



mineral resources

Department:

Mineral Resources

REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT 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: **KIMSWA MINING (PTY) LTD WITH REGISTRATION NUMBER
2018/299268/07**

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FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/1/2/12200 PR**

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (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, 1998 (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 therefore 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.

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts—
 - (aa) can be reserved;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be avoided, managed or mitigated.
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and Correspondence Address

i) Details of the EAP who prepared the report:

Name of the Practitioner: **ROELIEN OOSTHUIZEN**
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Physical Address: **4 Millin Street, Hadisonpark 8301**
Postal Address: **P.O. Box 110823, Hadisonpark 8306**

ii) Appointed by:

Kimswa Mining (Pty) Ltd

iii) Expertise of the EAP

(1) The qualifications of the EAP

Masters in Environmental Management (UFS)
B-Comm in Human and Industrial- Psychology (NWU)
(with evidence attached as **Appendix 1**)

(2) Summary of the EAP's past experience

(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc.

See attached CV.

(with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	<p>Farm No: 11</p> <p>Farm Name: Rietfontein</p> <p>Portion: Remaining Extent of Portion 9</p> <p>Magisterial District: Prieska</p> <p>Province: Northern Cape</p> <p>Title Deed No: T38265/2011CTN</p> <p>Extent: 2841.9980ha</p> <p>Owner: Willem Karsten</p> <p>Farm No: 11</p> <p>Farm Name: Rietfontein</p> <p>Portion: Portion 13</p> <p>Magisterial District: Prieska</p> <p>Province: Northern Cape</p> <p>Title Deed No: T91856/2001CTN</p> <p>Extent: 3771.2856ha</p> <p>Owner: Geelbeksdam Trust</p>
Application area (Ha)	6613.2836ha (Six thousand six hundred and thirteen comma two eight three six hectares).
Magisterial district:	Prieska
Distance and direction from nearest town	<p>Prieska is a town on the south bank of the Orange River, in the province of the Northern Cape, in South Africa.</p> <p>The application area is about 60 km northwest from Prieska and about 25km east from Maryvale on the south bank of the Orange River.</p>
21 digit Surveyor General Code for each farm portion	<p>Co6000000000001100009</p> <p>Co6000000000001100013</p>

c) **Locality map** (show nearest town, scale not smaller than 1:250000)

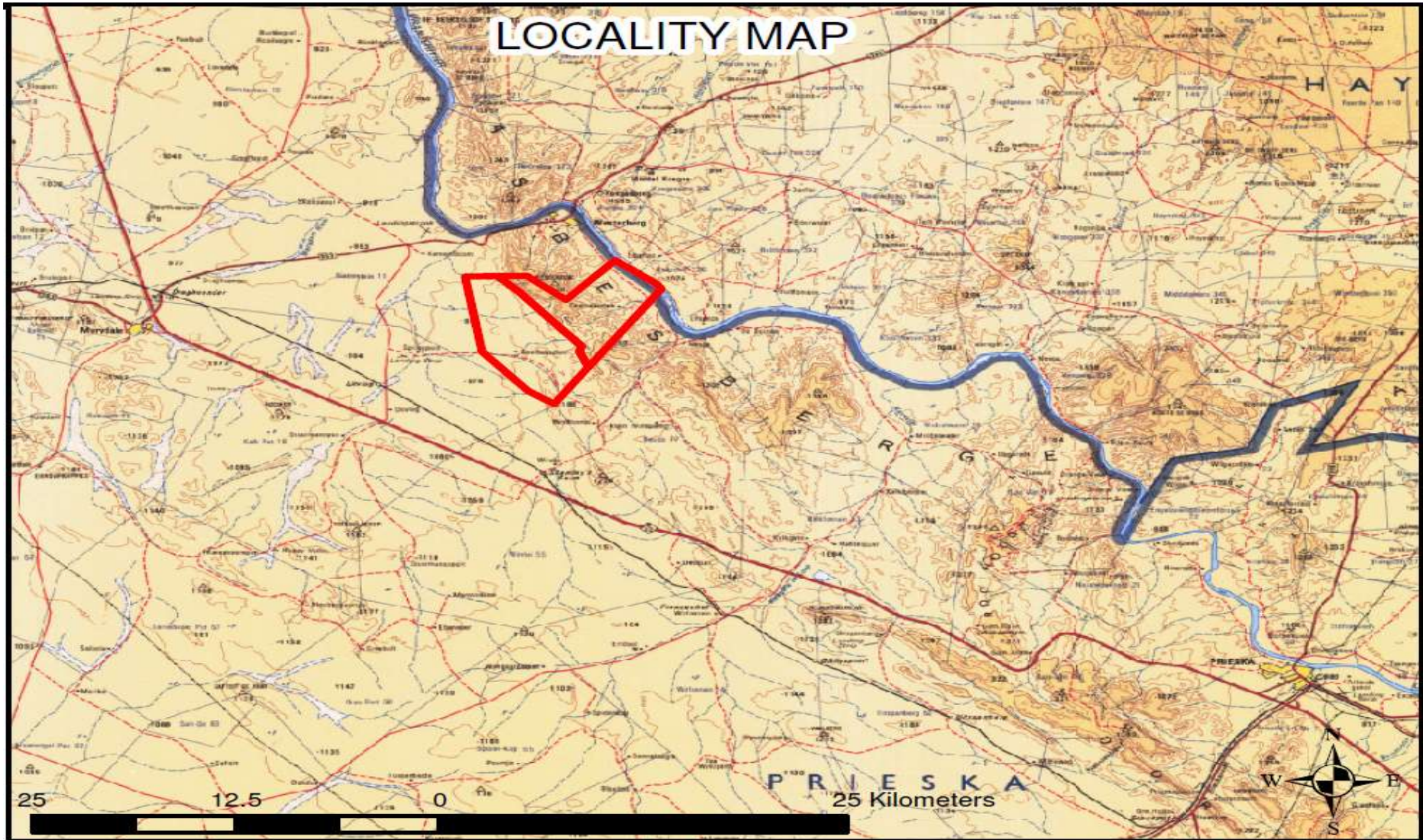


Figure 1. Locality Map 1: 250 000

d) Description of the scope of the proposed overall activity

(provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site)



Figure 2. Infrastructure site layout plan with proposed google overlay of core prospecting area and processing (Dr. B Milne out of ecological report 2019).

i) **Listed and specified activities****Table 1: Listed and Specified Activities**

Name of activity (e.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the activity (Ha or m ²)	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
Activity 9: "The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (vii) with an internal diameter of 0.36 metres or more; or (viii) with a peak throughput of 120 litres per second or more;	Water distribution Pipelines	X	NEMA: LN1 (GNR983)
Activity 12: "The development of— (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or	Clean and dirty water systems on the site. It is anticipated that the operations will establish storm water control berms and trenches to separate clean and dirty water on the mine site.	X	NEMA: LN1 (GNR983)

<p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse”</p> <p>Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities)</p>			
<p>Activity 14: The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.</p>	<p>The site will establish 2X23 000l diesel tanks and 1X 23 000l for old oil as well as new oils and grease for the site.</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>
<p>Activity 20: The Kimswa Mining operation directly relates to prospecting of a mineral resource (diamonds) and requires a prospecting right.</p>	<p>6613.2836 ha Although the total area will never be prospected and the footprint with the bulk sampling is calculated to be ± 400 ha.</p> <p>100 Trenches will be excavated with the following dimensions on pits that prove to contain gravels (tested positive). It is estimated that on average 3m of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2m) which is host to the diamonds. The trenches will be 200m X 200m X 0.5 – 5m deep. We calculated the volume of gravel on 2 m and if all 100 trenches are going to be excavated an average of 200 000m³ will be tested.</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>
<p>Activity 24(iii): The development of haul roads 15 m wide with no reserve.</p>	<p>5km</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>

<p>Roads (both access and haulage road on the mine site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 5 km of roads, with a width of 15 meter.</p>			
<p>Activity 25: “The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.”</p>	<p>Chemical toilets for the site Wash bays for the site</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>
<p>Activity 30: “Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).”</p>	<p>The proposed prospecting site falls within critical biodiversity areas as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). The Majority of the study site comprise of Ecological support areas, while the Orange River is classified as Critical Biodiversity Area One and a small section on the hills as Critical Biodiversity Area Two. No protected areas occur in or near the study area. (taken out of the Ecological study by Boscia Ecological Consulting September 2019)</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>
<p>Activity 56(ii): The continuous lengthening (and rehabilitation) of haul roads 15 m wide with no reserve. Roads (both access and haulage road on the mine site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 5 km of roads, with a width of 15 meter.</p>	<p>5km</p>	<p>X</p>	<p>NEMA: LN1 (GNR983)</p>

Activity 15: "The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) The undertaking of a linear activity; or (ii) Maintenance purposes undertaken in accordance with a maintenance management plan."	40ha		NEMA: LN2 (GNR984)
Activity 19: The Kimsa Mining operation directly relates to prospecting of a mineral resource (diamonds) and requires permission in terms of Section 20 (MPRDA), for the removal and disposal of bulk samples of any minerals.	6613.2836 ha Although the total area will never be prospected and the footprint with the bulk sampling is calculated to be ± 40 ha.	X	NEMA: LN2 (GNR 984)
Activity 21: The Kimsa Mining operation directly relates to activities associated with the primary processing of a mineral resource.	±0.4 per site	X	NEMA: LN2 (GNR 984)
Activity 27(iv): "The development of — (iv) a road catering for more than one lane of traffic in both directions;" Roads (both access and haulage road on the mine site):	5km	X	NEMA: LN2 (GNR 984)
Activity 2: A reservoir with a capacity of more than 250 m ³ for bulk water supply.	To be confirmed	X	NEMA: LN3 (GNR985)
Activity 4: The development of access roads 6 m in width with no reserve. Roads (both access and haulage road on the mine site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 5 km of roads, with a width of 6 meter.	5km	X	NEMA: LN3 (GNR985)
Activity 15: The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a prospecting right. Product stockpiles	0.5ha		NEMWA: Category A (GNR 633)

