



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: NC30/5/1/3/2/10815MP

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 un- interpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the basic assessment process

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

- (a) determine the policy and legislative context within which the 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 - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes 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
EStA	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 ²	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 ³	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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Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

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1. Contact Person & Contact Details EAP

1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl

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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 EMP'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

Farm Name:	Portion 14 Farm Mesklip 259
Application area (Ha)	5 Ha
Magisterial district:	Namakwaland
Distance from nearest town	45 Km South of Springbok
21-digit Surveyor General Code	C05300000000025900014

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

Refer to the locality plan attached at **Diagram 1**. **Diagram 2** shows the properties and co-ordinates.

Diagram 1: Locality map

contemplated in regulation 2(2) read with regulation 2(3) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 30 of 2002)

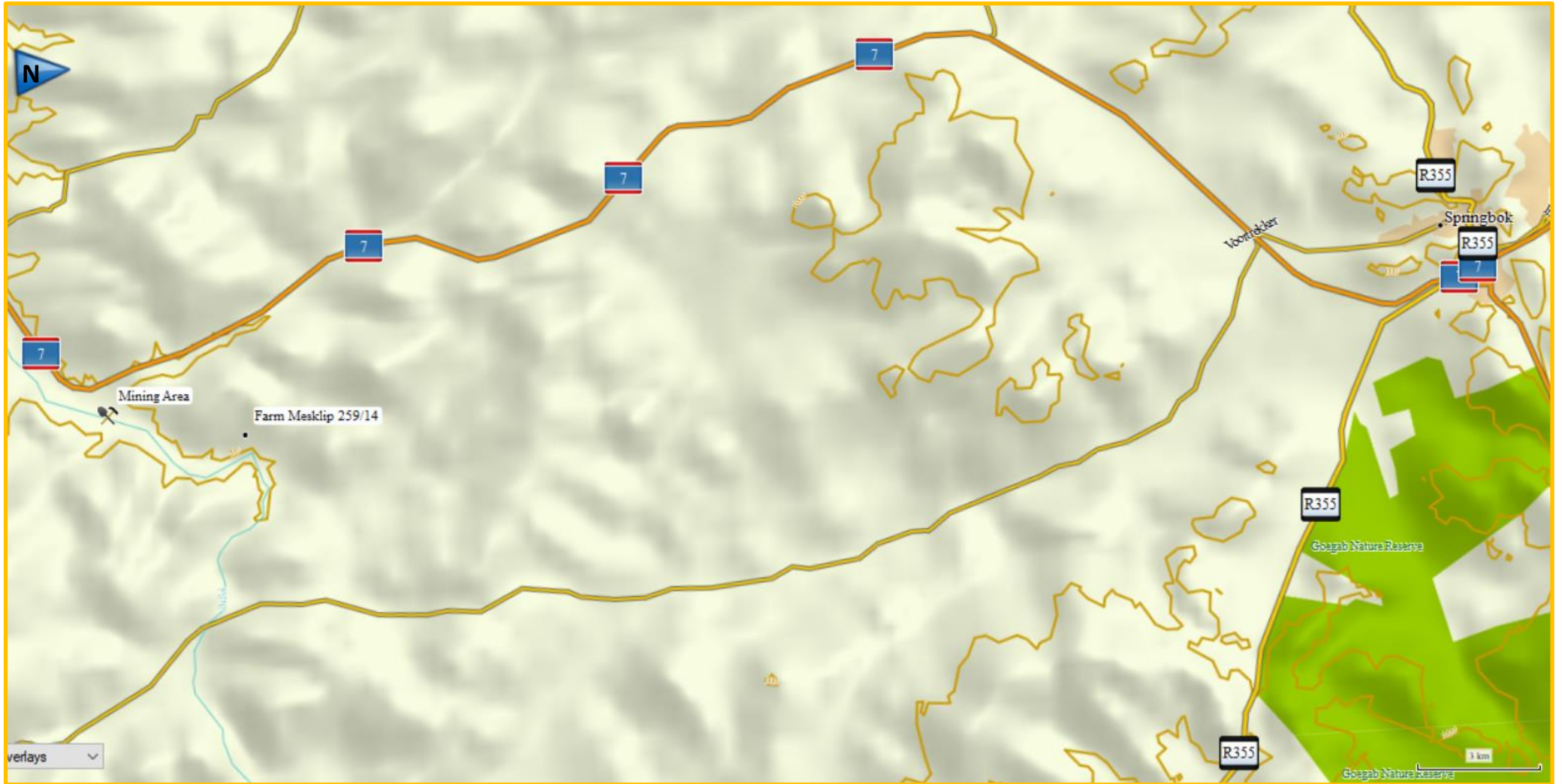


Diagram 2: Layout plan

contemplated in regulation 2(2) read with regulation 2(3) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 30 of 200

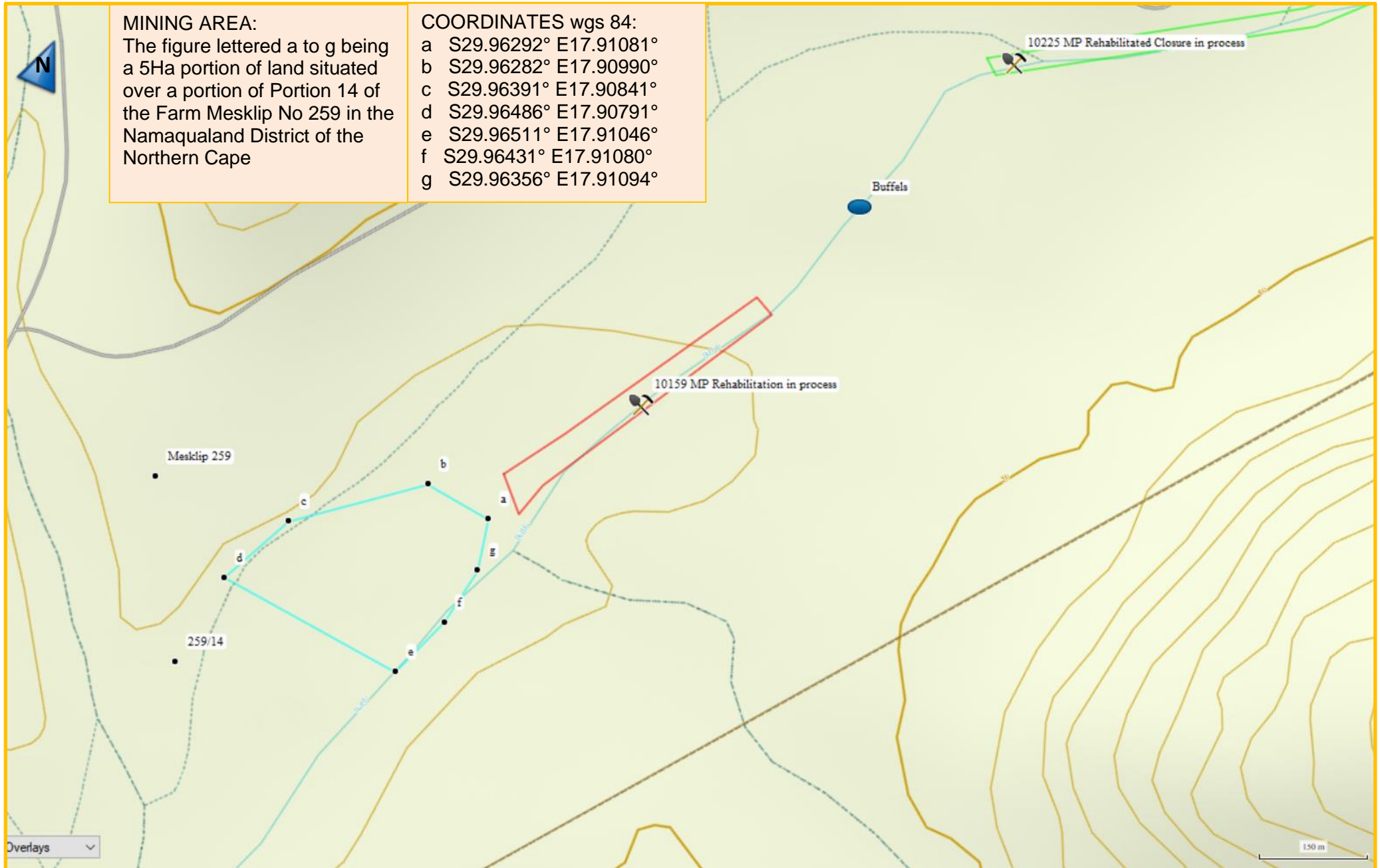


Diagram 3: Site Plan (Showing area under application as well as existing Sand Mining operations)



3. Description of the scope of the proposed overall activity

3.1 The Scope of the Proposed Activities

The proposed sand mining area is situated on a 5ha section of the Buffels on Portion 14 of Farm Mesklip 259, which is zoned as Agriculture 1. The sand mining operation is to be carried out by the Applicant, Heba Vergruisers CC.

Mining is in the form of a simple process that only includes loading and hauling of river sand from the seasonal drainage channel. The excavations in the river bed will be on average 2 metres deep.

Refer to Diagram 3: Site Plan which shows the location of the proposed sand mining permit area, laydown areas and access routes.

3.1.1 Construction Phase: Development of infrastructure and logistics

- Access and service roads:
 - Access to the mine works will be via the N7 and existing farm tracks as shown in Diagram 2 and 3.
 - Existing farm tracks will be used as haul roads and no new roads will be developed.
- Water supply:
 - No process water is used in the mining process.
- Electricity supply:
 - No electricity is used in the mining area.
- Logistics:
 - No infrastructure is present or will be required due to the small scale and simple mining method.
 - Limited waste management facilities will be supplied that will consist of the following:
 - Plastic containers for domestic waste, which will be transported daily to the Applicant's Headquarters in Springbok;
 - A temporary storage area for used lubrication products and other hazardous chemicals as part of the service bay for the collection of the small volume of waste before it is removed to the company headquarters; and,
 - Only one 200-litre container is needed for the small amount of waste.
- Maintenance Oil/grease/diesel management systems will consist of a drip trays for stationary equipment to be provided in the parking area and service bay outside the drainage channel.

3.1.2 Operational Phase

- This operation will only involve the loading and hauling of raw river sand. Only one Front End Loader (FEL) will be used for loading and hauling and no processing will take place. The only surface disturbance except for the mining excavation within the drainage channel, will be a small stockpile area and parking for equipment outside the drainage channel, referred to as a service bay (Refer to Diagram 3 Site Plan).
- The depth of the mining operations will be an average depth of 2 metres as only the top layer of sand is mined. The total area under excavation will be approximately 4 ha and sand will be removed over the total area. Backfilling is not an option as the sand is completely removed, as it is washed in from upstream.

- No industrial or mine waste is generated during the mining process. All material consisting mainly of river sand is removed from the seasonal drainage channel to an average depth of 1.5m and sold as a FoT¹ product. No processing is taking place except for limited stockpiling so no mining waste or overburden and Fine Residue Dumps (FRD) will be created.
- Domestic or any other waste generated during the mining operation will be stored in a temporary storage area provided as part of the service bay from where it will be removed to the Applicant's Headquarters.
- Only minor repairs are done on site. A PVC lining and drip trays are used during maintenance and accidental spills are cleaned up immediately by removing of the contaminated sand. The small volume of contaminated sand is sold with the rest of the sand to be used in the building industry.
- Only one FEL is used in the mining process that is transported to the Applicant's headquarters for major repairs.

3.1.3 Decommissioning and Closure Phase

Planning for closure and restoration from the beginning of an operation makes the process more efficient:

- Waste can be removed as it is created,
- Excavation can be planned so that topography restoration is less complicated, and
- Topsoil can be re-used at shorter interval.
- 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.

Rehabilitation is carried out on a continuous basis as work progresses. Such rehabilitation is undertaken by scarifying the disturbed and or compacted areas to promote natural revegetation. This will be monitored continuously to ensure effective restoration and revegetation of disturbed areas. The rehabilitation work will be conducted in-house under the supervision of an ECO.

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 Appendix 2).

¹ FoT: "Free on Truck ", which means there is no processing and that it's a raw product.

