be contained in lined sump and disposed of off-site at licensed facility.</li> </ul>	<p>SANS 10103 guideline  GN R. 827 (NEM:AQA)  GN R. 704 (NWA)  NEMA</p>	<p>Immediately in case of spills  Upon cessation of the individual activity</p>
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Final Rehabilitation and removal of temporary infrastructure	Decommissioning	<1Ha	<ul style="list-style-type: none"> <li>• Due to the remote location of the site, dust emissions are unlikely to be a source of nuisance; however, the site must be wetted if required.</li> <li>• Rehabilitation and preparation for re-vegetation must be done as soon as work is completed and before moving to the next drill site.</li> <li>• The disturbed site should be rehabilitated by scarifying hardened areas and filling the sludge catch pits (if any were required).</li> <li>• Any stored topsoil should be spread over the scarified surface to promote re-vegetation and prevent soil erosion.</li> </ul>	Environmental Authorisation; NEMA Section 2 Principles	Ongoing during construction and operation phase.
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## 14.9 Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ());

<b>ACTIVITY</b>	<b>POTENTIAL IMPACT</b>	<b>ASPECTS AFFECTED</b>	<b>PHASE</b> In which impact is anticipated	<b>MITIGATION TYPE</b>	<b>STANDARD TO BE ACHIEVED</b>
General prospecting	Conflict with other land users	Social	Life of operation	Control through monitoring & management	Impact minimised and mitigated.
Site Access	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact minimised and mitigated.
	Soil compaction from repeated use of access road to drill sites	Soil resources		Remedy through rehabilitation	
Site Establishment Drill pads and laydown area Vegetation clearance	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Visual intrusion	Visual			Impact mitigated
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	Destruction or loss of Cultural and Heritage Resources	Cultural and Heritage	Construction	Avoidance by relocation of activity	Impact avoided
	Soil disturbance and compaction and topsoil stockpiling	Soil		Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Dust fall & nuisance from activities	Air quality			Impact mitigated
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	Visual intrusion	Visual	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives

Drilling Core and Chip sample collection & storage	Vehicle and drill noise disturbing on-site flora and fauna	Noise	Operational	Control through management and monitoring	Impact mitigated
	Dust emissions from drilling and general site activities (vehicle entrained dust)	Air quality		Control through management and monitoring	Impact mitigated
Drill maintenance & refuelling Waste generation & management facilities	Surface and ground water contamination From hydrocarbons	Soil and water		Avoidance through management and monitoring	Impact avoided
Removal of temporary infrastructure and drill site rehabilitation	Dust emissions (vehicle entrained dust)	Air quality	Decommissioning	Control through management and monitoring	Impact mitigated
	Erosion due to slow recovery of vegetation	Soil and vegetation		Remedy through restriction and rehabilitation	Impact mitigated

## 14.10 Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

<b>ACTIVITY</b> whether listed or not	<b>POTENTIAL IMPACT</b>	<b>MITIGATION TYPE</b>	<b>TIME PERIOD FOR IMPLEMENTATION</b>	<b>COMPLIANCE WITH STANDARDS</b>
General prospecting	<ul style="list-style-type: none"> <li>• Conflict with other land users</li> </ul>	Control through monitoring & management	Concurrently with prospecting activities	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Site Access	<ul style="list-style-type: none"> <li>• Disturbance of onsite flora and fauna</li> <li>• Soil compaction from repeated use of access road to drill sites</li> </ul>	Remedy through restriction and rehabilitation	Immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Vegetation clearance	<ul style="list-style-type: none"> <li>• Disturbance of onsite flora and fauna</li> <li>• Noise Generation</li> <li>• Visual intrusion</li> </ul>	Remedy through restriction and rehabilitation Control through monitoring & management	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	<ul style="list-style-type: none"> <li>• Destruction or loss of Cultural and Heritage Resources</li> <li>• Soil disturbance and compaction and topsoil stockpiling</li> <li>• Noise Generation</li> <li>• Dust fall &amp; nuisance from activities</li> </ul>	Avoidance by relocation of activity Remedy through restriction and rehabilitation Control through monitoring & management		
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	<ul style="list-style-type: none"> <li>• Visual intrusion</li> </ul>	Remedy through restriction and rehabilitation	Immediately on cessation of drilling.	