Tailing Stockpiles Topsoil Stockpiles			
Activity 15: The establishment of residue deposits (slimes dams) resulting from activities which require a prospecting right.	0.5ha		NEMWA: Category A (GNR 633)
Pipelines for the bulk transportation of water with a diameter of < 0.36 m and a peak throughput of < 120 L/s. Pipelines for the bulk transportation of slimes with a diameter of < 0.36 m and a peak throughput of < 120 L/s. Pipelines for the bulk transportation of return water with a diameter of < 0.36 m and a peak throughput of < 120 L/s.	To be confirmed		
Office complexes Temporary workshop facilities Storage facilities Concrete bund walls and diesel depots Ablution facilities Topsoil stockpiles Overburden stockpiles Water tanks Return water dams	± 200 m2 ± 300 m2 ± 3 000 m2 ± 250 m2 ± 30 m2 ± 500 m2 5 000 m2 3m x 3m = 9m ² each To be confirmed		Not Listed
Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: <ul style="list-style-type: none"> • Small amounts of low-level hazardous waste in suitable receptacles. • Domestic waste. • Industrial waste. 	15m x 30m = 450m ² per site		Not Listed

ii) Description of the activities to be undertaken

(Describe methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Description of the Planned Prospecting Methods to be implemented

The entire proposed prospecting project at Prieska will be conducted in four phases as described below over a period of 60 months. This prospecting will consist of non-invasive and invasive (Bulk Sampling) activities. The review of available information that exists over the area of interest will be undertaken by means of conducting a literature review from satellite images and other available information.

1) Description of Planned Non-Invasive Activities

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

PHASE 1**Review of Past Exploration Results**

In order to direct the exploration programme in an efficient manner, there will be a review of all information and data gathered during previous exploration. A site investigation of the target areas will be undertaken to identify infrastructure and determine any potential problems that may need to be addressed.

Imagery Analysis & Geological Mapping

High-resolution satellite images will be studied and used to geologically map the application area. Contacts between various lithologies will be mapped and specific attention will be given to delineate and define areas underlain by alluvial gravels.

2) Description of Planned Invasive Activities

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

PHASE 2**Drilling**

RC-drilling – Drilling is done in phases, over anomalous target areas, using reconnaissance lines or a grid of 200m X 200m or 100m X 50m depending on the level of confidence in the targets and the level of information required. The holes will be approximately 5 metres deep depending on local depth to bedrock (It is envisaged that at least 300 holes will be drilled). If initial drilling proves that only Rooikoppie gravels exist on the property and gravels only go 1m or less deep, drilling will cease and pitting will continue.

PHASE 3**Invasive Prospecting Pits**

Invasive Prospecting Pits will be positioned also on a grid of 200m X 200m or 100m X 50m.

PHASE 4

Bulk Sampling

Bulk Sampling Activities

ACTIVITY		DETAILS		
Number of pits/trenches planned		150 pits/ 20 trenches		
	Number of pits/trenches	Length	Breadth	Depth
	150 pits	2m	3m	0.5 - 5m
	20 trenches	100m	50m	0.5 – 5m
Locality		The location of the trenches will be verified during a site reconnaissance visit and after the pre-feasibility studies has been compiled.		
Volume Overburden (Waste)		Pits 1350m ³ Trenches 250 000m ³		
Volume Ore		Pits 1350 m ³ Trenches 250 000 m ³		
Density Overburden		2.2		
Density Ore		2.2		
Phase(s) when bulk sampling will be required		Month 25 – 49 Phase 4 and 5		
Timeframe(s)		From time to time during Month 25 - 49		

3) Description of Pre-feasibility Studies

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

PHASE 5**Analytical Desktop Study**

The project geologist monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the manner in which the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

A GIS based database will be constructed capturing all exploration data.

4) Description of Bulk Sampling Activities

(Bulk sampling is a sampling technique only)

Volumes of the mineral to be tested:

Number of pits/trenches	Length	Breadth	Depth
150 pits	2m	3m	0.5 - 5m
20 trenches	100m	50m	0.5 – 5m

Hundred and Fifty pits will be excavated with the following dimensions: 2 m long by 3 m wide by varying depths for a total of 2700m³. It is estimated that on average 0.5 - 2.5 of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2.5m) which is host to the diamonds.

20 Trenches will be excavated with the following dimensions 100m X 50m X 0.5 – 5m. It is estimated that on average 0.5 – 2.5m of overburden will be removed before accessing the gravel layer (average 2.5m) which is host to the diamonds.

The location of the pits and trenches will be based on the drilling which needs to be done before the pitting and trenching.

Why they will be tested:

The gravel will be tested to determine a grade (carats per hundred tonne) and value (US\$ per carat). The closest alluvial operation is about 10km downstream which necessitates bulk sampling for this project.

Where they will be tested:

All bulk sampling activities will take place on site. Herewith follows a description of the process:

The planned bulk sampling technique is that of a typical South African alluvial diamond operation. The planned mining method is a strip-mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation. Gravels are excavated, loaded and transported to the nearby treatment facility using articulated dump trucks.

The access to the various gravel trenches will be provided by a haul road to the screening and processing plants. The operation is to be conducted using conventional open pit mining equipment comprising Three 40-t articulated dump trucks supported by 1X excavator, 2X front-end loaders, 1X 16 feet pan and 1X Finlay Screen.

The vegetated soil overlying the planned trenches is stripped prior to excavation of the gravel and stockpiled on a dedicated dump to be used for rehabilitation purposes at a later stage. Where the gravels are covered by hard calcrete possible drilling and blasting

will be needed. If needed the Drill patterns can be staggered or square pattern, with burden and spacing of 4m x 4m. Blast holes are charged with emulsion explosive and different down-hole charge configurations are used depending on the different rock types to be blasted. This together with the necessary blasting accessories will achieve optimal fragmentation.

The gravel is loaded with an excavator into ADT's. Ore is hauled to the screening plant. As an integral part of the bulk sampling processes, backfilling will take place continuously.

Gravels are loaded onto a vibrating grizzly and the +85 mm oversize material is discarded back into the open pit (about 25% reduction). The remaining -85 mm fraction is loaded into a 16-foot rotary pan with a treatment capacity of 50 tph. A magnetic separator is used to extract some of the heavy banded iron stones. Tracer tests are done regularly to ensure that the pans are operating at the correct density. Approximately 2.5 tonne of concentrate is tapped from the pan every hour and transported in locked containers to the final recovery unit.

The final recovery unit consists of a holding bin, sizing screen, sizing bins and one state of the art Flowsort X-ray recovery unit which recover diamonds from the +2 mm to - 32 mm size fraction. Final sorting of the Xray concentrate will be done manually.

Rehabilitation will take place continuously and at any stage only trenches will be open.

To whom they will be disposed of:

At an expected grade of 0.5 carats per hundred tonnes. Diamonds will be sold at a reputable diamond tender house in Kimberley to determine an average US\$/carat value for the diamonds.

Excavations will be carefully measured to determine the tonnages of excavated gravel material. Detailed records will be kept of the diamonds recovered. This will enable the appointed consulting geologist to determine the grade of the gravels. A diamond specialist will be hired to give a detailed description of the diamonds recovered and to do a projection of the size distribution of the deposit. The diamonds will be sold at a diamond tender house which will result in an average diamond value for the deposit. The grade and average diamond value will be used in a resource statement.

The following reports will result from the bulk sampling operation:

- measure volume and tonnage report by a mining supervisor;
- Report on diamonds recovered and their characteristics by a diamond expert;
- Diamond tender results;
- Report on bulk sampling results by a geologist.

Bulk sampling will enable to increase the confidence levels of resource levels from inferred to indicated. Without bulk sampling test it is not possible classify the resource beyond inferred levels.

Waste Management

Proper sanitation facilities will be provided for employees. No person will pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine. Acceptable hygienic and aesthetic practices will be adhered to. Non-biodegradable refuse such as glass bottles, plastic bags, etc. will be sorted and stored in separate lockable containers at a central point. It will be disposed of at a recognised disposal facility twice a month. Biodegradable refuse will either be handled as indicated, or be buried in a pit excavated for that purpose and covered with layers of soil when almost full. A final 0,5m thick layer of topsoil will be incorporated where practicable. Provision will be made for the future subsidence of the covering. Refuse will not be dumped in the vicinity of the mining area. Waste material with regard to vehicle repairs will be kept in 200 litres steel containers in the maintenance/farmstead area. This material will be disposed of at a recognised disposal facility once a month.

e) Policy and Legislative Context

<p>Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</p>	Reference where applied	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).</p>
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	<ul style="list-style-type: none"> - Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	<ul style="list-style-type: none"> - Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	<ul style="list-style-type: none"> - Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions. 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	<ul style="list-style-type: none"> - Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	<ul style="list-style-type: none"> - Definition, classification, use, operation, modification, disposal or dumping of hazardous substances. 	<ul style="list-style-type: none"> - Noted and Considered measures are to be implemented upon the approval of the EMPR.

Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Prospecting Right has been applied for ((NC) 30/5/1/2/2/12200 PR). - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)	- Control measures are to be implemented upon the approval of the EMPR.

	<ul style="list-style-type: none"> - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision) 	
National Environmental Management: Air Quality Act (Act 39 of 2004)	<ul style="list-style-type: none"> - Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines) 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	<ul style="list-style-type: none"> - Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations. <p>Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007</p>	<ul style="list-style-type: none"> - A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. In terms of the specialist study no species were encountered. - Control measures are to be implemented upon the approval of the EMPR.

	<p>Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 *</p> <p>Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 *</p> <ul style="list-style-type: none"> - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species) 	
<p>The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.</p>	<ul style="list-style-type: none"> - Chapter 2 lists all protected areas. 	<p>The proposed prospecting site falls within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem</p>

		types and species as well as the long-term ecological functioning of the landscape as a whole. The majority of the study site comprise of Ecological Support areas, while the Orange River is classified as Critical Biodiversity Area One and a small section on the hills as Critical Biodiversity Area Two. No protected areas occur in or near the study site.
National Environmental Management: Waste Management Act (Act 59 of 2008)	<ul style="list-style-type: none"> - Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921) 	- To be implemented upon the approval of the EMPR.