3.2 Listed and specified activities

Table 2

NAME OF ACTIVITY	Aerial extent of Activity Ha or m ²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Mining of river sand from the Buffels River, including: <ul style="list-style-type: none"> • Removal of topsoil from laydown areas adjacent to river bank, access areas to river bed, and stockpiling of topsoil. Refer to Diagram 3: Site Plan. • Accessing the site via existing farm tracks. • Temporary stockpiling of extracted sand prior to hauling in trucks to Springbok. • Refuse collection containers in service bay area • Mobile ablution facilities. • Removal of natural and alien vegetation. 	Total footprint is 5 Ha	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017): Activity 21: Any activity including the operation of that activity which requires a mining permit in terms of section 27 of MRPDA, including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.
The rehabilitation, decommissioning and closure of the sand mining site on the Buffels River, which will only be required at final decommissioning and closure.	Total footprint is 5 hectares	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017): Activity 22: The decommissioning of any activity requiring – (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
Mining of river sand from the Buffels River will require the clearance of an area of 1 hectare or more of indigenous vegetation.	Total footprint is 5 hectares	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017): Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.
Mining of river sand from the Buffels River, including: <ul style="list-style-type: none"> • Removal of topsoil from laydown areas adjacent to river bank, access areas to river bed, and stockpiling of topsoil. Refer to Diagram 3: Site Plan. • Temporary stockpiling of extracted sand prior to hauling in trucks to Springbok. 	Total footprint is 5 hectares	X	GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017): Activity 28: Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.
Removal of indigenous vegetation in disturbed areas earmarked for laydown areas adjacent to the access tracks at the river, located outside the drainage channel. Refer to Diagram 3: Site Plan .	Area could be more than 300m ²		Not Listed The site is not located within a critically endangered or endangered ecosystem, or in CBA, or on land zoned as open space or conservation, and is not designated for protection or conservation in an adopted Environmental Management Framework or Spatial Development Framework.
Temporary hydrocarbon waste storage and general domestic waste	Less than 0.5m ³		Not Listed
Sanitation requirements (chemical toilets)			Not Listed

3.3 Description of the activities to be undertaken

The methodology and technology to be employed in each phase is described below:

3.3.1 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 Diagram 3 for the location of the existing farm tracks that provide access off the N7 to the proposed project site on the Buffels River. Existing access tracks to the mine area along the river to access the sections being worked in a phased manner. This is the method preferred to keep vehicles and roads out of the drainage channel as much as possible. With regard to access to the mine the existing roads will be used and must be upgraded and maintained as haul roads for trucks as needed by the mine.
- No buildings and infrastructure will be required as the operation will be run from the company headquarters in Springbok where all logistics will be available.
- No water or electricity is used in the mining operation and no permanent infrastructure will be required due to the small scale and simple mining method to be employed.
- Domestic waste will be collected in plastic containers and transported daily 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. Only one 200 litre container is needed for the small amount of waste.
- Maintenance Oil/grease/diesel management systems will require a parking area/service bay, provided outside the drainage channel and will provide for drip trays for stationary equipment.

3.3.2 Operational phase

This operation will only involve the loading and hauling of raw river sand. Only one Front End Loader (FEL) will be used for loading and hauling and no processing will take place. The only surface disturbance that will take place, except for the mining excavation within the drainage channel, is a small stockpile area and service bay (parking) for equipment outside the drainage channel. During operations mining will only consist of loading and hauling of river sand. Only temporary product stockpiles will be developed as sand will be transported to the Applicant's headquarters for stockpiling and distribution as it is loaded.

The depth of the mining operations will be on average 2m as only the top layer of sand is mined. The total footprint will be 5 hectares and sand will be removed over the total area. Backfilling is not an option as the sand is completely removed as it is washed in from upstream.

No industrial or mine waste is generated during the mining process. All material consisting mainly of river sand is removed from the seasonal drainage channel to a depth of 2m and sold as a Free on Truck (FoT) product. No processing is taking place except for limited stockpiling so no mining waste or overburden and Fine Residue Deposits (FRD) will be created.

Domestic or any other waste generated during the mining operation will be stored in a temporary storage area provided as part of the service bay from where it will be removed to the company HQ.

Only minor repairs are done on site. A PVC lining and drip trays are used during maintenance and accidental spills are cleaned up immediately by removing of the contaminated sand. The small volume of contaminated sand is sold with the rest of the sand to be used in the building industry.

Only one FEL is used in the mining process that is transported to the company headquarters for major repairs.

The trucks will transport sand from the site 6 days a week, operating during the week only between 7h00 and 17h00 during normal working hours. No operations will take place on Sundays or during the builder's break at year end.

As part of this phase training of personnel in the implementation of the EMPr will be undertaken and the implementation of the environmental awareness plan as part of the EMPr will be an ongoing process.

3.3.3 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, excavation 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 this final rehabilitation, decommissioning and mine closure plan.

4. Policy and Legislative Context

Table 3

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
Legislation		
<p>Constitution of South Africa, specifically everyone has a right;</p> <p>a. to an environment that is not harmful to their health or wellbeing; and</p> <p>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <p>i. prevents pollution and ecological degradation;</p> <p>ii. promote conservation; and</p> <p>iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p>	Mining activities	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>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 mining permit in terms of Section 27 for an area not exceeding 5 hectares in extent.	The conditions and requirements attached to the granting of the Prospecting Right will apply to the prospecting activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
<p>National Environmental Management Act, No 107 of 1998 (as amended) (NEMA)</p> <p>GNR 983 Listing Notice 1 of 2014 (dated 8 December 2014), as amended by GNR 327 (dated 7 April 2017) Listing Notice 1, Activity 21</p>	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations	<p>An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation.</p> <p>The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed.</p> <p>The appropriate EA will be obtained before proceeding with any sand mining activities.</p> <p>Measures will be implemented to prevent any pollution occurring during the mining activities. 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 and the Public Participation Process are required in terms of NEMA.</p>

<p>National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended)</p> <p>Waste listed activities in GNR 921 (dated 29/11/ 2013)</p> <p>Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.</p>	<p>Part B: EMP and Sections 13.8; 13.9; 13.10 & Section 15</p> <p>General waste management measures as part of environmental awareness plan</p>	<p>No listed activities are triggered or included as part of the Environmental Authorisation (EA) application process.</p> <p>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 sand mining. All waste generated during the mining activities 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 2 December 2011)</p>	<p>Section 8 Diagram 4, 5, 6, 7 & 8.</p>	<p>There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The site is located within in an CBA1</p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)</p>	<p>Section 8</p>	<p>Alien invasive vegetation management is included in the EMPr.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013</p>	<p>Section 8</p>	<p>Dust control measures are included in the EMPr</p>
<p>National Heritage Resources Act, 25 of 1999 (“NHRA”)</p>	<p>Section 8</p>	<p>Refer to Appendix 4 for a copy of the Heritage Impact Assessment</p>
<p>National Water Act (Act 36 of 2008)</p>	<p>Section 8 Appendix 5</p>	<p>The applicable Water Use activities are Section 21(c) related to impeding or diverting the flow of water in a watercourse, and Section 21(i) related to altering the bed, banks, course or characteristics of a watercourse.</p> <p>An application for a General Authorisation in terms of GN 509 of 2016 for Section 21(c) and (i) was submitted with the Draft Basic Assessment Report to DWS.</p>
<p>Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]</p>	<p>Decision by the Competent Authority</p>	<p>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</p>
<p>Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)</p>	<p>Comments required from the Nama Khoi Local Municipalities.</p>	<p>Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.</p>

Municipal Plans and Policies		
Namakwa District Municipality Integrated Development Plan (IDP) 2017/2022	Section 5.2	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 5.3	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.
Standards, Guidance and Spatial Tools		
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.	Section 5.1 & 8. Diagram 4	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 5.6	Refer to Section 5.6
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7 & Table 4	Refer to Section 7 & Table 4
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	Refer to Appendix 1 : Impact Assessment Tables
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	Refer to Appendix 1 : Impact Assessment Tables
Namakwa District Biodiversity Sector Plan (2008) BGIS (www.bgis.sanbi.org)	Baseline environmental description and	Used during desktop research to identify sensitive environments within the mining right area.
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)² 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”³. The primary environmental objective of the MPRDA is to give effect to the “environmental right”⁴ 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 Mining area as shown in **Diagram 4** are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and “Category D: Moderate Biodiversity Importance” – moderate risk for mining.

These categories have since been super-ceded by the Critical Biodiversity Area (CBA) map (refer to **Diagram 8**), 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. This FBAR and EMPr provide the environmental impact assessment required for the activities triggered.

5.2 Building Material Supply and Employment benefits

Building sand is commonly used for the manufacture of plaster, mortar and concrete. Springbok fulfils an important urban niche in the Northern Cape region, where the Applicant’s building material and sand supply company is located. The project site is located within 40km of Springbok with direct access to the N7 road corridor. The area’s development potential in terms of renewable energy has seen an increase in the need for construction materials.

² 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.

³ Constitution of the Republic of South Africa (No. 108 of 1996).

⁴ 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.”

The proposed sand mining activity is considered to be a temporary land use, and the area will be rehabilitated in accordance with the Mining Closure and Rehabilitation Plan, attached as Appendix 2. The benefits of the project can be divided into social and economic classifications. The mine will provide limited direct employment for local persons. The operation further creates indirect employment opportunities in equipment supply industries, transport and sand mining, and the construction environment.

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

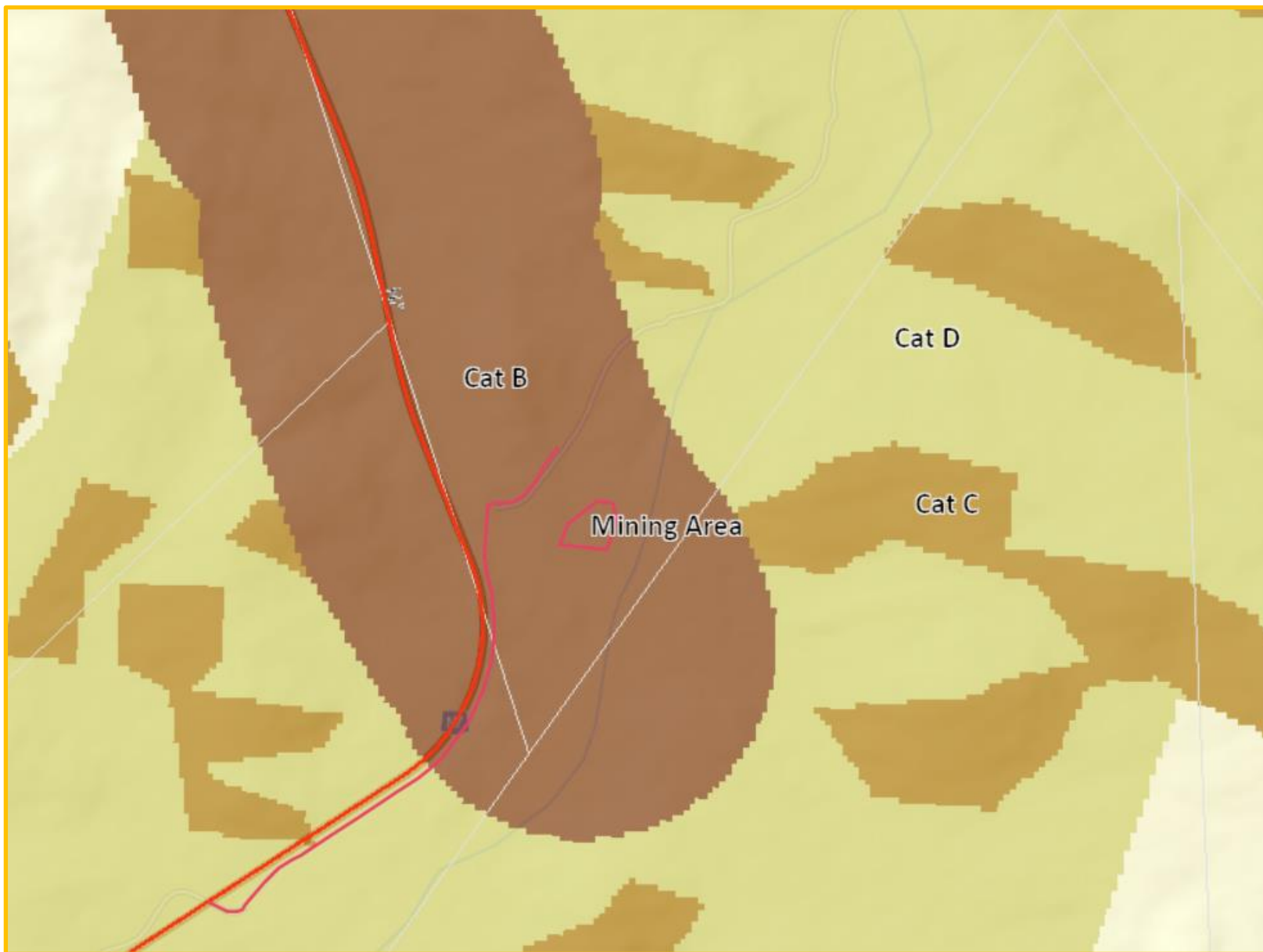
The Strategic Objectives are

- 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.