Drilling Core and Chip sample collection & storage	<ul style="list-style-type: none"> <li>• Vehicle and drill noise disturbing on-site flora and fauna</li> <li>• Dust emissions from drilling and general site activities (vehicle)</li> </ul>	Control through management and monitoring	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Drill maintenance & refuelling Waste generation & management facilities	<ul style="list-style-type: none"> <li>• Soil, surface and ground water contamination From hydrocarbons</li> </ul>	Avoidance through management and monitoring		
Removal of temporary infrastructure and drill site rehabilitation	<ul style="list-style-type: none"> <li>• Dust emissions (vehicle entrained dust)</li> <li>• Erosion due to slow recovery of vegetation</li> </ul>	Control through management and monitoring Remedy through restriction and rehabilitation		

## 15. Financial Provision

15.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

- Objective 1 - To create a safe and healthy post-mining environment
  - Safe mining area
    - Maintain affected environment in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
    - No potentially dangerous areas; secured if required
  - Limited residual environmental impact
    - No surface and/or groundwater contamination
    - Waste management practices not creating or leaving legacies
    - Develop a landscape that reduces the requirement for long term monitoring and management
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
    - Improve Land use with an increased production with regard to grazing.
    - Minimise disturbance of ecology due to loss of habitat and noise/visual/dust
    - Minimise risk of erosion from either increased base flow or prospecting operations:
      - Management of air emissions to minimise nuisance effects; implementation of dust suppression activities.
      - Increase of land with agricultural potential: profiling and sloping of remaining drill sumps and removal of all drill spoils and ripping of all compacted areas to facilitate recovery of natural vegetation through colonization by dispersing species (patch dynamics)
      - Prevent long term changes in land use: revert back to mainly stock farming (grazing).
      - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
    - Maintain positive and transparent relationships with stakeholders: maintaining communication channels to all stakeholders and forums.
    - Provide stakeholders with relevant information: making all information available to stakeholders and providing information to authorities as per legislative requirements.
    - Undertaking environmental management in accordance with the implementation, maintenance and auditing of an environmental management system.
  - Minimal negative aesthetic impact
    - Maintain affected environment in an improved state containing no foreign debris or other materials.

The legal framework within which all the above lies entails:

- Defining and meeting closure standards.
- Complying with legislation.
- Sufficient financial provision for mine closure activities.
- Monitoring and plan for latent environmental impact.

15.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties. The closure objectives were reported in the final BAR as well as the Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment and was made available to all registered interested and affected parties.

15.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

Refer Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment Annexure 1.

15.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The closure objectives are to return the land disturbed by drilling activities back to its original condition taking into account the transformation due to historic large-scale mining in the area. The rehabilitation plan provides the detail on how this will be achieved. Through experience, it can be confirmed that effective rehabilitation of drill sites is possible and achievable with the rehabilitation plan set out in Annexure 1.

15.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline As per Paragraph 11 of this report and Annexure 1.

15.6 Confirm that the financial provision will be provided as determined. As per Paragraph 11 of this report and Annexure 1.