National Forest Act (Act 84 of 1998) and Regulations	<ul style="list-style-type: none"> - Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister. 	<ul style="list-style-type: none"> - A permit application regarding protected tree species need to be lodged with DAFF if necessary. - Control measures are to be implemented upon the approval of the EMPR.
National Heritage Resources Act (Act 25 of 1999) and Regulations	<ul style="list-style-type: none"> - Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority. - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999	<ul style="list-style-type: none"> - Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. 	<ul style="list-style-type: none"> - A water use licence application is in the process of being lodged with the EIA EMP document for the property

	<ul style="list-style-type: none"> - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: <ul style="list-style-type: none"> (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse; (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and; - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) 	<p>under the Prospecting Right. Control measures are to be implemented upon the approval of the EMPR.</p>
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	<ul style="list-style-type: none"> - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j)) 	
Nature Conservation Ordinance (Ord 19 of 1974)	<ul style="list-style-type: none"> - Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Northern Cape Nature Conservation Act (Act 9 of 2009)	<ul style="list-style-type: none"> - Addresses protected species in the Northern Cape and the permit application process related thereto. 	<ul style="list-style-type: none"> - A permit application regarding provincially protected plant species as well as for large-scale harvesting of indigenous flora need to be lodged with DENC if necessary. - Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	<ul style="list-style-type: none"> - Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	<ul style="list-style-type: none"> - Entire Act. 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	<ul style="list-style-type: none"> - It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution). 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		<ul style="list-style-type: none"> - To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	<ul style="list-style-type: none"> - To control planning and development 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.

Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	<ul style="list-style-type: none"> - To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA 	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997)) and regulations, more specifically GN R1130	<ul style="list-style-type: none"> - To control land surveying, beacons etc. and the like; - Agriculture, land survey S10 	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998)) and regulations, more specifically GN R1775	<ul style="list-style-type: none"> - To regulate law on veld and forest fires - (Draft regulations s21) 	- To be implemented upon approval of the EMPR
Municipal Ordinance, 20/1974	- To control pollution, sewers etc.	- To be implemented upon approval of the EMPR
Municipal Ordinance, PN955, 29/08/1975	- Nature conservation Regulations	- To be implemented upon approval of the EMPR

Cape Land Use Planning Ordinance, 15/85	- To control land use planning	- To take note.
Cape Land Use Planning Ordinance, PN1050, 05/12/1988	- Land use planning Regulations	- To take note.

f) Need and desirability of the proposed activities

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location)

Farm land adjacent to the Orange River has for decades been used extensively for irrigated agricultural development within the Boegoeberg Dam Irrigation Area. The earliest available aerial imagery for the Prieska area is from 2001 which shows evidence of large-scale pivot systems adjacent to the Orange River from the R386 and Prieska and further upstream towards the east. Agricultural development adjacent to the Orange River appears to decrease notable from the R386 towards the downstream environment and towards Prieska.

Additionally, livestock farming is also practiced within the area. In summary livestock farming within the Prieska area comprises:

- Livestock: Goats, sheep, cattle and dairy production to a lesser extent.
- Crop production: Grapes, wheat, groundnuts, cotton, maize and Lucerne.

The application area is about 60 km northwest from Prieska and about 25km east from Maryvale on the south bank of the Orange River, and are currently used for livestock farming and is characterised with a low agricultural potential. Additionally, small scale asbestos mining of the surrounding hills and diamond mining of the underlying gravels were undertaken on the farms in the past (period not certain).

The area applied for is over the entire portions but the main prospecting focus area will be on the higher terraces if the pitting proves positive. After prospecting the land will be utilized for grazing again.

The diamond industry is an international trade and the consumer demand for diamonds has shown positive nominal US Dollar (USD) growth, with annual growth of almost 5 % from 2008 to 2013. South Africa was the fifth biggest producing country, with its production increasing with 15% to a value of USD 1.19 billion. The diamond value or its selling price depends on a number of factors: colour, clarity, stone size and shape. An average value can only be determined from the valuation of a large representative parcel of diamonds recovered from the deposit.

Prospecting with bulk sampling will assist in indicating the grade and quality of diamond resources on the application farms. The proposed project is envisaged to have a positive socio economic impact on the local, regional and national economy.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

This section converses the determination of the specific site layout having taken into consideration the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised

by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Figure 2 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

(a) The property on which or location where it is proposed to undertake the activity:

Farm Name	Title Deed	In Extent
Farm No: 11 Farm Name: Rietfontein Portion: Remaining Extent of Portion 9 Magisterial District: Prieska Province: Northern Cape Owner: Willem Karsten	T38265/2011CTN	2841.9980 ha
Farm No: 11 Farm Name: Rietfontein Portion: Portion 13 Magisterial District: Prieska Province: Northern Cape Owner: Geelbeksdam Trust	T91856/2001 CTN	3771.2856 ha

Alternatives considered: -

As the area covered under the Prospecting Right had been selected based on the assumption of possible diamond reserves and indication of the presence of diamonds, it will not be viable to consider an alternative site for the prospecting. Alternatives for land are thus not available, as the Prospecting Right application cannot be considered over another area.

Therefore there are no alternatives to the area.

(b) The type of activity to be undertaken:

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed

development enables sustainable development, a number of feasible options must be explored. The various alternatives were assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality the prospecting operation do not form part of the discussion as the location of the prospecting operation is determined by the geological location of the mineral resource (as discussed in section f).

Land Use

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of fauna, flora, soil and land use was described and included in this report as part of the ecological study.

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Apart from the KIMSWA diamond prospecting right application, the property was also subjected to asbestos and lead mining in the past. Currently, the farm is utilised for grazing by cattle, goat and sheep, while a portion along the river is used for crop irrigation. A number of homesteads on the farm are currently occupied by land owners, tenants and workers.

If the prospecting operation does not continue, the grazing capacity and crop irrigation will continue. Water from the Orange River will be obtained for bulk sampling. The prospecting operation will not abstract any ground water.

The prospectors will have to promote rehabilitation strategies to ensure that open pits and trenches are backfilled. There will be infield screening to ensure that all oversize material is deposited back into the pits and trenches. This material should be covered with the overburden (where available), and topsoil that has been previously put aside for this purpose. The post-mining land use should be determined so that the developments strategies of the farm can still be continue beyond the prospecting and mining of the area should the area be viable for mining.

Project Infrastructure

Alternatives and considerations pertaining to the project infrastructure were discussed in section g.

Prospecting Method

The Prospecting method of open pits and trenches with continued backfilling is the only economic viable method currently being used by the diamond fraternity. There is no alternative prospecting method for the prospecting of diamonds.

Proceed without the Mine (no go)

Socio-Economy

The prospecting plan is to employ 15 people. The non-approval of this prospecting operation would impact negatively on the employment rate for Douglas / Prieska and the families who are likely to benefit from the positive employment opportunities. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

The implementation of the prospecting will have a potential impact on the biodiversity through removal of indigenous vegetation and destruction of habitats. If no prospecting activities were to continue, the status quo would apply and no damage would accrue to the environment.

Heritage and Cultural Resources

In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

(c) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating prospecting project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the nearby access roads, proximity to the areas earmarked for bulk sampling as well as limited additional impact on the environment (non-perennial drainage lines and wind direction), heritage resources and discussions with the relevant Departments.

The following infrastructure will be established and will be associated with the prospecting operation:

- Processing Plant : 1 X 16 feet
- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
- Clean & Dirty water system: Berms
It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the prospecting site.
- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
It is anticipated that the operation will utilize 2 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.
- Prospecting Area: Area applied for to pit and trench for diamonds (bulk sampling).

- Processing plant:
- Roads (both access and haulage road on the prospecting site):
Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 1.5 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the prospecting site.
- Salvage yard (Storage and laydown area).
- gravel Stockpile area.
- Waste disposal site
The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:
 - Small amounts of low level hazardous waste in suitable receptacles;
 - Domestic waste;
 - Industrial waste.
 - Temporary Workshop Facilities and Wash bay.
 - Water distribution Pipeline.
 - Water tank:
It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

Alternatives considered:-

Alternatives for fuel storage include surface storage, underground storage and the storage of fuel in mobile tanks with a metal bund wall. Underground storage has an adverse negative pollution potential, because it is not easy to monitor leakages. Remediation measures are also not as effective as compared to surface storage tanks. Mobile tanks are a viable option for infield screening activities, but the best viable long term option is the instalment of fuel tanks within a concrete bund wall. The final location of the fuel storage tanks will be determined based on proximity to site operations.

In terms of water use alternatives; the operation is located near to the Orange River which is a perennial river as the best water source for the operation. Plastic pipelines are considered to be the best long term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

Therefore, a pipeline route will be designed based on the principle of minimum impacts to the environment.

In terms of power generation the options available was for Generators or ESKOM power. All of the electricity needs for the operations will be generated by a diesel generator and there would therefore be no additional pressure on the Eskom Electricity Grid.

In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.

(d) The technology to be used in the activity:

- Technique

The area will be excavated (opencast method) with an excavator up to bedrock, stockpiled next to an open area and loaded onto the trucks by a frond end loader. The trucks will transport the gravel via a newly constructed road, which will be constructed to the required safety standard. No provincial roads will be used. At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening section for delivery to a recovery plant and associated equipment.

- Technology

At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening section for delivery to a recovery plant and associated equipment.

Alternatives considered:-

The planned prospecting activities include (bulk sampling) with an excavator up to bedrock. The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative prospecting method for the bulk sampling of possible alluvial and kimberlite diamonds.

(e) The operational aspects of the activity:

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the bulk sample gravels will be fed onto a grizzly for screening out oversize material. The tailings will be processed through a screening section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract possible diamonds.

Prospecting activities will primarily make use of existing roads, but additional roads will most likely be created.

Alternatives considered:-

The conventional opencast load-haul-bulk sampling method has been proven to be the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative bulk sampling method for the prospecting and extraction of possible kimberlite and alluvial diamonds.