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



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.

In terms of employment opportunities and job security, the prospecting activities themselves would not directly lead to 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 extensive 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 as ensured through this environmental impact assessment process and implementation of the EMPr (Part B) and Closure and Rehabilitation Plan (Appendix 2).

5.5 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF 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 NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province. The NCPSDF, 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. The potential negative environmental impacts will be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

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. The impact summary is attached at **Appendix 1**.

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. I.e. 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 in **Appendix 1**, and included in the EMPr.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site includes portions identified as Critical Biodiversity Area (CBA) 1 and 2 but all invasive activities will be restricted to the ecological support and transformed areas (**refer Diagram 8**). The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. 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 (**Appendix 2**) 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 **Appendix 1**, EMPr, and Closure Plan (**Appendix 2**) 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 **Appendix 1**, the EMPr and Closure Plan (**Appendix 2**) 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 **Appendix 1**, the EMPr and the Closure Plan (**Appendix 2**).
- **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 **Appendix 1**, the EMPR and the Closure Plan (**Appendix 2**).

- **Interests, needs and values of Interested and Affected Parties** – This process has been 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 the Draft Basic Assessment Report to be included as part of the Final Basic Assessment Report are summarised in Section 7, Table 4.
- **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 site was selected as it contains good quality building sand located in a convenient position in close proximity to transport routes to the Applicant's business premises where the building material is manufactured. The layout and technology of this sand mining project has been determined by the shape, position and orientation of the mineral resource, which is the sand in the Buffels River. Refer to the Site Plan attached as Diagram 3. The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages.

- The preferred and only location of the sand mining activity is on the earmarked section of the Buffels River on Portion 14 of the Farm Mesklip 259.
- The preferred and only activity is the mining of sand.
- The preferred and only technology is the use of a Front-End Loader to remove the sand from the river, and for trucks to transport the sand to the Applicant's brick yard.

The Site Plan or layout of the activity on the site is shown in Diagram 3.

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 has been 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 has been followed and include the following activities: (Refer **Appendix 3** Public Participation Process)

Potential I&APs were notified about the project and of commencement of the Basic Assessment (BA) process and invited to registration as stakeholders by means of:

- Letters of notification to directly affected landowners;
- Written notifications to other stakeholders including neighbors, Local and District Municipalities (including traditional authorities where applicable); and
- Media advertisements and site notices.
- Circulation of a Background Information Document (BID) with the notification letter to the landowner, neighbouring landowners and potential I&APs;
- Registered I&APs including the 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&As (To be included in the FBAR after the 30-day PPP period)

Table 4

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.
ORGANS OF STATE				
Landowners or Lawful occupier/s of the land				
Landowners or lawful occupiers on adjacent properties				
Municipality				
Communities				
Traditional Leaders				
None identified	NA			
Interested parties - Reply on advertisement and site notices				

8. Process to reach the proposed preferred site

8.1 Location or site alternatives

This site was selected because it contains good quality building sand and it is located in a convenient position close to the N7 and Springbok, where the Applicant's business operations are located. The proposed site is located within a section of the Buffels River on Portion 14 of the Farm Mesklip 259, based on the landowners' willingness to permit sand mining activities on their farm, and due to the fact that the river sand is suited for building purposes. The section of the river selected for sand mining has a flat gradient and an average width of >50 metres providing a large surface area suitable for excavation, with no permanent surface water and little vegetation. There are no wetlands on site. The vegetation found growing in the river channel is infested with alien invasive plant species, such as Prosopis and Tamarisk spp. The rural nature of the area effectively means that the proposed mining activities will not disturb any local communities. There are no reasonable or feasible location alternatives for further consideration.

8.1.1 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 supply of building materials. The holder of a mining permit is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use. The mining 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. In the case of this application the best post-mining land use alternative is to return the river to its natural state. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine sand from the section of the Buffels River as indicated. The only other activity required to be assessed in terms of NEMA is the "do-nothing" alternative, as detailed further in section 8.6 below.

8.1.2 Design or Layout of activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource, which in this case is linear along an existing river bed lying in an east-west orientation. There would be two feasible ways of mining this resource. It could be mined from east to west or in the opposite direction. Best practice dictates that it is better to mine and rehabilitate the area sequentially in mining blocks from upstream, as this minimises the disturbance to the mining blocks once they have been rehabilitated. 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 in the impact ratings table.

8.1.3 Technology Alternatives

The technology used in a mining project is determined by the shape, position and orientation of the mineral resource, with the technology alternative for sand mining being restricted to the use of a Front-End Loader to remove the sand to an average depth of 2 metres, and includes trucks for the hauling of the sand to Springbok. There are no technology alternatives for further consideration.

8.1.4 Operational alternatives

The proposed sand mining activities will take place during normal working hours from 07h00 to 18h00 on week days and Saturdays. The hauling of the sand will therefore also take place during these hours. There are no operational alternatives for further consideration.

8.1.5 The No-go Alternative

The No-Go Alternative will mean that sand mining will not take place. There will be no supply of sand for the building and renewable energy industry from this site, resulting in the need to look for suitable sand deposits in other river channels. There will be no new employment opportunities or guaranteed job security provided for those people that the Applicant, Kobus Duvenhage Bouers currently employs.

The No-Go Alternative will result in the status quo remaining of the section of the Hartbees River earmarked for sand mining. The Hartbees River is considered to be a Category B NEPA River, which means that it is largely natural (refer to Section 8.1.6 below). The alien vegetation that is present in the river is required by the National Environmental Management Biodiversity Act to be removed by the landowners, with or without the sand mining operation in the river.

The assessment of alternatives must at all times include the “no-go” option as a baseline against which all other alternatives must be measured. The “no go” alternative is therefore assessed together with the preferred alternative.

8.2 The Environmental attributes associated with the alternatives (Baseline Environment)

8.2.1 Regional setting

The proposed mining area is located on a 5Ha portion of Portion 14 of the Farm Me4sklip 259 registered in the name of ROOIWAL COMMUNAL PROP ASSOC by virtue of title deed T62507/2015CTN filed in the Kimberley Deeds Office.

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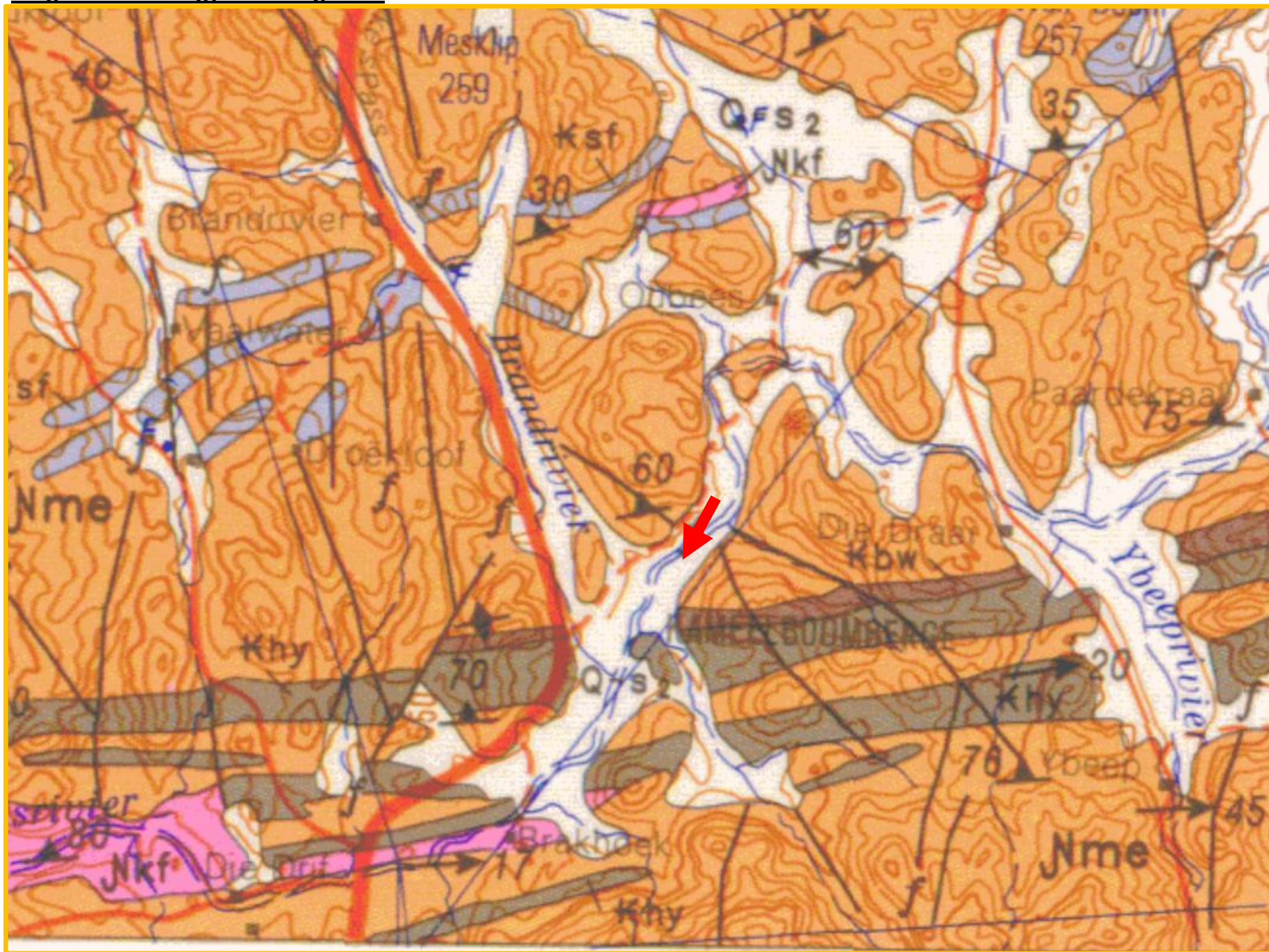
8.2.2 Landscape and Land Use

The proposed project site is located within a 900m section of the Buffels River, which is a non-perennial river. There are no irrigation activities in this stretch of the River floodplain and the only other land use except for existing sand mines is grazing. The N7 national road crosses over the Buffels River less than 1 km downstream of the mine site. The property is boarded by mostly undeveloped natural areas. There is no adjacent development upstream of the project site. There is a road bridge over the Brand River located on the property.

8.2.3 Geology

The regional rocks are predominantly hybrid migmatites with granites / granodiorites and minor mafic intrusives, such as gabbro's and diorites in the form of sills and dykes. In the eastern portion granitoid emplacements predominate and are then replaced by metamorphosed schists and phyllites. Metamorphism declines towards the East but is still regionally intense. Excluding some of the intrusives, all these rocks are Precambrian in age and form part of the Mesklip Gneiss (Nme). There is a large variety of lithological types, many of which grade into one another and are genetically related and influenced by poly-phase intrusion and metamorphism. Within the drainage channel the Lithology is described as Red aeolian sand, pediment deposits (Q-s₂) (Refer Diagram 5).

Diagram 5: Geology of Mining area



8.2.4 Soil and land capability

Approximately 90% of NDM is used for livestock grazing and production, with the remainder comprising of mining, agriculture and urban development. The main crops currently grown in the NDM include Lucerne, oats, wheat and rooibos. Approximately 10% of the crops are planted near rivers for chance/accidental irrigation. The other approximately 90% are dry land crops, which are being planted in high rainfall areas with approximately 600mm/year.

Tourism is a seasonal feature – with visitors to the region arriving almost exclusively between July and October in order to take in the world-renowned yearly flower display. Urban development is not a major feature of the landscape and is not expected to increase much in the coming years. As such the proposed prospecting activities will not have an impact on agricultural land or agricultural production.