15.7 Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including

- i) Monitoring of Impact Management Actions
- ii) Monitoring and reporting frequency
- iii) Responsible persons
- iv) Time period for implementing impact management actions
- v) Mechanism for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All Prospecting Activities	N/A	Ensure that the prospecting programme is being implemented in line with the approved prospecting works programme	Site Manager and Geologist	<b>Annual</b> Submit a prospecting progress report to DMR
	All commitments contained in the BA Report and accompanying EMPr	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Site Manager and independent EAP	<b>Annual</b> Undertake and submit an environmental performance audit to DMR
Site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads, the drill site and soil stockpiles must be monitored for erosion on a regular basis and specifically after rain events.	Site Manager Contractor (or sub-contractors)	<b>Monthly, and after rain events (only during invasive activities)</b> Site Manager to consolidate monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the ECO.
Invasive Sampling Activities	Visual inspection of biodiversity impacts	Visual inspection of drill site activities and other possible secondary impacts <ul style="list-style-type: none"> <li>• Ensure that where applicable the fire brake is maintained.</li> <li>• Rehabilitation of drill pads</li> <li>• Records of water intersections on borehole logs</li> <li>• Monitor groundwater quality and level in adjacent boreholes within 500m from a drill site that are able to be measured (if any).</li> <li>• Control and minimise the development of new access tracks</li> <li>• Appropriate storage and handling of topsoil</li> </ul>		



Invasive Sampling Activities	Visual inspection of pollution incidents, the integrity of secondary containment structures and waste management Housekeeping & maintenance	<ul style="list-style-type: none"> <li>• All secondary containment structure will be inspected on a daily basis to confirm the integrity thereof and to identify potential leaks timeously.</li> <li>• All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.</li> <li>• Standard waste management practices must be implemented to prevent contamination and littering.</li> </ul>	Site Manager Contractor (or sub-contractors)	Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA
Post Prospecting Post Closure	Groundwater Revegetation Stability Soil erosion Alien invasive species	<p>Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.</p> <ul style="list-style-type: none"> <li>• Identify any areas of subsidence around drill holes and under take additional backfilling if required.</li> </ul>	Site Manager	<p><b>Final Closure</b> A final audit report for site closure must be submitted to the DMR for approval</p>

15.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

An external environmental performance audit shall be conducted annually by an independent environmental assessment practitioner that include an annual rehabilitation plan for implementation during the next reporting period. A review of the Final decommissioning, rehabilitation and mine closure Plan will also be done on an annual basis together with an update of the quantum calculations for financial provision for rehabilitation.

## **16. Environmental Awareness Plan**

16.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Training is part of its Induction process and environmental Management System (EMS). The induction includes:

- Awareness training for contractors and employees;
- Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts;
- EMS training;
- Comprehensive training – on emergency response, spill management, etc;
- Specialised skills; and
- Training verification and record keeping

Before commencement of the prospecting activities all employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.

The training course should include key information abstracted from the EMP pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.

The full EMP document is also made available to attendees.

16.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Environmental risks and how to manage them are dealt with in the induction course referred to in section (m) (i) above. If an incident of environmental pollution or damage does occur it is analysed and appropriate prevention and/or mitigation measures are developed. These measures are added to the EMP and conveyed to the relevant personnel.

All emergency incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

### **Hydrocarbon Spills**

Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m<sup>2</sup>), resulting from situations such as; a leaking diesel bowser, an oil drum that is knocked over, large spillages from equipment, etc.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill,
- The removal of all contaminated material, and
- The disposal (at a licenced hazardous disposal facility) or bioremediation of this material.

### **Fire**

There is the potential for fire to occur in the following locations of the drill site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

**Veld fires:** The first action of any person who observes the fire should be to put out any small manageable fire or report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

**Vehicles and Equipment:** Fire extinguishers will be available at the site where drilling activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

### 16.3 Specific information required by the Competent Authority

Not applicable at this stage

### **17. Undertaking**

The EAP herewith confirms -

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- 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:



**N.J. van Zyl**  
**Reg. EAP (EAPASA 2019/2034)**  
**April 2023**

**-END-**

**Annexure 1: Final Rehabilitation, decommissioning and mine closure plan  
Including Environmental Risk Assessment and quantum  
calculations**

**Annexure 2: PPP summary part of Final BAR**

**Annexure 3a: Desktop HIA**

**Annexure 3b: Desktop PIA**