(f) **The option of not implementing the activity:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of fauna, flora, soil and land use was described and included in this report as part of the ecological study.

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Apart from the KIMSWA diamond prospecting right application, the property was also subjected to asbestos and lead mining in the past. Currently, the farm is utilized for grazing by cattle, goat and sheep, while a portion along the river is used for crop irrigation. A number of homesteads on the farm are currently occupied by land owners, tenants and workers.

Therefore, prospecting activities are believed to be the most economically beneficial option for the area to establish any potential for mineral resources.

Socio-Economy

The operation will make provision for 15 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of fauna, flora, soil and land use was described and included in this report as part of the ecological study.

The proposed prospecting site falls within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. The majority of the study site comprise of Ecological Support areas, while the Orange River is classified as Critical Biodiversity Area One and a small section on the hills as Critical Biodiversity Area Two. No protected areas occur in or near the study site.

Heritage and Cultural Resources

PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE

RESOURCES ACT (NO 25/1999) FOR THE PROPOSED MINE PROSPECTING ON THE REMAINING EXTENT OF PORTIONS 13 AND 9 OF THE OF THE FARM RIETFONTEIN 11, PRIESKA DISTRICT, NORTHERN CAPE PROVINCE was done by Dr Edward Matenga on 22 January 2019. The report is appended as **Appendix C** to this report.

EXECUTIVE SUMMARY

1. The Kimsa Mining Pty Ltd intends to lodge an application for a prospecting right on the Remaining Extent of Portions 13 and 9 of the Farm Rietfontein 11, Prieska District, Northern Cape Province. This report has been prepared in compliance with Section 38 of the National Heritage Resources Act (No 25/1999) and forms an integral part of an Environmental Impact Assessment (EIA) for the authorisation of the prospecting right.
2. Fifteen (15) sites were recorded and ranked in terms of their heritage value and the potential threat of the proposed development. The following is a summary of our findings:
3. *The Stone Age*
Stone tools and associated waste material in varying densities have been recorded in thirteen (13) locations. The stone tools comprise mainly scrapers, points and flakes while a few blades and cores also occur. No significant concentrations were found to suggest a settlement or regular activity.
4. The occurrence of a crude pear-shaped hand-axe is of particular interest as it seems to confirm the presence of Acheulean material in the area dating between 2 million to 250 000 years BP.
5. *The Iron Age*
No Iron Age relics were found on the property.
6. *Early mining and commercial farming*
An asbestos ore crushing and loading site was seen. A small rectangular structure is built of dressed dolomite apparently locally sourced. There are no circumstances to warrant destruction of these two structures.
7. *Burial grounds*
No graves or burial grounds were reported on the property.
8. *Conclusion and recommendations*
The mine prospecting can go ahead subject to the precautions taken to protect the two historical structures on the property. The study is mindful that archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during development activities, such activities should be halted, and the heritage authorities notified in order for an investigation and evaluation of the finds to take place.

Palaeontological Impact Assessment for the proposed prospecting rights on Farm Rietfontein 11 and 13, Prieska District, Northern Cape Province by Prof Marion Bamford Palaeobotanist

Executive Summary

A palaeontological Impact Assessment was requested for the prospecting rights application for the Farm Rietfontein 11 Portions 9 and 13, near Prieska, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.

The geological structures suggest that the rocks are mostly too old or volcanic to contain fossils. Stromatolites (tracefossils) might occur in the Ghaap Group rocks. There is a small chance that the Dwyka Group mudstones could preserve fragment of the Glossopteris flora and invertebrates. Since there are potentially fossiliferous rocks in the vicinity a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low. No further palaeontological impact assessment is required.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the lavas and dolerite dykes do not contain fossils but the dolomites, sandstones, mudstones shales and sands are typical for the country and could contain fossil plant, insect, invertebrate and very rarely vertebrate material in the Dwyka Group mudstones. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the loose sands of the Quaternary Kalahari or in the limestones and stromatolites of the Vryburg Formations or the Schmidtsdrif Subgroup. There is a very small chance that fossils may occur in the mudstones of the Dwyka Group rocks so a Chance Find Protocol should be added to the EMP: if fossils are found once prospecting has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. Prospecting may proceed as far as the palaeontology is concerned.

ii) **Details of the Public Participation Process Followed**

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The consultation process with interested and affected parties (not neighbouring farmers and land owners) was completed for the acceptance of the application, the distribution of the Background Information Documents and the Scoping Report that was submitted and consisted of the process below.

The consultation process with interested and affected parties (neighbouring farmers and land owners) was not completed as the applicant had encountered problems in obtaining the addresses of the farm owners (Private person and Trust).

The process as described by NEMA for Environmental Authorisation was followed. See table 3 below for the identification of Interested and Affected Parties to be consulted with.

An Advert (Notice) was placed in the DFA on 18 September 2018 to notify all other interested and affected parties that might want to register for the application.

Registered consultation letters were sent on 10 September 2018 to all identified parties and government departments with a BID (Background Information Document) document attached.

Notices had not been placed yet as the owners had not been obtained for permission.

The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.

The document was also made available at the public library in Prieska.

The EIA EMP was put on disc and was distributed to all registered parties per registered mail during November 2019.

Consultation process:

Proof of consultation (attendance registers, minutes of meetings and response forms) is attached as Appendix 'A'. The consultation process is ongoing

iii) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

Table 2: Consultation with I & Aps

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted		Date Comments Received	Issues Raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated
<u>AFFECTED PARTIES</u>					
Landowner/s	X				
Willem Karsten Asterstraat 5 Blydeville Upington 8801 Mobile 0736054665 Work: 054 3388000	X October 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
Geelbeksdam Trust	X October 2018 mailed registered letter with BID document.				

		The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
Lawful occupier/s of the land						
Landowners or lawful occupiers on adjacent properties		X				
Mr. Barend C van Wyk CPA Koegas PO Box 1889 Kimberley 8301 barend@koegascpa.co.za Tel: 053 8329910 Mobile:0745809929 Fax: 053 832 9658		The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
Municipal Councillor		X				
Municipality		X				
Siyathemba Local Municipality P O Box 16 Prieska 8940 Mr Piet Papier		X 10 September 2018 mailed registered letter with BID document.				

<p>Pixley Ka Seme District Municipality Private Bag X1012 De Aar 7000</p>	<p>X 10 September 2018 mailed registered letter with BID document.</p> <p>The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.</p>				
<p>Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA</p>					
<p>ESKOM Environmental Division P O Box 356 Bloemfontein 9300 Ms A van Gensen</p>	<p>X 10 September 2018 mailed registered letter with BID document.</p> <p>The Scoping Report was put on disc and was distributed to all the registered parties per registered mail</p>				

	during October 2018.				
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development PO Box 606 Kimberley 8300	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.	17 September 2018	We confirm that our services will not be affected. Eskom distribution will raise no objection to the proposed Prospecting Right activity on the above mentioned property.		
Orange Vaal River Users Association P O Box 314 Douglas 8730	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail				

	during October 2018.				
SANRAL	<p>X</p> <p>10 September 2018 mailed registered letter with BID document.</p> <p>The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.</p>				
Transnet PO Box 72501 Parkview 2122	<p>X</p> <p>10 September 2018 mailed registered letter with BID document.</p>				
NC Department of Roads and Public Works PO Box 3132 Squirehill Park Kimberley 8300	<p>X</p> <p>10 September 2018 mailed registered letter with BID document.</p> <p>The Scoping Report was put on disc and was distributed to all the registered</p>				

	parties per registered mail during October 2018.				
Communities					
Refer to adjacent properties The Koegas CPA is on the neighbouring properties					
Dept. Land Affairs					
Department of Agriculture, Land Reform and Rural Development P O Box 28 De Aar 7000 Attention: Ms N Yende Tel: 053 – 631 3631 Fax: 053 – 631 0564 e-mail: nyende@ncpg.gov.za	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.		No comments received		
Traditional Leaders					
No Traditional Leaders					
Dept. Environmental Affairs					
Northern Cape Department of Environment and Nature Conservation Private Bag X6102	X 10 September 2018 mailed registered letter with BID document.				

Kimberley 8300 Tel: 053 807 7430 Fax: 053 831 3530	The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
Other Competent Authorities affected					
Department of Water and Sanitation Private Bag X6101 Kimberley 8300	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
SAHRA P.O. Box 4637 Cape Town 8000	X 10 September 2018 mailed registered letter with BID document.				

	The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5108 Kimberley 8300	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
National Dept. of Public Works P.O. Box 1931 Kimberley 8300	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was				

	distributed to all the registered parties per registered mail during October 2018.				
Department of Agriculture, Forestry and Fisheries Attention: Jacoline Mans Tel: 054 – 338 5909 Fax: 054 – 334 0030 Web: www.daff.gov.za e-mail: JacolineMa@daff.gov.za	X 10 September 2018 mailed registered letter with BID document. The Scoping Report was put on disc and was distributed to all the registered parties per registered mail during October 2018.				
<u>OTHER AFFECTED PARTIES</u>					
None					
<u>INTERESTED PARTIES</u>					
None					

iv) The Environmental attributes associated with the development

footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment**(a) Type of environment affected by the proposed activity**

(its current geographical, physical, biological, socio-economic, and cultural character)

o **GEOLOGY:**

Regional Geology

The bedrock of the Orange River valley between the confluence of the Vaal River and the Orange and Prieska, referred to as the Middle Orange, is dominated by flat-lying Dwyka tillite and siltstone of the Karoo Supergroup. These sediments were deposited by the Dwyka icesheet, with a flow direction from the north-east, in a broad valley roughly corresponding with the present Vaal-Orange system.

The Dwyka comprises matrix supported diamictite with pebbles and boulders of both local and transported lithologies, set in a rock-flour matrix, together with dropstone-bearing mudstones, shales and silts. Underlying the Dwyka, and exposed where the Orange has incised through that sequence, are lavas and pyroclastics of the Ventersdorp Supergroup, overlain in places by sediments of the Transvaal Supergroup, comprising shales, quartzites and dolomites. The bedrock is cut in places by faults and dolerite sheets, which are rarely exposed and can only, be mapped using geophysics. The surface on which the Dwyka was deposited was irregular with several topographic highs (presumed to be roches moutonnes) and glacially striated surfaces.