Land use involves mostly cultivated drylands and mining (diamonds, copper, base-metals, granite, sandstone and gypsum), as well as salt pans. Future pressures on biodiversity are likely to come from:

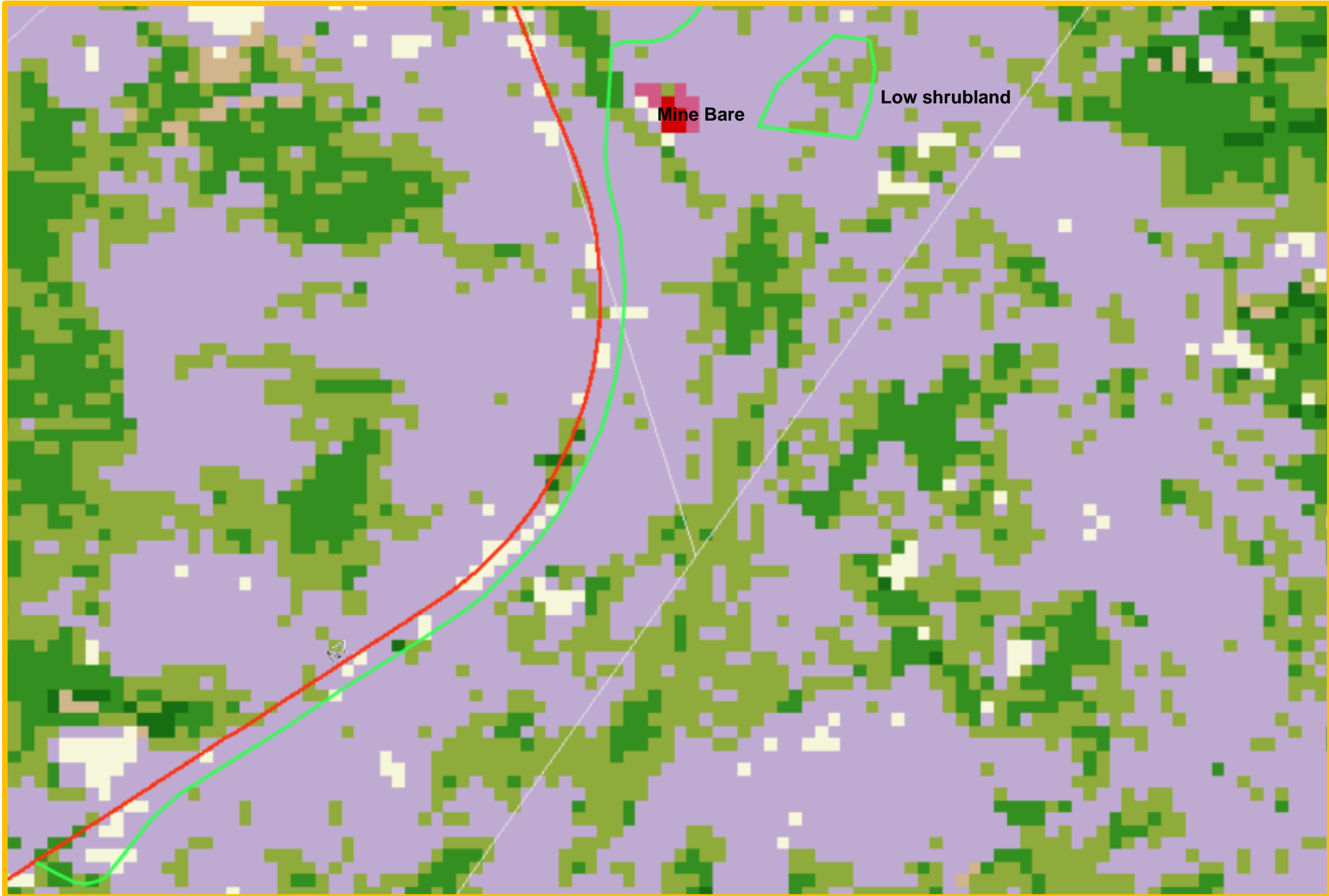
- new mining development
- expansion of crop agriculture
- unsustainable use of natural resources, (especially due to overgrazing), and
- to a certain extent urban development

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 **Diagram 6**.

Table 5. 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

Diagram 6: Location of Mining area in terms of Land Cover sourced off SANB BGIS Map Viewer



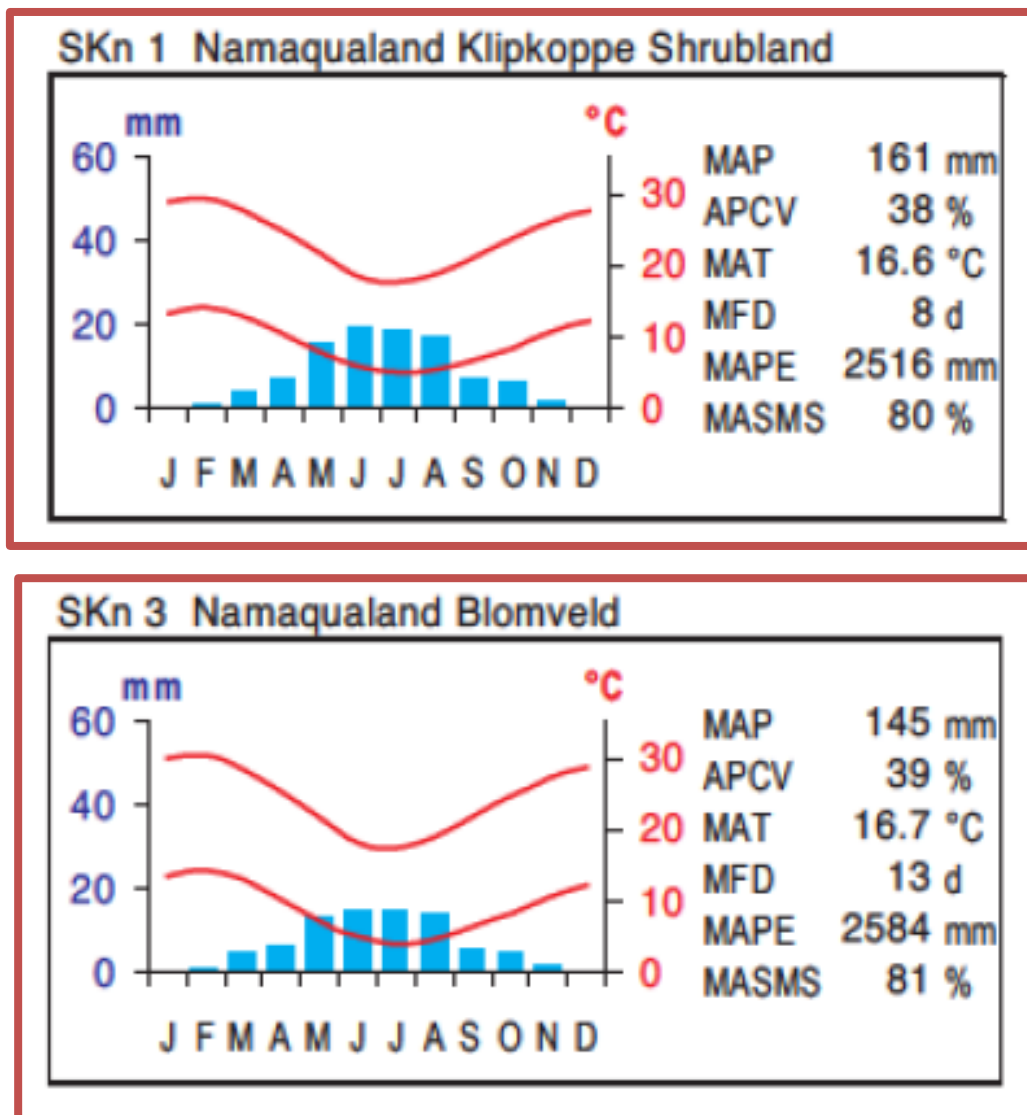
8.2.5 Landscape - Topography

Refer to Figure 2 which shows the contours at 20-meter intervals located between 460m and 480m above mean sea level.

8.2.6 Climate

The cold Benguela Current that flows northwards along the coast of Namaqualand has a marked effect on the climate with regular fog occurring over the coastal zone, adding substantially to high soil moisture levels. Similar to the coast of Namibia further north, but not as extreme, the Namaqualand coastal region is a hyper-arid area. It experiences winter rainfall ranging between 50 mm and 100 mm per annum (Le Roux, 2005). Seasonal winter rainfall (May to September). MAP about 160 mm, with epizodic drought periods (well below 100 mm per year) of one or two years in succession. Dew is present throughout the winter. MAT 16.6°C. Hot summers, with mean maximum and minimum daily temperatures 30°C and 5°C for January and July, respectively. Frost occurs about 8 days per year but can vary widely from year to year. See also climate diagram (Figure 3).

Figure 3: Climate diagram



8.2.7 Biodiversity (Flora and Fauna)

The proposed prospecting right is located in the Succulent Karoo Biome and dominated by the Namaqualand Klipkoppe Shrubland (SKn1) and Namaqualand Blomveld (SKn3) vegetation units (**Refer Diagram 7**).

The conservation status of the Namaqualand Klipkoppe Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. Some 6% statutorily conserved in Namaqua National Park (incl. former WWF Skilpad Wild Flower Reserve), Goegap Nature Reserve with spectacular granite-koppie landscapes, and a small portion in the Moedverloren Nature Reserve. Target 28%. Largely without any alien invaders and hardly any transformation due to agriculture (steep rocky habitats), but old mine spoils (mainly copper) are a disturbing view in some localities. Erosion is moderate (35%), very low (35%) or low (30%).

The conservation status of the Namaqualand Blomveld, according to Driver et al. 2005 and Mucina et al. 2006 is also Least Threatened. Conservation Target 28%. Small areas (1.5%) statutorily conserved in Goegap Nature Reserve and Namaqua National Park. Some protection is warranted on private game farms. Only about 6% of the total area is transformed, mainly by grain cultivation and some planting of salt-bush (*Atriplex nummularia*). Overgrazing is found almost throughout this unit. All alien infestations are only of local extent. Erosion is low (40%), very low (30%) or moderate (30%).

The mining area is located in a Critical Biodiversity Area 1 (CBA1) due to the fact that the Brand River is earmarked as a NFEPA Water Management Areas (Refer Diagram 8). There are no Centres of Endemism that occur near to the proposed mining area and the area is not included as part of the NPAES. No protected areas are located within a 5Km radius of the mining area and no activity will be triggered in terms of Listing notice 3 of the NEMA EIA regulations.

8.2.8 Water Resources

The property is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14).

Refer to Diagram 9 that shows the location of the project site on a section of the Buffels River earmarked as a Freshwater Ecosystem Priority Area (FEPA)⁵. The Brand River one of the tributaries of the Buffels River is also earmarked as a FEPA River as well as a FEPA Water Management area.

Both Rivers are non-perennial rivers, classed as Category B: Largely Natural as referenced from the SANBI BGIS NFEPA Database Map Viewer. Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in any event very low given the low rainfall average is 106mm 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.

⁵ FEPAs are strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for conserving ecosystems and associated biodiversity of rivers, wetlands and estuaries. FEPA maps are suitable to use at a desktop level for planning and decision-making processes at the national or water management area level. In general, confidence in the FEPA maps at a national level is high but decreases at more local levels of planning.

Diagram 7: Vegetation

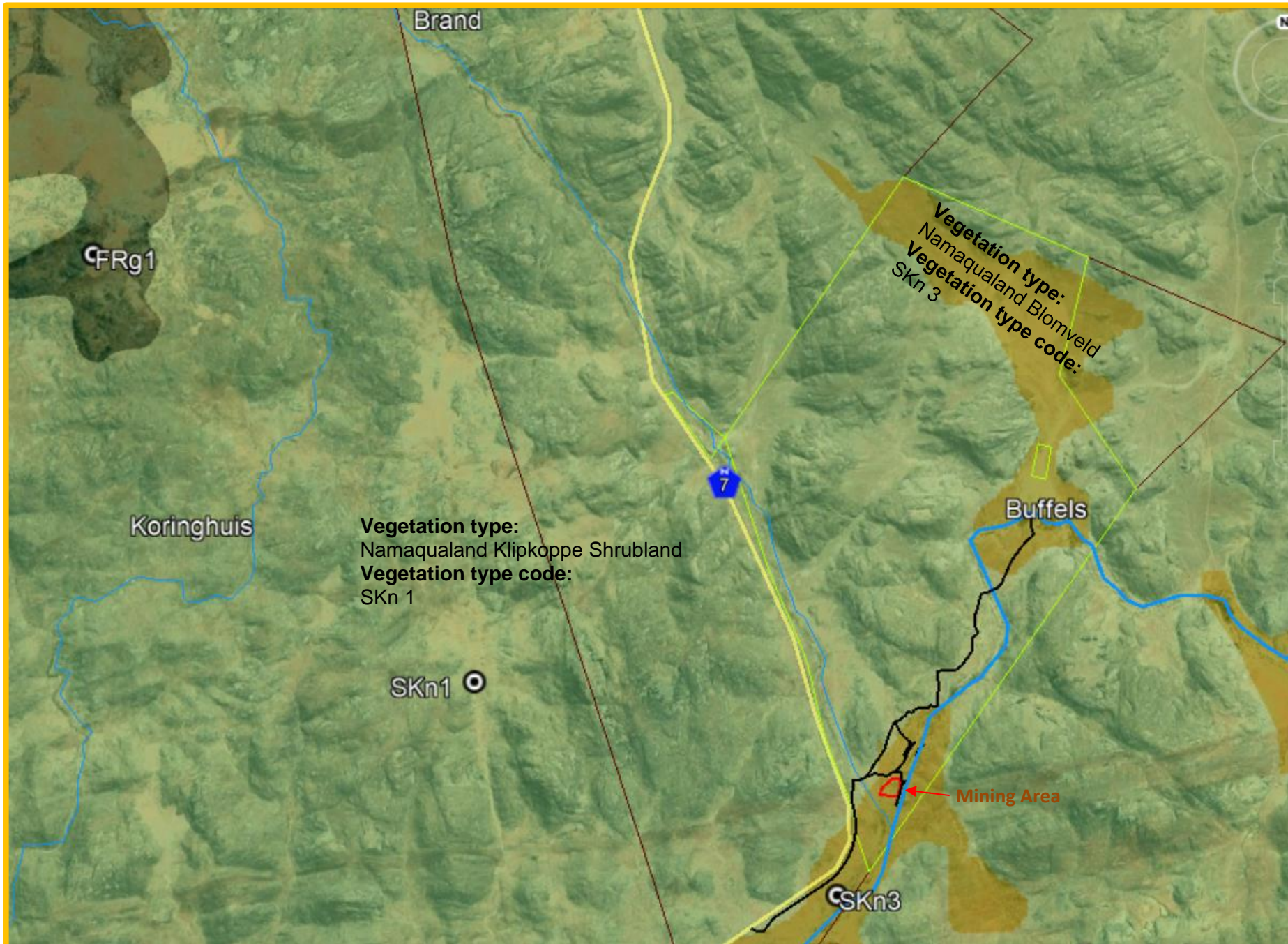


Diagram 8: Threatened Ecosystems



River FEPAs achieve biodiversity targets for river ecosystems and threatened/near-threatened fish species, and were identified in 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. This does not mean that FEPAs 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 ecosystem⁶. It is important to note that river FEPAs currently in an A or B ecological category may still require some rehabilitation effort, e.g. clearing of invasive alien plants and/or rehabilitation of river banks.

There are no wetlands or strategic water source areas for underground or surface water near the proposed project site as shown in Diagram 9.

As described above, 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 category of relevance to this proposed sand mining project is “Category B: Highest Biodiversity Importance” as the site is located in a river FEPA and CBA 1, which requires (in summary), an environmental impact assessment process to address the issues of sustainability. Refer to Diagram 4 and 8 which shows the Mining and Biodiversity Guidelines and Critical Biodiversity areas as per the SANBI BGIS map viewer.

The proposed activities trigger the National Water Act (Act 36 of 1998) Water Use Activities of Section 21(c) related to impeding or diverting the flow of water in a watercourse, and Section 21(i) related to altering the bed, banks, course or characteristics of a watercourse. An application for a General Authorisation in terms of GN 509 of 2016 for Section 21(c) and (i) was submitted with the Draft Basic Assessment Report to DWS, and is attached as Appendix G. No amendments have been made to this Appendix in the FBAR.

⁶ “Implementation Manual for Freshwater Ecosystem Priority Areas Report to the Water Research Commission” (WRC Report No. 1801/1/11; AUGUST 2011)

Diagram 9: Location of Mining area in relation to

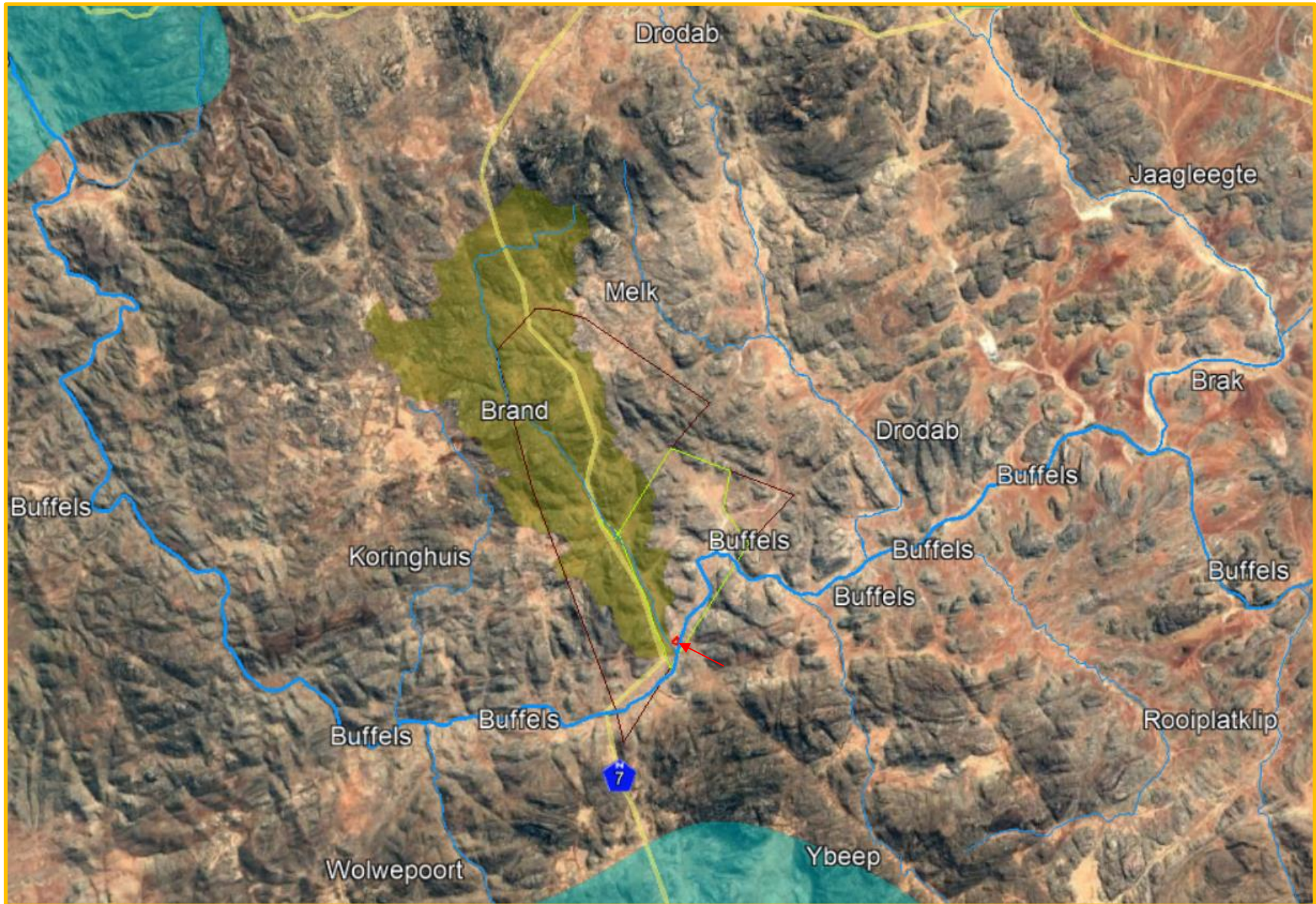
NFEPA Water Management Areas



NFEPA Rivers



Strategic Water source areas for Underground Water



8.2.9 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). Dust is generated off un-surfaced roadways on site, and during the existing mining operations from the adjacent mine which has transported the finer sand over the adjacent areas. Mining activities will take place in a very remote area and dust generation will be limited to a small radius around the operation.

Noise

Farm traffic-generated noise occurs in the area and such noise levels are low (observed estimate at ± 55 dBA).

Noise from earth moving equipment and machinery associated with the existing mining operation on the adjacent mine will be within the norm and due to the remote locality of the operation will have no impact.

8.2.10 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

8.2.11 Cultural, Heritage and Palaeontological Resources

Reference is made to the "Heritage Impact Assessment of proposed sand mine on Portion 14 of Mesklip 259, Namakwaland Magisterial district, Northern Cape", attached as Appendix 4, prepared by Dr Jayson Orton of ASHA Consulting (Pty) Ltd (dated April 2020).

The palaeontological desktop study suggested that the only likely finds would be isolated fossils in the alluvial sands that are probably of fairly recent age. Such finds are likely to be very sparse and the area is considered to be of very low palaeontological sensitivity.

The field survey revealed that archaeological materials are minimally present along the river banks and all were found to be of very low heritage significance. Of slightly greater significance was a light scatter of artefacts located in front of a large boulder but this was located well away from the proposed mining area. Two historical artefacts were found in the river channel and must have been washed downstream in floods. No significant archaeological impacts are expected.

The N7 was identified as a scenic route due to the aesthetic qualities of the landscape but due to the screening offered by topography and the riparian vegetation, no significant impacts are expected.

The following recommendations were made as part of the AIA that are incorporated into the EMPr and conditions of authorisation as appropriate:

- The development footprint (mining and associated roads) must be kept as small as possible;
- Existing farm roads should be reused as much as possible;
- The haul road should preferably be contained within the mined-out areas of the river channel; and
- If any palaeontological material, 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.

8.2.12 Description of specific environmental features and infrastructure on the site

Refer to Diagram 3 to 9 which provides an overview of the position of the propose project site in the Buffels River, the existing access tracks, and the extent of the vegetation on the river banks and in the river itself.

8.2.13 Environmental and current land use maps

Refer to Diagram 3 to 9 provided as part of the specific attributes

8.3 Impacts and risks identified

8.3.1 Overview

As described in Section 3.1 of this report (and elsewhere), the mining activities are restricted to the removal of river bed sand up to an average depth of 2 metres from the Buffels River.

The risks associated with safety:

- The risk of deep and unstable excavations that can be detrimental to the safety and health of humans and animals can be regarded as insignificant given the extremely low rainfall in the area and small size of the excavations. The drainage channel is only in flood on average once a year and during flood events any excavations are filled naturally with sand washed in from upstream.
- Due to the simple mining process that only includes loading and hauling, there will be no unsafe areas like steep slopes that would require demarcation to prevent access by humans and animals.
- No infrastructure, sub-surface voids, fine residue dams or evaporation ponds will be developed that can lead to potentially unsafe post-mining areas; therefore, no post mining access control would be required.

The risks associated with the removal of vegetation on the banks:

- This will lead to scouring, and will be mitigated by shaping of the bank of the drainage channel;
- Preventing destruction of vegetation on the banks to prevent scouring; and,
- Restricting the depth of the excavations to an average depth of 2m.

The potential risks arising 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 the post-mining topography must be adjusted where possible to minimise the effect on water flow and increase potential for re-vegetation.

The risk of erosion and scouring:

- Ensure stability of the bank of the drainage channel by re-shaping and backfilling of the access point with suitable material where required.

The risk of waste:

- No industrial or mine waste is generated during the mining process and all material consisting mainly of river sand will be removed from the site and sold as a FoT product. No processing will take place so no mining waste or overburden and fine residue dumps will be created and there will be only limited product stockpiles present on site.
- The potential risk is related to waste management practices that will require implementing of mitigation and management actions to limit the residual impact after mine closure.

8.3.2 Potential impacts and risks associated with the Preferred Alternative

Refer to Appendix 1 for the full Impact Assessment Tables for the Preferred and Only Alternative (Sand Mining Activity) compared to the No-Go Alternative.