The present surface of the Dwyka comprises a gently undulating terrain lying at an elevation of between 1,050m and 1,100m amsl. The river has incised into this surface to a depth of between 90m and 150m. Owing to the irregularity of the pre-Dwyka surface, several reaches of the river are superimposed on pre-Dwyka topographic highs, which due to their relative resistance to erosion, give rise to more rugged topography. Here the Orange River is confined to gorges with increased river gradients. In contrast, the easily-eroded Dwyka has been dissected by minor tributaries of the Orange River, giving rise to trellis-type drainage pattern. To the north of the Orange River, the Ghaap Plateau represents an ancient surface of Transvaal Supergroup rocks.

Local Geology

The present drainage of the region consists of the Vaal-Harts River from the north-east, and the Orange River from the south-east. There is, however, strong evidence that a major drainage, flowing along the eastern face of the Ghaap

Plateau, entered the system in the vicinity of Oranjeoord, approximately 20km downstream from the Vaal-Orange confluence, during the Miocene-Pliocene.

It is suggested that this substantial river may have had as much as four times the discharge of the Orange River. Given that the area was already relatively arid, the river must have had a large catchment area, McCarthy (1983) suggesting that it had the upper Zambezi, Okavango and Kwando Rivers as tributaries. The upper Limpopo may also have flowed into the system during the Miocene-Pliocene. The alluvial diamonds of the Middle Orange have several probable primary source areas:- the diamondiferous kimberlites of Lesotho, eroded by the present Orange River; diamonds from the same source as the Lichtenburg – Western Transvaal diamondfields, eroded by the Vaal-Harts system; diamonds derived from the kimberlites of the Kimberley area; and diamonds from Botswana and the Postmasburg fields, including the Finsch kimberlite, eroded by the palaeo-drainage note above.

A terrace deposit is defined as an alluvial package of sediments in a braided river environment. Subsequent incision by the river at times of less energetic flow cuts into the braided deposits, leaving them perched above current river level. If this incision takes place in the centre of the valley-fill, terraces will be developed on both banks of the river. If incision is accompanied by lateral migration, as is often the case, the terrace is restricted to one bank only. Therefore, “terrace” is a morphological term, and the terrace can display any or all of the typical braided stream features, such as splays, chute bars, point bars, channels, sand banks. The terrace initially preserves the morphology of the braided river deposits, but later erosion can dissect or totally remove the terrace. On a regional scale, the terraces tend to have an elongated sheet-like shape, with an overall gentle gradient downstream, but this gradient can be stepped at barriers across the river valley, such as lithological changes in bedrock, cross dykes, etc. Consequently, contemporaneous terraces can be deposited at differing elevations, and conversely, terraces at the same elevation were not necessarily deposited during the same cycle, at the same time.

Several attempts have been made to correlate named terraces along the Vaal and middle Orange Rivers using the base elevations, both above sea level and above the present river level, of the various deposits. These attempts at correlation have met with limited success. In addition to the problem of stepping, no allowance can be made for post-depositional regional warping. Subsequent differential incision of the river into the terrace platform can also render the latter approach doubtful. The descriptions of the gravels given here are composite of information taken from McCarthy (1998).



Figure 3. The distribution of geological features in the study area. (Map taken out of the ecological study by Boscia Ecological Consultants by Dr Betsie Milne).

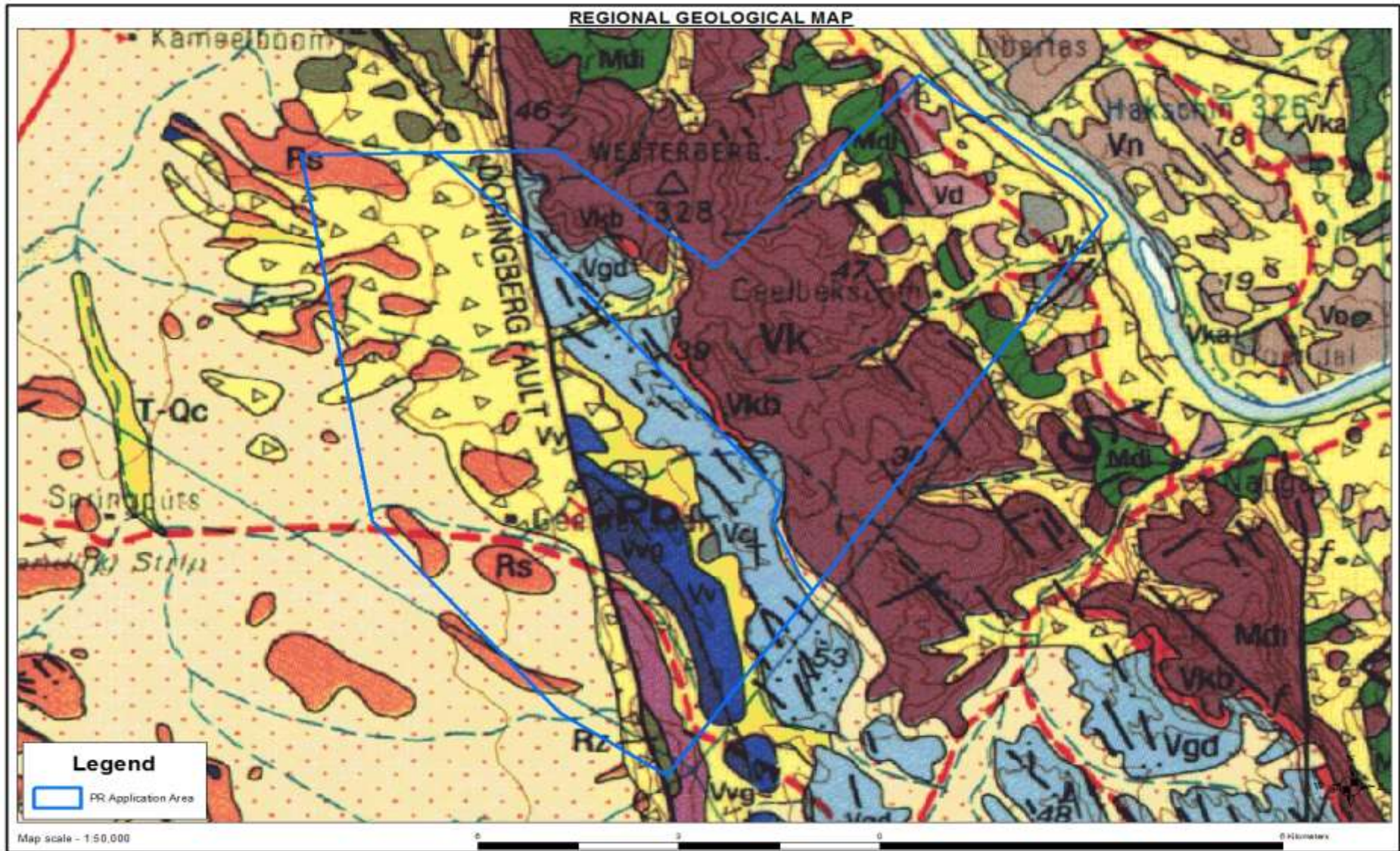


Figure 4. Extraction of Geological Map Prieska 2922 1:250 000

○ **CLIMATE:**

Regional Climate:-

The Northern Cape is classified as a semi-desert and is known to have summer rains with high temperatures in the Summer (as high as 38°C to 40°C) and cold Winters (temperatures ranging from -4°C to -6°C). The sun shines approximately 80% during Summer and approximately 70% during the Winter.

Average Annual Rainfall:-

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Ave rainfall (mm)	77	69	67	40	17	6	5	10	19	38	55	60	463
Ave rain days/month	6.5	5.7	6.2	4	1.6	0.9	0.8	1	1.6	3.5	5.2	5.9	43

Rainfall Intensity:-

Most of the rainfalls occur during thunderstorms in the Summer months as well as during cloud bursts where maximum rainfalls were measured of up to 112.5mm at a downpour of approximately 60 minutes.

Average Maximum and Minimum Temperatures:

The average maximum temperature measured during the Summer is 30.9°C and the minimum during the Winter months is 3.4°C.

Average Monthly Wind Direction and Speed:-

The prevailing wind direction in the area is mainly from the north to north-westerly with the strongest winds from the west-southwest to north-northwest that occurs between August and December. October and November month are common for high wind speeds of up to 4.85 metres per second.

Average Monthly Evaporation:-

It is estimated that the average annual evaporation rate is approximately 2365mm which indicates the dry climate conditions in this area.

Presence of Extreme Climatic Conditions:-

Hail	:	October to March
Frost	:	May to September
Strong Winds	:	Occasional strong winds occur but not often
Droughts	:	Normal for a desert area – approximately 6 out of 10 years

○ **TOPOGRAPHY:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological

characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area.

The area is characterised by rugged terrain, with irregular hills and ridges that divide the property to slope west towards the plains and east towards the Orange River. Altitude ranges from 900 m along the river in the east and 970 on the ridges in the west, to 1 285 m above sea level on the hilltops in the centre of the property. The terrain is generally indicated by gentle slopes of 6 % running east towards the river and 3 % running west towards the plains, while steeper slopes of 30 - 50 % are found around the hilltops (Ecological report by Dr. B Milne, 2019).

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
- identify the relative ecological sensitivity of the project area;
- produce an assessment report that:
 - indicates identified habitats and fauna and flora species,
 - indicates the ecological sensitivity of habitats and conservation values of species,
 - determines the potential impacts of the project on the ecological integrity,
 - provides mitigation measures and recommendations to limit project impacts,
 - indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological assessment report attached as Appendix B describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

○ **SOILS:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area. Soils was described and included in this report as part of the ecological study.