Table 6. The potential environmental and social impacts

Phase	Activities	Potential Impacts
CONSTRUCTION PHASE	Site access	Disturbance to river bank at access point
		Disturbance of vegetation and fauna
		Soil compaction from repeated use of access track
	Site Establishment Activities (including: topsoil stripping and stockpiling for lay down areas, waste generation and management)	Noise Generation
		Visual intrusion
		Dust fall and nuisance from activities, dust emission from top soil stripping.
		Wildlife and vegetation disturbance from site preparation
		Removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Soil and sand contamination from hydrocarbons
		Contamination and disturbance of soil from compaction and soil disturbance due to topsoil stockpiling
Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)		
No impact on heritage artefacts, heritage sites or grave yards – Refer to Appendix 4		
OPERATIONAL PHASE	Removal of sand to a depth of 1.5 metres in the river bed; movement of trucks on site to collect sand for removal; waste generation and management	Noise caused by the machinery and vehicles on site, and by vehicles going to and from the sand mining site
		Visibility of the sand mining operations
		Dust emissions from general site activities (vehicle entrained dust)
		Removal of sand from river bed impacting on river ecosystem
		Wildlife and vegetation disturbance from front end loader and trucks
		Ongoing removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Soil and sand contamination from hydrocarbon spills
		Compaction of soil on access tracks and in river bed due to sand mining activities
		Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)
		No impact on heritage artefacts, heritage sites and grave yards – Refer to Appendix 4
DECOMMISSIONING PHASE	Rehabilitation of the sand mining area, scarifying compacted areas and vehicle tracks	Shaping of river profile and replacing topsoil
		Ongoing removal of alien invasive plant species such as Prosopis sp. (positive impact)
		Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)

8.4 Methodology used in determining potential environmental impacts

Refer to Table 7 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed mining activity for the Preferred and Only Alternative. Each impact is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation.

Table 7: Impact Assessment Criteria

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
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
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
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 from occurring.

8.5 Positive and negative impacts of proposed activity and alternatives

Refer to **Appendix 1** for the impact assessment tables.

Positive impacts

- Creation of employment and job security and economic spin-offs (positive impact)
- Provision of materials for construction industry to support local and regional economic growth related to the renewable energy industry.
- Removal of alien invasive plant species, such as Prosopis and Tamarisk spp.

Negative impacts

The key potential negative impacts associated with the sand mining activity include the following:

- Site access:
 - Disturbance of onsite fauna and flora
 - Soil compaction from repeated use of access track
- Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary equipment laydown area, waste generation and management)
 - Noise Generation
 - Visual intrusion
 - Dust fall and nuisance from activities, dust emission from top soil stripping
 - Wildlife and vegetation disturbance from site preparation
 - River bed contamination from hydrocarbons
 - Contamination and disturbance of river sand from compaction and soil disturbance due to topsoil stockpiling
- Removal of sand to an average depth of 2 metres in the river bed; movement of trucks on site to collect sand for removal; waste generation and management:
 - Noise caused by the machinery and vehicles on site, and by vehicles going to and from the mining site
 - Visibility of the sand mining operations
 - Dust emissions from general site activities (vehicle entrained dust)
 - Removal of sand from river bed impacting on river ecosystem
 - Wildlife and vegetation disturbance from front end loader and trucks
 - Impact of storm water run-off during infrequent rainfall events
 - River sand contamination from hydrocarbon spills
 - Compaction of soil on access tracks and in river bed due to sand mining activities
- Rehabilitation of the sand mining area, scarifying compacted areas and vehicle tracks
 - Dust emission from decommissioning activities (vehicle entrained dust)
 - Soil erosion of topsoil
 - Ongoing removal of alien invasive plant species such as Prosopis sp. (positive impact)
 - Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)
 -

8.6 The possible mitigation measures that could be applied

Refer to **Appendix 1** for the Impact Assessment Tables, as the mitigation measures are included under each impact.

8.7 Motivation where no alternative sites were considered

Alternatives were considered, as described in Section 8.1 and 8.3 above and subjected to the impact rating methodology in **Appendix 1**.

8.8 The possible mitigation measures that could be applied and the level of risk. Refer to **Appendix 1** for the Impact Assessment Tables, as the mitigation measures are included under each impact.

8.9 Motivation where no alternative sites were considered
Alternatives were considered, as described in Section 8.1 and 8.3 above and subjected to the impact rating methodology in **Appendix 1**.

8.10 Concluding Statement on Alternatives development

The site was selected as it contains good quality building sand located in a convenient position in close proximity to transport routes to the Applicant's business premises where the concrete is manufactured. The layout and technology of this sand mining project has been determined by the shape, position and orientation of the mineral resource which is the sand in the Buffels River. Refer to the Site Plan attached as Diagram 3.

The operational approach is practical and based on best practice to ensure a phased approach of mining followed by rehabilitation in sequential stages. 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 against the baseline.

9. ENVIRONMENTAL IMPACT ASSESSMENT

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

Refer to Diagram 3 for the Site Plan of the Preferred and Only Alternative.

Refer to Section 8.3 above where the risks have been described.

Refer to Section 8.4 above where the methodology has been described.

Refer to Appendix 1 for the full Impact Assessment Tables for the Preferred and Only Alternative (Sand Mining Activity) compared to the "No-Go" Alternative.

This BAR and EMPr were compiled through a detailed desktop investigation and site assessment in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process will also assist the EAP in the identification of any additional impacts associated with the proposed sand mining activities.

The methodology described above was used to assess the significance of the potential impacts of the sand mining activities. The assessment of impacts is based on the experience of the EAP.

The mitigation measures proposed are considered to be reasonable and based on the location of the mining area and must be implemented in order for the outcome of the assessment to be accurate.

9.2 Assessment of each identified potentially significant impact and risk

Table 8: Significance of Impacts per Activity per Phase

NAME OF ACTIVITY		Site Access	
POTENTIAL IMPACT 1	Disturbance to river bank at access points	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Water Resources functionality of a NEPA River affected (flow regime; water quality and quantity; aquatic biota). The Buffels River is however, non-perennial and impacts will have little effect on water resource functionality as a whole.		
MITIGATION TYPE	<ul style="list-style-type: none"> • Topsoil at access point to be removed during construction phase, and replaced during rehabilitation. • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • 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/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Temporarily halt material handling in windy conditions. • Compacted areas that are not required for access shall be scarified immediately or during final decommissioning and rehabilitation. • Rehabilitation of the river banks at each access point as soon as that section of the river has been mined. • Shaping of river bank to be returned to original profile. 		
POTENTIAL IMPACT 2	Disturbance of vegetation and fauna	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Effect on biodiversity in a Critical Biodiversity Area 1 (CBA 1) Laydown areas have been earmarked for existing disturbed areas where clearing would be minimal, resulting in little impact on ecological functioning at a local level during the construction process. The clearing of alien invasive vegetation is a positive impact, and will benefit and improve the ecological functioning of the river bed and adjacent areas.		
MITIGATION TYPE	<ul style="list-style-type: none"> • Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Refer to Diagram 3, which indicates that existing tracks will be used. • Demarcate areas for clearing. • Remove alien invasive vegetation, • No indigenous plants outside of the demarcated work areas may be damaged. • Ensure ongoing alien vegetation clearing in the area. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g. reptiles; antelope). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by the ECO, if necessary. 		

POTENTIAL IMPACT 3	Soil compaction from repeated use of access track. Soil disturbance due to topsoil removal & stockpiling	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Loss of soil resource		
MITIGATION TYPE	<ul style="list-style-type: none"> • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • 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/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/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. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. 		
NAME OF ACTIVITY	Site establishment		
POTENTIAL IMPACT 1	Visibility	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	LOW	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Visual intrusion		
MITIGATION TYPE	<ul style="list-style-type: none"> • The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Restrict working hours to normal work day hours with no work over Sundays and public holidays to minimize hauling trucks along access roads 		
POTENTIAL IMPACT 2	Noise, Dust and Vehicle (carbon) emissions	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	LOW	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Dust and noise nuisance and greenhouse emissions		
MITIGATION TYPE	<ul style="list-style-type: none"> • The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. • The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). 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. • Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during Sundays and public holidays to limit the impact of noise of neighbours. Should the Contractor need to work outside normal working hours, the surrounding neighbours shall be informed prior to the work taking place. • No amplified music shall be allowed on site. • On public roads adjacent to the site vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Trucks shall have tarpaulins to prevent sand from blowing off in transit. 		

POTENTIAL IMPACT 3	Disturbance of vegetation and fauna	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Disturbance to biodiversity		
MITIGATION TYPE	<ul style="list-style-type: none"> Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Refer to Diagram 3, which indicates that existing disturbed areas have been earmarked for laydown areas. Demarcate areas for clearing. Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area No indigenous plants outside of the demarcated work areas may be damaged. The noise and vibration caused by the earthmoving equipment will disturb smaller animals (e.g. reptiles; antelope). These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by the ECO, if necessary. 		
POTENTIAL IMPACT 4	Soil and sand contamination from hydrocarbons	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Loss of soil resource through pollution		
MITIGATION TYPE	<ul style="list-style-type: none"> Oils and lubricants must be stored within sealed containment structures if kept on site. Any mechanical equipment maintenance must be undertaken on 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. Machinery must be kept in good working order and regularly inspected for leaks. A spill kit will be available on each site where mining activities are in progress. Any spillages will be cleaned up immediately. 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 Provide all workers with environmental awareness training. Provide a bin at the site. Regularly dispose of any solid waste at a municipal waste disposal site. Ensure all workers comply with the requirements of the EMPr. Provide a mobile ablution facility. 		

POTENTIAL IMPACT 5	Contamination and disturbance of soil from compaction and soil disturbance due to topsoil stockpiling	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Loss of soil resource		
MITIGATION TYPE	<ul style="list-style-type: none"> • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • 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/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/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. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. 		
POTENTIAL IMPACT 6	Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)	PHASE In which impact is anticipated	Construction
SIG-NIFICANCE if not mitigated	MEDIUM (-)	SIG-NIFICANCE if mitigated	MEDIUM (+)
ASPECTS AFFECTED	Improvement in people's living standards, and support to local economy through supply of building materials in response to demand.		
MITIGATION TYPE	<ul style="list-style-type: none"> • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). 		

NAME OF ACTIVITY	Sand Mining: Removal of sand from river to an average depth of 2 metres; movement of trucks on site to collect sand for removal; waste generation and management		
POTENTIAL IMPACT 1	Noise caused by the machinery and vehicles on site, and by vehicles going to and from the sand mining site	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	LOW	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Noise nuisance		
MITIGATION TYPE	<ul style="list-style-type: none"> Ensure sand hauling is during normal working hours and not on Sundays and public holidays No amplified music shall be allowed on site. On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. 		
POTENTIAL IMPACT 2	Visibility of the sand mining operations	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	LOW	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Visual intrusion		
MITIGATION TYPE	<ul style="list-style-type: none"> The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads. 		
POTENTIAL IMPACT 3	Noise, Dust (vehicle entrained dust) and Vehicle emissions	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	LOW	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Dust and noise nuisance and greenhouse emissions		
MITIGATION TYPE	<ul style="list-style-type: none"> After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. Incremental clearing of vegetation in river bed should take place to avoid unnecessary exposed surfaces. Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. Reduce drop height of material to a minimum. Temporarily halt material handling in windy conditions. A speed limit of 30km/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. Trucks shall have tarpaulins to prevent sand from blowing off in transit. 		
POTENTIAL IMPACT 4	Removal of sand from river bed impacting on river ecosystem	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Water Resources functionality of a NEPA River affected (flow regime; water quality and quantity; aquatic biota). The Buffels River is however, non-perennial and impacts will have little effect on water resource functionality as a whole. Sand will be washed from upstream to the affected area		
MITIGATION TYPE	<ul style="list-style-type: none"> No stockpiling to take place within the drainage channel. Shaping of river bed to avoid diversion of stormwater towards banks to prevent erosion of river banks, and to prevent channelling of water that would increase erosive capacity of stormwater. Sand will be washed from upstream to the mining site over time. 		

POTENTIAL IMPACT 5	Wildlife and vegetation disturbance from front end loader and trucks transporting materials.	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Effect on biodiversity in a Critical Biodiversity Area 1 (CBA 1). Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The clearing of alien invasive vegetation is a positive impact, and will benefit and improve the ecological functioning of the river bed and adjacent areas.		
MITIGATION TYPE	<ul style="list-style-type: none"> The mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area. The annual rehabilitation plan must be implemented. Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area. No indigenous plants outside of the demarcated work areas may be damaged. 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. Should any animals be encountered these should be moved away by the ECO, if necessary. 		
POTENTIAL IMPACT 6	River sand contamination from hydrocarbon spills	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Loss of soil resource through pollution		
MITIGATION TYPE	<ul style="list-style-type: none"> Oils and lubricants must be stored within sealed containment structures if kept on site. Any mechanical equipment maintenance must be undertaken on 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. Machinery must be kept in good working order and regularly inspected for leaks. A spill kit will be available on each site where mining activities are in progress. Any spillages will be cleaned up immediately. 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 Provide all workers with environmental awareness training. Provide a bin at the site. Regularly dispose of any solid waste at a municipal waste disposal site. Ensure all workers comply with the requirements of the EMPr. Provide a mobile ablution facility. 		
POTENTIAL IMPACT 7	Compaction of soil on access tracks and in river bed due to sand mining activities	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	LOW
ASPECTS AFFECTED	Loss of soil resource		
MITIGATION TYPE	<ul style="list-style-type: none"> Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. 		
POTENTIAL IMPACT 8	Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)	PHASE In which impact is anticipated	Operation
SIG-NIFICANCE if not mitigated	MEDIUM (-)	SIG-NIFICANCE if mitigated	MEDIUM (+)
ASPECTS AFFECTED	Improvement in people's living standards, and support to local economy through supply of building materials in response to demand.		
MITIGATION TYPE	<ul style="list-style-type: none"> Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). 		

NAME OF ACTIVITY	Rehabilitation of the sand mining area, scarifying compacted areas and vehicle tracks		
POTENTIAL IMPACT 1	Ongoing removal of alien invasive plant species such as Prosopis and Tamarisk spp.	PHASE In which impact is anticipated	Decommissioning
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Rehabilitation		
MITIGATION TYPE	<ul style="list-style-type: none"> Ongoing removal of alien invasive vegetation 		
POTENTIAL IMPACT 2	Shaping of river profile	PHASE In which impact is anticipated	Decommissioning
SIG-NIFICANCE if not mitigated	MEDIUM	SIG-NIFICANCE if mitigated	VERY LOW
ASPECTS AFFECTED	Rehabilitation		
MITIGATION TYPE	<ul style="list-style-type: none"> Compacted areas shall be scarified after use during decommissioning and rehabilitation. Any stored topsoil shall be spread over the scarified surface. Shaping of river bed to avoid steep profiles and hollows. 		
POTENTIAL IMPACT 3	Socio-economic impact on job security, employment creation and economic spin-offs (positive impact)	PHASE In which impact is anticipated	Decommissioning
SIG-NIFICANCE if not mitigated	MEDIUM (-)	SIG-NIFICANCE if mitigated	MEDUIM (+)
ASPECTS AFFECTED	Rehabilitation		
MITIGATION TYPE	<ul style="list-style-type: none"> Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling) 		

The supporting impact assessment conducted by the EAP is attached as **Appendix 1** to this document.

9.3 Summary of specialist reports.

Table 9: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOM. HAVE BEEN INCLUDED IN THE EIA REPORT	SECTION WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Impact Assessment (Attached as Appendix 4)	No mitigation is required. Should any heritage resources be found SAHRA should be contacted immediately.	Yes	Section 8.2.10 Appendix 1: Impact Assessment Tables

10. Environmental impact statement

10.1 Summary of the key findings of the environmental impact assessment

The significance ratings of impacts after mitigation on the key aspects of the “preferred alternative” and the “no go” alternative are shown per Phase in the following tables.

Table 10: Significance Ratings of Impacts after Mitigation during Construction Phase (Site Access and Site Establishment)

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. SOIL EROSION AND COMPACTION: The clearing of laydown areas for site establishment and clearing of existing vegetation will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from repeated use of access tracks.	Low / Insignificant Risk	N/A
2. WATER RESOURCE FUNCTIONALITY IN A FEPA RIVER: The removal of sand from the river bank at the access points could impact on flow regime, water quality and quantity, and aquatic biota. The River is however, non-perennial and impacts will have little effect on water resource functionality as a whole.	Low / Insignificant Risk	N/A
3. LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IMPACTING ON LOCAL BIODIVERSITY IN AN CBA 1: Existing disturbed areas have been identified for laydown areas for site establishment. Clearing of existing vegetation in the river bed will result in the loss of vegetation and localized ecological functioning, however this vegetation consists of mostly alien invasive species.	Very Low / Insignificant Risk	N/A
4. POTENTIAL FOR SOIL AND RIVER SAND CONTAMINATION AND SOLID WASTE POLLUTION	Low / Insignificant Risk	N/A
5. VISUAL INTRUSION: Caused by the front-end loader, topsoil stockpiles, cleared areas, and movement of trucks on site. The site is however, remote and rural in nature with no receptors (people) as it is located on private property.	Very Low / Insignificant Risk	N/A
6. EMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front-end loaders) and vehicles, which will emit Greenhouse Gases.	Very low / Insignificant Risk	N/A
7. HERITAGE, PALAEOLOGICAL AND CULTURAL IMPACTS	Low / Insignificant Risk	N/A
8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	Medium (+)	Medium (-)

Table 11: Significance Ratings of Impacts after Mitigation during Operational Phase (Sand mining and transporting of materials)

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
<p>1. SOIL EROSION & SOIL COMPACTION: The sand mining process will disturb the river sand increasing the potential for fine particle suspension by wind. Soil compaction will result from repeated use of access tracks.</p>	Low / Insignificant Risk	N/A
<p>2. WATER RESOURCE FUNCTIONALITY IN A FEPA RIVER: The removal of sand from the river channel could impact on flow regime, water quality and quantity, and aquatic biota. The River is however, non-perennial and impacts will have little effect on water resource functionality as a whole, as there is no permanent surface water, and storm water run-off events are very seldom in the arid climate. Sand will be transported downstream into the mined area over time.</p>	Low / Insignificant Risk	N/A
<p>3. LIMITED LOSS OF NATURAL VEGETATION AND DISTURBANCE OF ECOLOGICAL FUNCTIONING IN AN CBA 1: The clearing of existing vegetation in the river bed will result in the loss of vegetation and localized ecological functioning. However, the existing vegetation is mostly alien invasive species and biodiversity will improve as a result. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The Front-End Loader will disturb local fauna.</p>	Low / Insignificant Risk	N/A
<p>4. POTENTIAL FOR SOIL AND RIVER SAND CONTAMINATION AND SOLID WASTE POLLUTION</p>	Low / Insignificant Risk	N/A
<p>5. VISUAL INTRUSION: Caused by the front-end loader, topsoil stockpiles, cleared areas, and movement of trucks on site. The site is however, remote and rural in nature with no receptors (people) as it is located on private property.</p>	Very Low / Insignificant Risk	N/A
<p>6. EMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front-end loaders) and vehicles, which will emit Greenhouse Gases.</p>	Very Low / Insignificant Risk	N/A
<p>7. HERITAGE, PALAEOLOGICAL AND CULTURAL IMPACTS</p>	Low / Insignificant Risk	N/A
<p>8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS</p>	Medium (+)	Medium (-)

All of the negative identified impacts will occur for a limited period and the extent of the negative impacts will be localised. All of the identified impacts can be suitably mitigated. There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in Appendix 1.

10.2 Final Site Map

Please refer to **Diagram 3 to 9** for the Environmental Sensitivities Map including the target area of interest for proposed mining activities.

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

Refer to Section 10.1 above.

10.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

10.4.1 Management Objectives

The impact management objectives are listed below:

- Objective 1 - To create a safe and rehabilitated post-mining environment.
 - Ensure safe mining area with no potentially dangerous areas like deep excavations.
 - The site in the river bed is to be shaped and levelled at each stage of closure and rehabilitation.
 - Topsoil to be stockpiled and replaced during decommissioning and closure, and rehabilitation.
- Objective 2 - To minimise pollution or degradation of the environment
 - Provide sufficient information and guidance to plan the sand mining activities in a manner that would reduce impacts as far as practically possible.
 - Limit residual environmental impact with no surface water or soil contamination by ensuring that no fuel or oil spills occur in the mining area.
 - Ensure that no solid waste or rubble is dumped on the site.
 - Ensure that portable toilets are used.
- Objective 3 – To minimise impacts on the community and to provide optimal post-mining social opportunities
 - Ensure that workers remain within the mining permit area.
 - Ensure access control measures are implemented.
 - Operate during normal working hours only.
 - Minimise the generation of noise and dust.
 - Respond rapidly to any complaints received.
 - Minimal negative aesthetic impact
 - Optimised benefits for the social environment

10.4.2 Outcomes

- By providing sufficient information to strategically plan the sand mining activities, unnecessary social and environmental impacts be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary.
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads.
- Wildlife disturbance and clearance of vegetation will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible.
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refueling with care to minimise the

chance of spillages and by having a spill kit available on each site where sand mining activities are in progress.

10.5 Aspects for inclusion as conditions of Authorisation.

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

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (Appendix 2).
- Concurrent mining and rehabilitation must be done.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- Eradicate all alien vegetation in the area during mining.
- The sand mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
- Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted, as detailed in Appendix 4.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road off the N7 where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

10.6 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.

- The desk-top research included reference to the SANBI BGIS database map viewer for the various baseline environmental attributes, and any assumptions or gaps in knowledge expressed by SANBI in the provision of this information would be applicable to this information as referenced.
- The latest Google Earth™ reference available is outdated (2016) for purposes of current land use identification in close proximity to the proposed site on adjacent properties upstream and downstream of the site.
- It is assumed that the proposed mitigation measures as listed in this report and included in the EMPr will be implemented and adhered to. 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.

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

10.7.1 Reasons why the activity should be authorized or not

It is the opinion of the EAP that the proposed sand mining activity should be authorised. In reaching this conclusion the EAP has considered that:

- The “preferred alternative” takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible.
- The site is located in a Freshwater Ecosystem Priority Area (FEPA) River with a Category B (Largely Natural). It is the opinion of the EAP that the underlying biodiversity objectives and ecological functioning will not be compromised, subject to the strict adherence to the EMPr and Closure Plan.
- No negative impacts have been identified that are so severe as to prevent the proposed mining activity from taking place. The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of building sand at a local and district level for the construction sector.
- Provided the recommended mitigation measures are implemented and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Mine Closure Plan (Appendix 2), in an environmentally sound manner, the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

10.7.2 Conditions that must be included in the authorisation

As per section 10.5 above:

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (Appendix 2).
- Concurrent mining and rehabilitation must be done according to the annual rehabilitation plan.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- Eradicate all alien vegetation in the area during and regularly after mining.
- The sand mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
- Should any burials, fossils or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted. Refer to Appendix 4.
- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road off the N7 where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

10.7.3 Period for which the Environmental Authorisation is required

The authorisation is required for the duration of the sand mining permit which is an initial 2 years plus a potential to extend the permit 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.

10.7.4 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report (BAR) and the Environmental Management Programme report (EMPr).

11. Financial Provision

11.1 Legal Framework

With the repeal of Section 41 of the MPRDA (Act 28 of 2002) that requires that the owner of a mine must make financial provision for the remediation of environmental damage, 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 regulation 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(1). 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, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Financial provision in terms of reg. 6(c) are 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 in terms of regulation 6(b) and attached as **appendix 2**.

11.2 Calculation

Financial provision in terms of reg. 6(c) 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 in terms of regulation 6(b) and attached as **appendix 2**.

Table 12: Table of Costs for Final Rehabilitation, Decommissioning and Closure of the Mining Operations

Closure Element Mitigating measures	Unit	No Units	Unit Cost	Cost per Element
Remove all stockpiles	Ha	2.5	R2,053.54	R5,133.85
Compacted area - Stockpile and hauling area (ripping & levelling)	Ha	2.5	R1,000.00	R2,500.00
Area covered by normal surface disturbance roads (ripping & levelling)	Ha	5	R1,000.00	R5,000.00
Spread topsoil dumps over ripped areas	Ha	5	R2,053.54	R10,267.70
Reinstate original profile of the riverbank by back filling of access points with the original material excavated	Ha	1	R2,053.54	R2,053.54
Promote re-vegetation of bank with natural riparian vegetation (ripping & levelling)	Ha	2	R1,000.00	R2,000.00
Prompt rehabilitation and maintenance of erosion events	Refer annual rehab plan			
Preventing attenuating or diverting any of the natural flow	Refer annual rehab plan			
Prevent canalisation of the flow	Refer annual rehab plan			
Levelling of the river bed to prevent impeding and damming upstream	Refer annual rehab plan			
Final clean-up	Ha	5	R76.04	R380.20
Annual rehabilitation plan	Year 1			R14,750.00
Total financial provision required to fully decommission and rehabilitate the mining operation				R42,085.29

11.3 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, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report (**Refer Appendix 2**).

11.4 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 Regulations 2015.

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.

12. Specific Information required by the competent Authority

12.1 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:

12.1.1 Impact on the socio-economic conditions of any directly affected person

A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected persons the opportunity to raise any potential concerns. Concerns raised have been captured and addressed within the public participation section of this report (attached as Appendix 3) to inform the decision-making process.

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

The potential impact on heritage resources is unlikely due to the nature of the sand mining activity in a river bed, as confirmed by the Heritage Impact Assessment attached at Appendix 4.