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
- identify the relative ecological sensitivity of the project area;
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 - indicates identified habitats and fauna and flora species,
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 - provides mitigation measures and recommendations to limit project impacts,
 - indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological assessment report attached as **Appendix B** describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

The Soils of the study area have been described by Dr. Milne as Land types found on the property include Ae275a, Fb378c, Fb383a, Fb388a, lb340a and lc152a (Figure 5). The lb land types are typically rocky areas with miscellaneous soils, while the lc types are very rocky with little to no soils. The Ae types are associated with red-yellow apedal, freely drained soils, red with high base status and more than 300 mm deep (no dunes). The core prospecting area is however closely associated with land type Fb (Figure 5). Here, Glenrosa and/or Mispah forms are primarily found with lime being rare or absent in upland soils but generally present in low-lying soils.

To conclude, Dr. Milne stated that it is clear that the destruction of the within the prospecting area is inevitable. The significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area.

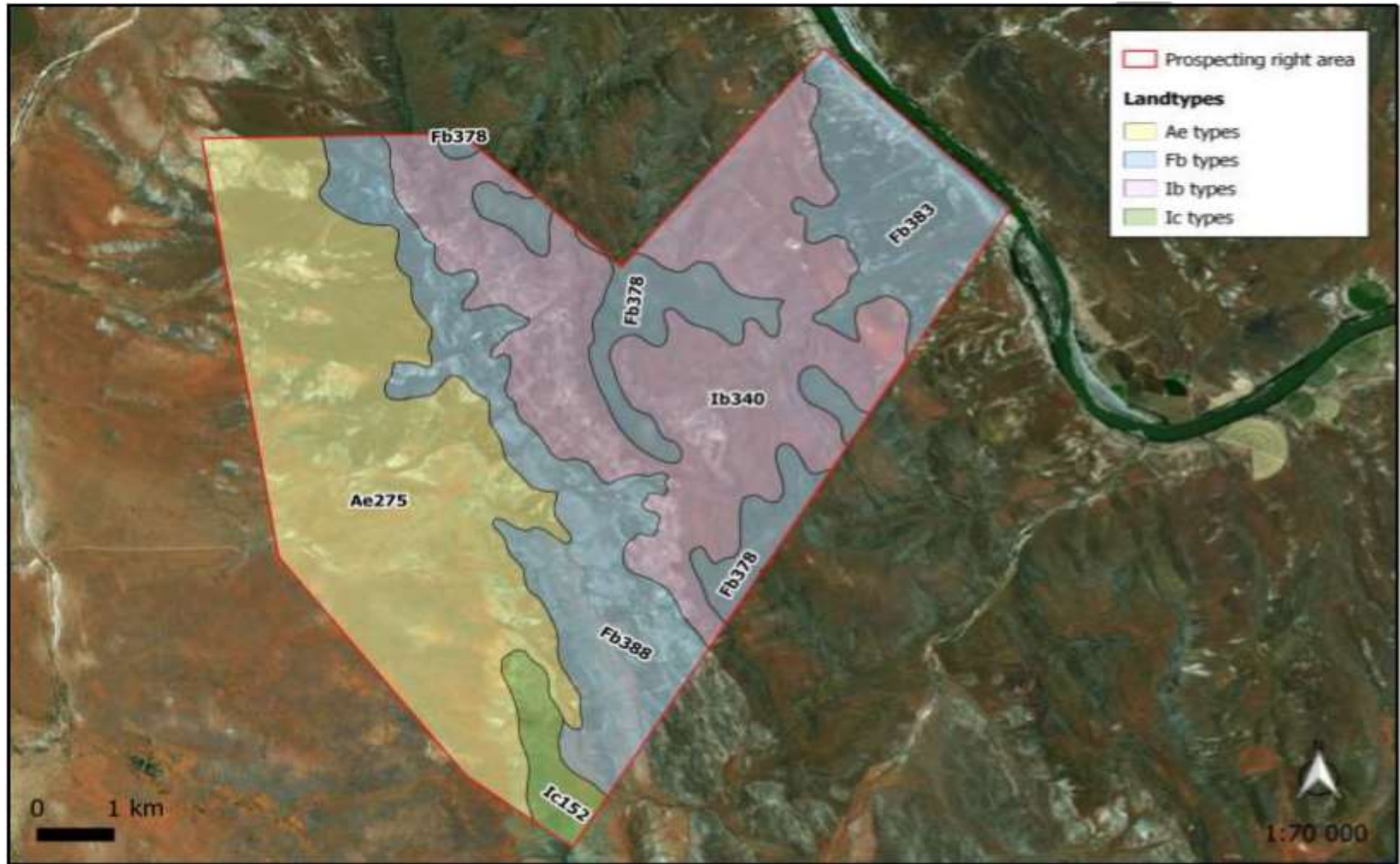


Figure 5. The distribution of land types at the study site. (Map taken out of the Ecological study by Dr. B Milne, 2019)

○ **LAND CAPABILITY AND LAND USE:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area. Land use and capability was described and included in this report as part of the ecological study.

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
- identify the relative ecological sensitivity of the project area;
- produce an assessment report that:
 - indicates identified habitats and fauna and flora species,
 - indicates the ecological sensitivity of habitats and conservation values of species,
 - determines the potential impacts of the project on the ecological integrity,
 - provides mitigation measures and recommendations to limit project impacts,indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological assessment report attached as **Appendix B** describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting operation, and assesses the impacts, as well as the residual impacts after closure.

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Apart from the KIMSWA diamond prospecting right application, the property was also subjected to

asbestos and lead mining in the past (Figure 6). Currently, the farm is utilised for grazing by cattle, goat and sheep, while a portion along the river is used for crop irrigation (Figure 6). A number of homesteads on the farm are currently occupied by land owners, tenants and workers (Figure 6). (Taken out of the Ecological Study done by Boscia Ecological Consultants, Dr. Betsie Milne 2019).

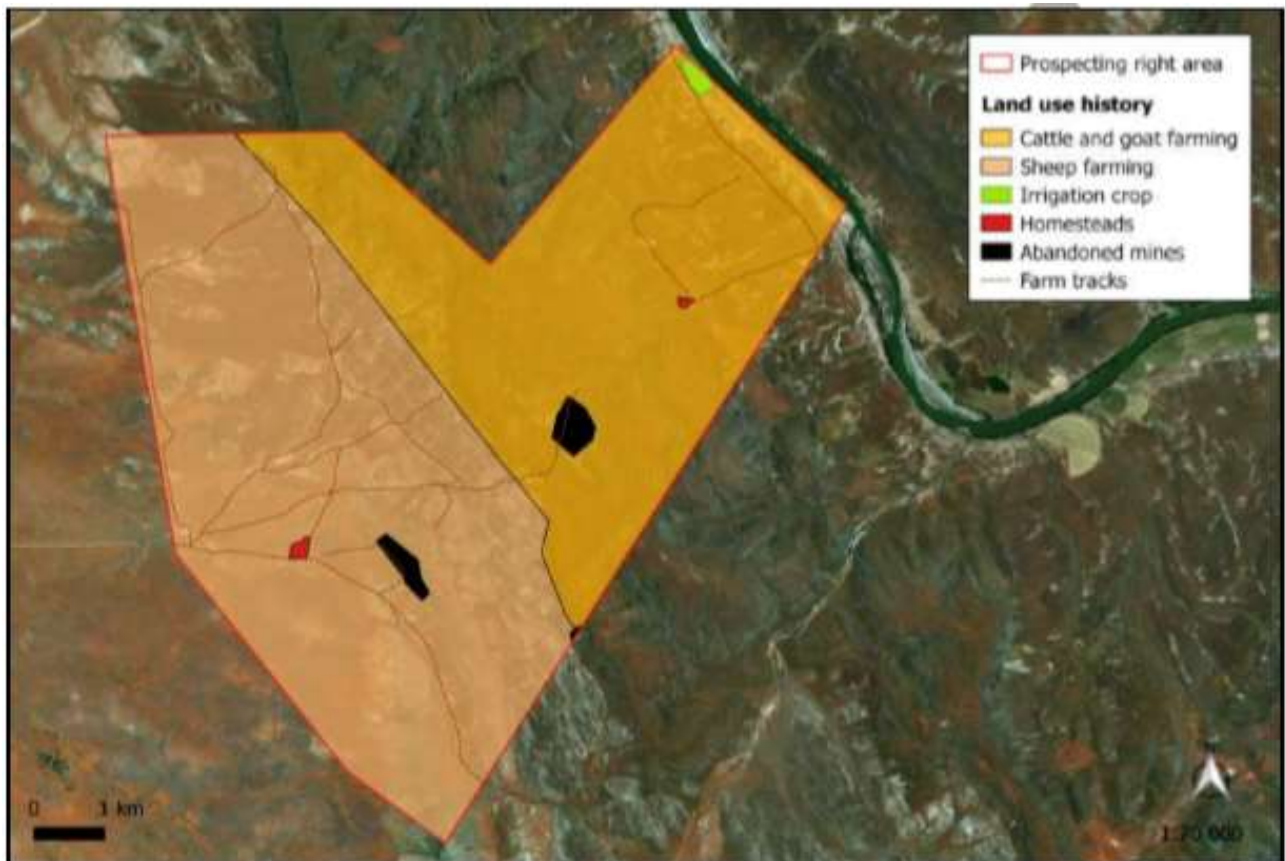


Figure 6. The land use history of the study area.

- **FLORA (NATURAL VEGETATION):**
Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the area.

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;

- identify the relative ecological sensitivity of the project area;
- produce an assessment report that:
 - indicates identified habitats and fauna and flora species,
 - indicates the ecological sensitivity of habitats and conservation values of species,
 - determines the potential impacts of the project on the ecological integrity,
 - provides mitigation measures and recommendations to limit project impacts, indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological report is attached as **Appendix B** describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

A desktop study and field investigation was performed by Dr. Betsie Milne to obtain ecological information for the proposed area and identify the ecological characteristics and sensitivity of the site.

Broad-scale vegetation patterns

The study area falls within the Nama Karoo Biome (Mucina and Rutherford 2006).

According to the vegetation map of Mucina and Rutherford (2012), the site is represented by two broad-scale vegetation units, i.e. Lower Gariiep Broken Veld and Bushmanland Arid Grassland (Figure 7).