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

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

A motivation for not investigating reasonable and feasible alternatives is provided in **Section 8** above.

13. Environmental Management Program

13.1 Details of the EAP,

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

13.2 Description of the Aspects of the Activity

This has already been covered. Refer **Section 9 and 10** of this document.

13.3 Composite Map

This has already been covered. Refer **Diagram 1 & 2**.

13.4 Description of Impact management objectives including management statements

This has already been covered. Refer **Section 10.4** of this document.

13.5 Determination of closure objectives.

This has already been covered. Refer **Section 10.4** of this document.

13.6 Volumes and rate of water use required for the operation.

The proposed sand mining activity does not require water for operation.

13.7 Has a water use license has been applied for?

An application for a General Authorisation in terms of GN 509 of 2016 for Section 21(c) and (i) was submitted with the Draft Basic Assessment Report, as attached at Appendix 3.

13.8 Impacts to be mitigated in their respective phases

Table 13: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	SITE ACCESS (use of existing farm tracks; access points to river bed) & SITE ESTABLISHMENT	PHASE	CONSTRUCTION	SIZE AND SCALE of disturbance	Total footprint is 5ha
COMPLIANCE WITH STANDARDS	NEMA Section 2 Principles Environmental Authorisation	TIME PERIOD FOR IMPLEMENTATION	Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities) Upon cessation of each activity where applicable. Immediately in the event of spills		
MITIGATION MEASURES	<p>Impact 1: Soil erosion & soil compaction</p> <ul style="list-style-type: none"> • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • 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/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/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. <p>Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.</p> <p>Impact 2: Water resource functionality</p> <ul style="list-style-type: none"> • Topsoil at access point to be removed prior during construction phase, and replaced during rehabilitation. • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • 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/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Temporarily halt material handling in windy conditions. • Rehabilitation of the river banks at each access point as soon as that section of the river has been mined. • Compacted areas are to be scarified. • Shaping of river bank to be returned to original profile. 				

Impact 3: Impact on biodiversity

- Identify existing disturbed patches for laydown areas, and demarcate areas for clearing. Refer to Diagram 3 which indicates that existing farm tracks will be used, and disturbed areas have been earmarked for laydown areas.
- Remove alien invasive vegetation and ensure ongoing alien vegetation clearing in the area.
- No indigenous plants outside of the demarcated work areas may be damaged.
- 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. Should any animals be encountered these should be moved away by ECO, if necessary.

Impact 4: Contamination & Pollution

- Oils and lubricants must be stored within sealed containment structures if kept on site.
- Any mechanical equipment maintenance must be undertaken on 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.
- Machinery must be kept in good working order and regularly inspected for leaks.
- A spill kit will be available on each site where mining activities are in progress.
- Any spillages will be cleaned up immediately.
- 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
- Provide all workers with environmental awareness training.
- Provide a bin at the site.
- Regularly dispose of any solid waste at a municipal waste disposal site.
- Ensure all workers comply with the requirements of the EMPr.
- Provide a mobile ablution facility.

Impact 5: Visual landscape

- The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.
- Restrict working hours to normal work day hours with no work on Sundays and public holidays.

Impact 6: Emissions

- The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations.
- The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). 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.
- Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during Sundays and public holidays to limit the impact of noise of neighbours. Should the Contractor need to work outside normal working hours, the surrounding neighbours shall be informed prior to the work taking place.
- No amplified music shall be allowed on site.
- On public roads adjacent to the site vehicles shall adhere to municipal and provincial traffic regulations including speed limits.
- Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions.
- Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material.
- Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.

Impact 7: Heritage resources

- Refer to Appendix 4 - no mitigation required for project site investigated.

Impact 8: Socio-economic

- Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)

ACTIVITIES	Mining of sand material (extraction, loading and hauling)	PHASE	OPERATION	SIZE AND SCALE of disturbance	Total footprint is 5ha: average depth of 2 metres
COMPLIANCE WITH STANDARDS	NEMA Section 2 Principles Environmental Authorisation	TIME PERIOD FOR IMPLEMENTATION	During the estimated 5-year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.		
MITIGATION MEASURES	<p>Impact 1: Soil erosion & soil compaction</p> <ul style="list-style-type: none"> • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of vegetation in river bed should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/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. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • Planting of indigenous vegetation in areas under rehabilitation. <p>Impact 2: Water resource functionality</p> <ul style="list-style-type: none"> • No equipment may be parked within the drainage channel when not in use. • No stockpiling to take place within the drainage channel. • Shaping of river bed to avoid diversion of stormwater towards banks to prevent erosion of river banks, and to prevent channelling of water that would increase erosive capacity of stormwater. • Sand will be washed from upstream to the mining site over time. <p>Impact 3: Impact on biodiversity</p> <ul style="list-style-type: none"> • Identify existing access tracks. Refer to Diagram 3, which indicates that existing farm tracks will be used. • Demarcate areas for clearing in the river bed. • The mining area and stockpile areas must be demarcated and the footprint contained within the demarcated area. • Mining areas to be limited to blocks of 500m at a time with rehabilitation of the bank and access areas required before moving upstream to the next block. • The annual rehabilitation plan must be implemented. • Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • 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. Should any animals be encountered these should be moved away by the ECO, if necessary. 				

	<p>Impact 4: Contamination & Pollution</p> <ul style="list-style-type: none"> • Oils and lubricants must be stored within sealed containment structures if kept on site. • Any mechanical equipment maintenance must be undertaken on 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. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately. • 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 • Provide all workers with environmental awareness training. • Provide a bin at the site. • Regularly dispose of any solid waste at a municipal waste disposal site. • Ensure all workers comply with the requirements of the EMPr. • Provide a mobile ablution facility. <p>Impact 5: Visual landscape</p> <ul style="list-style-type: none"> • The laydown areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads. <p>Impact 6: Emissions</p> <ul style="list-style-type: none"> • Ensure sand hauling is during normal working hours and not on Sundays • No amplified music shall be allowed on site. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. <p>Impact 7: Heritage resources</p> <ul style="list-style-type: none"> • Refer to Appendix 4 – no mitigation required for project site investigated. <p>Impact 8: Socio-economic</p> <ul style="list-style-type: none"> • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling) 				
ACTIVITIES	Final Rehabilitation and removal of temporary infrastructure	PHASE	DECOMMISSIONING	SIZE AND SCALE of disturbance	Less than 5ha
COMPLIANCE WITH STANDARDS	NEMA Section 2 Principles Environmental Authorisation	TIME PERIOD FOR IMPLEMENTATION	During the estimated 5-year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.		
MITIGATION MEASURES	<ul style="list-style-type: none"> • Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan. • Compacted areas shall be scarified after use during decommissioning and rehabilitation. • Any stored topsoil shall be spread over the scarified surface. • Shaping of river bed to avoid steep profiles and hollows. • Ongoing removal of alien invasive vegetation. • Planting of indigenous vegetation. 				

13.9 Impact Management Outcomes

Table 14: Impact Management Outcomes

AC TIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site access	Disturbance of river bank at access points	Water resources functionality in a FEPA	Construction	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Disturbance of fauna and flora	Biodiversity in an ESA		Remedy through restriction and rehabilitation	
	Soil compaction and erosion	Soil resource		Control through monitoring and management	
Site establishment, including waste generation and management	Visibility	Visual intrusion	Construction	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an ESA		Remedy through restriction and rehabilitation	
	Soil and sand contamination, soil compaction and disturbance	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage resources		Avoidance by relocation of activity if required. Refer to Appendix 4 – no mitigation required for project site assessed	Impact avoided
Removal of sand, loading and hauling, waste generation and management	Visibility	Visual	Operation	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an ESA		Remedy through restriction and rehabilitation	
	Soil and sand contamination, soil compaction and disturbance	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Disturbance of river bed; sand extraction	Water resources functionality in a FEPA			
	Destruction or loss of Heritage resources	Cultural and Heritage resources		Refer to Appendix H – no mitigation required for project site investigated.	Impact avoided
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Soil resource	Decommissioning	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil erosion due to slow recovery of vegetation	Soil resource & biodiversity		Remedy through restriction and rehabilitation & control through monitoring and management	
	River bed profile	Water resources functionality in a FEPA			

13.10 Impact Management Actions

Table 15: Impact Management Actions

AC TIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Site access	Disturbance of river bank at access points	Remedy through restriction and rehabilitation	Concurrently with site access activities	Remain within the ambit of the Mining Permit Programme and Environmental Authorisation
	Disturbance of fauna and flora	Control through monitoring and management	Upon cessation of activity	
	Soil compaction and erosion			
Site establishment, including waste generation and management	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)			
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Avoidance by relocation of activity if required		
Removal of sand, loading and hauling, waste generation and management	Visibility	Control through monitoring and management	Concurrently with site access activities	Remain within the ambit of the Mining Permit Programme and Environmental Authorisation
	Emissions (dust, noise & vehicles)	Control through monitoring and management		
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation	Upon cessation of activity	
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Disturbance of river bed; sand extraction			
	Destruction or loss of Heritage resources	Refer to Appendix 4 - none required.		
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Control through monitoring and management	Upon cessation of activity	Remain within the ambit of the Mining Permit Programme and Environmental Authorisation
	Soil erosion due to slow recovery of vegetation	Remedy through restriction and rehabilitation & control through monitoring and management		
	River bed profile			

14. Financial Provision

14.1 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 rehabilitated post-mining environment:
 - Ensure safe mining area with no potentially dangerous areas like deep excavations.
 - The site in the river bed is to be shaped and levelled at each stage of closure and rehabilitation.
 - Topsoil to be stockpiled and replaced during decommissioning and closure, and rehabilitation.
- Objective 2 - To minimise pollution or degradation of the environment:
 - Provide sufficient information and guidance to plan the sand mining activities in a manner that would reduce impacts as far as practically possible.
 - Limit residual environmental impact with no surface water or soil contamination by ensuring that no fuel or oil spills occur in the mining area.
 - Ensure that no solid waste or rubble is dumped on the site.
 - Ensure that portable toilets are used.
- Objective 3 – To minimise impacts on the community and to provide optimal post-mining social opportunities:
 - Ensure that workers remain within the mining permit area.
 - Operate during normal working hours only.
 - Minimise the generation of noise and dust.
 - Respond rapidly to any complaints received.
 - Minimal negative aesthetic impact
 - Optimised benefits for the social environment

14.2 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 draft 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.

14.3 Rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities

Refer Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment **appendix 2**.

14.4 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 sand mining activities back to its original condition. The rehabilitation plan provides the detail on how this will be achieved as detailed in **Appendix 2**.

14.5 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 **appendix 2**.

14.6 Confirm that the financial provision will be provided as determined.
As per Paragraph 11 of this report and **appendix 2**.

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

Table 16: Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All mining activities	All commitments contained in the BA Report and accompanying EMP.	Ensure commitments made within the approved BAR and EMP are being adhered to.	Site Manager and EAP.	Annual Undertake and submit an environmental performance audit to DMR
Site access and site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	Weekly, and after rain-fall events Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Sand Mining	Visual inspection of biodiversity impacts	Visual inspection of sand mining activities and other possible secondary impacts <ul style="list-style-type: none"> • Control and prevent the development of new access tracks. • Control and prevent growth of alien vegetation in cleared areas and on stockpiles. • Standard waste management practices must be implemented to prevent contamination and littering. • All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure. 	Site Manager & Contractor (or sub-contractors)	Daily Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
	Visual inspection of water resource functionality			
	Visual inspection of waste management, housekeeping and maintenance.			
Closure & Rehabilitation	Revegetation; Stability; River profile; Soil erosion; Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	Bi-Annual A final audit report for site closure must be submitted to the DMR for approval.

14.8 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.

15. Environmental Awareness Plan

15.1 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 mining 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.

15.2 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 unplanned 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 >1m²), 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 (at a licenced facility) 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: Any person who observes the fire must 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.

15.3 Specific information required by the Competent Authority
(Among others, confirm that the financial provision will be reviewed annually).

Not applicable at this stage

16. Undertaking

The EAP herewith confirms the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&As, 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.



N.J. van Zyl

Signature of the environmental assessment practitioner:

Private Enterprise

Name of company:

31 May 2020

Date:

-END-

Appendix 1: Impact assessment

**Appendix 2: Final Rehabilitation, decommissioning and mine closure plan
Including Environmental Risk Assessment and quantum
calculations**

Appendix 3: Public Participation Process

Appendix 4: Heritage Impact Assessment

**Appendix 5: Application for a General Authorisation ito GN 509 (2016) for
Sec21(c) and (i) of the National Water Act (Act 36 of 2008)**