Lower Gariiep Broken Veld is restricted to the Northern Cape Province. It comprises Hardeveld along the Orange River from Onseepkans in the west, to Prieska in the east. The unit varies in altitude from 400 to 1 200 m. The topography includes hills and mountains, slightly irregular plains with sparse vegetation dominated by shrubs and dwarf shrubs.

Scattered *Aloidendron dichotomum* individuals grow on the slopes of koppies, while *Senegalia mellifera* is typically found on the sandy soils of foot slopes.



Figure 7. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area. (Map taken out of the Ecological study by Dr. B Milne, 2019).

Fine-scale vegetation patterns

Plant communities in the study area are delineated according to plant species respondences and changes in soil structure. They can be divided into six distinct units, which are described below. These descriptions include unique characteristics and the dominant species found in each unit. A complete plant species list, including those species likely to occur here is presented in Appendix 1.

i) *Aloidendron dichotomum* - *Boscia albitrunca* open woodland on ironstone hilltops This community covers the central parts of the study area and is found on the ironstone hilltops south of the Orange River, where a bare rocky substrate constitute about 20 % of the ground cover. It is primarily presented as an open woodland where *Aloidendron dichotomum* dominates the tree layer, with stunted *Boscia albitrunca* shrubs scattered within the matrix.

Other common tall shrubs include *Rhigozum obovatum*, *Senegalia mellifera* and the succulent shrub *Euphorbia avasmontana*. The lower and dwarf shrub layer includes *Rhigozum trichotomum*, *Zygophyllum rigidum*, *Phaeoptilum spinosum*, *Aptosimum marlothii*, *A. albomarginatum*, *Pteronia mucronata*, *Kleinia longiflora*, *Monechma spartioides*, *Euphorbia gregaria*, *Cadaba aphylla*, *Sarcostemma viminalis*, *Blepharis mitrata*, *Ruschia intricata*, *Asparagus* sp., *Lycium* sp., *Eriocephalus* sp. and *Pentzia* sp.

The grass layer was not identifiable during the time of the field visit, due to the drought conditions. Herbs found here include *Geigeria ornativa*, *Sansevieria aethiopica* and *Anacampseros baeseckeii*.

ii) *Enneapogon desvauxii* - *Zygophyllum rigidum* open shrubland on calcrete ridges and slopes

The open shrubland on calcrete ridges and slopes is found on calcrete, intermixed with sand, which constitute about 10% of the ground cover. The plant community is defined by the monotonous short grass layer, dominated by *Enneapogon desvauxii*, but *Stipagrostis uniplumis* is also common.

The surrounding shrub layer is dominated by dwarf shrubs on the lower slopes, but taller shrubs and trees become more dominant higher up towards the steeper slopes.

Along the higher ridges in the east, where this community forms a transitional zone with the ironstone slopes, *Aloidendron dichotomum* becomes particularly conspicuous and forms very dense populations, as on the hilltops. Other common tall shrubs include *Senegalia mellifera*, *Rhigozum obovatum* and *Boscia albitrunca*.

Zygophyllum rigidum dominates the low shrub layer, but other low shrubs include *Pteronia mucronata*, *Barleria rigida*, *Monechma spartioides*, *Pentzia incana*, *Aptosimum marlothii*, *Euphorbia gregaria*, *Rhigozum trichotomum*, *Kleinia longiflora*, *Aloe claviflora*, *Asparagus sp.* and *Lycium sp.*

iii) *Senegalia mellifera* - *Rhigozum trichotomum* shrubland on gravel terraces The shrubland on gravel terraces occurs as two disjunct communities on Rietfontein, i.e. one in the north-west and another in the north-east. They are separated by the hills and mainly occur on the footslopes of the hills on rocky soils that constitute $\pm 40\%$ of the ground cover.

The tall shrub layer is significantly dominated by *Senegalia mellifera*, but trees such as *Boscia albitrunca* and *Aloidendron dichotomum* are widespread as well. The low shrub layer is dominated by *Rhigozum trichotomum*, with *Zygophyllum rigidum* and *Psilocaulon coriarium* also being common. Other shrubs found here include *Euphorbia gregaria*, *Cadaba aphylla* and *Monechma divaricatum*.

The herbaceous layer is not well developed, with grasses being scarce or grazed beyond recognition. However, the herb *Chascanum garipense* occurs here.

iv) *Rhigozum trichotomum* - *Stipagrostis uniplumis* open shrubland on sandy plains The open shrubland on sandy plains is found in the south-west corner of the study site where it occurs on red wind-blown sand which constitute $\pm 30\%$ of the ground cover. *Boscia albitrunca* occurs widespread and scattered within a matrix dominated by the low shrub *Rhigozum trichotomum*. *Senegalia mellifera*, *Phaeoptilum spinosum* and *Lycium sp.* are also common. Other low shrubs found here include *Ruschia intricata*, *Monechma incanum*, *Aptosimum marlothii* and *Aloe claviflora*.

Stipagrostis uniplumis dominates the graminoid layer, but the grass stratum was evidently dry during the time of the site visit.

The fungus *Podaxis pistillaris* is common, but was restricted to termitaria.

v) *Eucalyptus camaldulensis* - *Prosopis velutina* riparian woodland

The riparian woodland lines the immediate banks of the Orange River on deep alluvial sand, with an open canopy comprising tall trees, dominated by invasive species such as *Eucalyptus camaldulensis* and *Prosopis velutina*. This suggests heavy disturbance in the past. However, common indigenous species include *Senegalia mellifera*, *Vachellia karroo*, *Searsia lancea*, *Ziziphus mucronata* and *Tamarix*

usneoides. Low shrubs *Psilocaulon coriarium* and *Lycium* sp. are widespread. *Phragmites australis* occurs on the edge of the river bank in some places.

vi) Ephemeral rivers, streams and drainage lines

An extensive network of drainage lines occurs across the site. These water courses are typically distinguishable by their rocky channels that cut through the landscape. Trees and tall shrubs typically line their banks, including species such as *Senegalia mellifera*, *Olea europaea* subsp. *africana*, *Ziziphus mucronata*, *Ehretia rigida*, *Boscia albitrunca*, *Aloidendron dichotomum*, *Searsia burchellii*, *Phaeoptilum spinosum* and *Asparagus* sp. Common graminoids include *Cenchrus ciliaris* and *Fingerhuthia africana*.

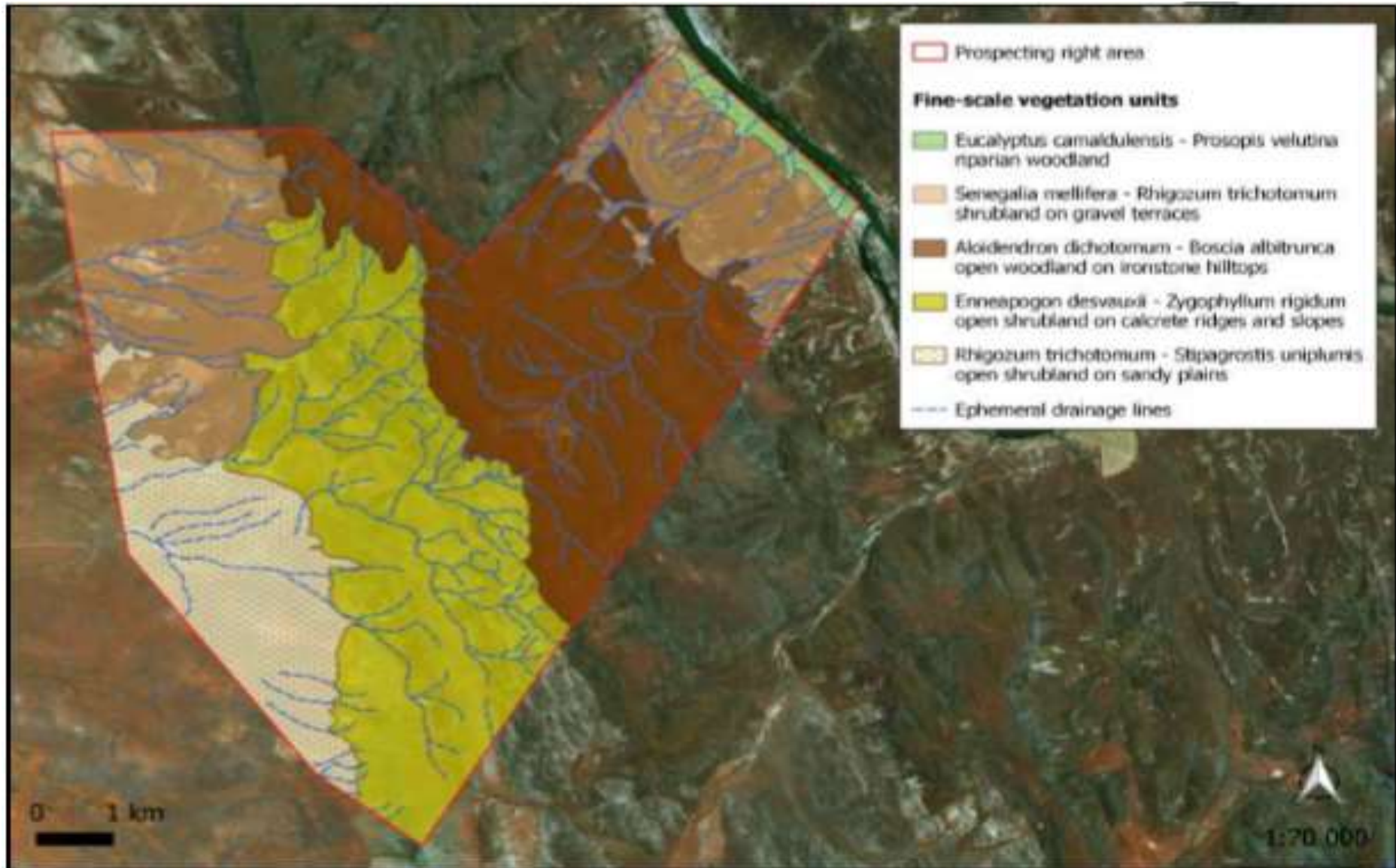


Figure 8. The distribution of fine-scale plant communities in the study area.

CONCLUSION, RECOMMENDATIONS

Six plant communities were identified on site of which the riparian woodland along with the ephemeral rivers, streams and drainage lines are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. The calcrete ridges and ironstone hilltops are also considered to be of very high sensitivity due to the dense population of listed *Aloidendron dichotomum* found here, along with high densities of nationally protected tree *Boscia albitrunca* and other species protected according to the NCNCA. The remaining study area, which comprises the shrubland on rocky ridges and sandy plains, is considered to be of high sensitivity primarily due to the high occurrences of species of conservation concern that occur widespread across these units.

The most profound impacts are expected to be related to the loss of plant species of conservation concern as well damages to the burrows of fossorial mammals that occur on the alluvial plains. The disruption of ecological corridors and the hydrological regime if any of the tributaries to the Orange River are cut off is also considered to be a major impact. Species of conservation concern that are found in the prospecting area include *Ruschia intricata*, *Sarcostemma viminalis*, *Aloe claviflora*, *Aloidendron dichotomum*, *Boscia albitrunca*, *Euphorbia avasmontana*, *E. gregaria* and *Olea europaea* subsp. *africana*. Similarly, the prospecting operation will result in the large-scale clearance of indigenous vegetation. Permit applications regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation.

Similarly, if any of the *Boscia albitrunca* trees are to be affected, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to these trees.

To conclude, it is clear that the destruction of the natural habitat within the study area is inevitable.

The significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area. In my opinion, authorisation can be granted if the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures. Furthermore, the application should only be granted if the applicant commits to exclude the areas where dense populations of *Aloidendron dichotomum* and *Boscia albitrunca* occur from the mining footprint.

○ **NATURAL FAUNA:**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological assessment in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the area attached as **Appendix B**.

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
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 - indicates identified habitats and fauna and flora species,
 - indicates the ecological sensitivity of habitats and conservation values of species,
 - determines the potential impacts of the project on the ecological integrity,
 - provides mitigation measures and recommendations to limit project impacts, indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological report is attached as **Appendix B** describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

Faunal communities

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected or specially protected animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner.

The many landscape features on Rietfontein provide diverse habitat opportunities to faunal communities. Animals likely to be found in the study area are discussed in their respective faunal groups below.

Mammals

As many as 60 terrestrial mammals and seven bat species have been recorded in the region (see Appendix 2), of which many signs of fossorial

mammal activities were especially evident in the riparian woodland and on the sandy plain.

Nine listed terrestrial mammal species and four listed bat species potentially occur in the area (Table 7). The African Straw-coloured Fruit-bat, Geoffroy's Horseshoe Bat and Honey Badger have a high chance of occurring across the site, given their wide habitat tolerances.

The Dassie Rat and Littledale's whistling rat both have a high potential of occurring on site based on their preferences for rocky and open shrubland habitat, respectively. The Cape Clawless Otter has a high potential to occur in the vicinity of the Orange River due to their preference for aquatic habitats. On the other hand, the Bushveld Gerbil and Lesser Dwarf Shrew have a moderate potential of occurring in the more grassy areas on site, while the South African Hedgehog and Black-footed cat may potentially occur on site on account of their preferences for arid areas. They are both however rather skittish and therefore they will most likely be found very seldomly. The Brown Hyaena has a low potential to be found on site mainly based on the fact that farm fences are restricting their occurrences across their natural distribution range. The Dent's Horseshoe Bat and Darling's Horseshoe Bat also have a low chance to be found on site due to their preference for savanna habitat.

Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA (see Appendix 2). Those that are specially protected include Aardvark, South African Hedgehog, Aardwolf, African Wild Cat, Black-footed cat, Cape Fox, Brown hyena, Bat-eared Fox, Striped Polecat and Honey Badger. Problem animals (Schedule 4) include Black-backed Jackal, Vervet Monkey, Chacma Baboon and Caracal.

It is not clear where the core prospecting activities will take place yet, but all fauna associated with those habitats that fall within the core area will be affected. Listed mammals that are most likely to be impacted in the form of species- and/or habitat loss resulting from the prospecting activities include Aardvark. If any Aardvark burrows occur in the core area, then they will most likely be destroyed. Any disturbances to the Aardvark burrows will displace this protected species locally and there is a risk of individuals being killed during excavation activities. Littledale's whistling rat and Bushveld Gerbil can also potentially be found in the sandy habitats and could accidentally be disturbed or killed during prospecting activities.

Reptiles

Rietfontein lies within the distribution range of at least 51 reptile species (see Appendix 2), of which none are of international or national conservation concern. One species is endemic to South Africa, i.e. *Acontias gracilicauda* (Thin-tailed Legless Skink), while most other reptiles are protected either according to Schedule 1, 2 or 3 of NCNCA,

except for agamas, geckos and skinks (see Appendix 2). Specially protected species include *Karusasaurus polyzonus* (Southern Karusa Lizard) and *Chamaeleo dilepis dilepis* (Namaqua Chamaeleon).

The habitat diversity for reptiles in the study area is high and includes the aquatic and riparian zones, rocky hills and ridges, sandy plain and ephemeral drainage lines. Impacts by the proposed prospecting operations will depend on the extent of the operation, but includes habitat destruction, local disturbances through noise as well as killing them accidentally or intentionally. Monitoring during the prospecting operation is vital in order to ensure no or low impact.

Amphibians

Fourteen amphibian species are known from the region (Appendix 2). Low amphibian diversity is normal for an arid area, but is likely to increase within the aquatic and wetland ecosystem of the Orange River and ephemeral streams. As a result, higher amphibian diversity is most likely to be found in these habitats, while only those species which are relatively independent of water are likely to be common in the terrestrial habitats.

Pyxicephalus adspersus (Giant Bull Frog) is the amphibian species of conservation concern that potentially occur in the study area. It is listed as Near Threatened in terms of the Red Data Book of Frogs and is protected according to Schedule 1 of the NCNCA. They are primarily associated with temporary pans or vleis and therefore have a low potential to be found on site. All other amphibians of the study area are protected according to Schedule 2 of NCNCA (see Appendix 2). Impacts on amphibians are likely to be low if no prospecting activities are planned in any of the aquatic or riparian habitats.

Avifauna

The study site does not fall within or near (< 100 km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 247 bird species have been recorded from the region and all of these species are protected either according to Schedule 1, 2 or 3 of NCNCA (see Appendix 2).

Seventeen listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened or Endangered (Table 8). The Verreaux's Eagle (Vulnerable) is confirmed to occur on site. One individual was seen soaring over the hills and ridges during the site visit. They nest in rocky habitats and on cliffs, but might be found in the other habitats when hunting. The remaining listed species could occur in the core areas either by occasionally passing over or foraging on the alluvial plains. Flamingos and Chestnut-banded Plovers are however not expected to occur here as they prefer saline wetland habitats.

Sociable Weaver nests are found in some of the *Aloidendron dichotomum* trees on the hills. These community nests have a high ecological importance, because they provide shelter and shade for a large diversity of birds and other fauna. These birds are also protected according to Schedule 2 of the NCNCA.

It is not foreseen that any of these nests would be affected, but if any activities are to be planned in the vicinity of these nests, or if there is a likelihood that they are to be disturbed by any related activities; a permit from DENC is required before such disturbance takes place.

In general, bird species of the study area are likely to experience disturbances as a result of the Rietfontein prospecting activities. The most significant impacts are expected to be in the form of habitat destruction in the core area. This will especially impact those species that rely on this habitat for breeding, nesting and foraging. Terrestrial birds are likely to experience local disturbances, where habitat loss will be confined to the footprint of core sites and their activities will cause disturbances in the form of noise and movement. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary. Therefore, the prospecting activities would not constitute a significant loss that would compromise the available habitat for any of the terrestrial resident bird species.

Apart from general disturbances and habitat loss, other potential impacts would come from the accidental or intentional killing of birds. Monitoring during the prospecting operation is vital in order to ensure no or low impact

Fish

Fish species expected to occur in the active channel of the Orange River is listed in Table 9, along with their IUCN status and sensitivity to physico-chemical and no-flow conditions.

The Largemouth Yellowfish is endemic to the Orange-Senqu and Vaal River systems in the Orange-Senqu River Basin. It is also listed as Near Threatened (IUCN 2015) due to the continuous decline in water quality in most rivers and streams in its geographic range, the destruction of suitable spawning beds due to erosion, as well as their slow growth rate, late maturing and low fecundity.

No prospecting activities are planned near the river and therefore the Rietfontein operation is not expected to have any impacts on the fish communities.

Invertebrates

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993; Weisser and

Siemann 2004). Their immense species diversity makes it almost impossible to list all species that may possibly occur on site.

Nevertheless, key morphospecies as well as species of conservation concern are discussed here.

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed in Table 10, along with species that are specially protected according to Schedule 1 of the NCNCA. All other invertebrates from the class Insecta and Arachnida are protected either according to Schedule 2 or 3 of the NCNCA.

Two major habitats delimit possible invertebrate communities on site, i.e. the perennial Orange River and a variety of terrestrial habitats collectively classified as Karoo vegetation for insect preference, according to Picker et al. (2004).

i. Perennial Orange River

Invertebrates expected to be associated with the Orange River include Flatworms, earthworms, leeches, freshwater crabs and shrimps, mayflies, damselflies, dragonflies, moths, giant water bugs, boatmen, water striders, marsh treaders, creeping water bugs, water specs, water mites, sponges, waterscorpions, backswimmers, riffle bugs, caddisflies, diving beetles, riffle beetles, whirligig beetles, small water beetles, water scavenger beetles, water snipe flies, midges, house flies, black flies, hoverflies, horseflies, crane flies and freshwater limpets, snails, clams and mussels. The prospecting operation does not envisage altering the active channel of the Orange River and is therefore not expected to have any impacts on the river invertebrate communities.

ii. Karoo vegetation

Invertebrate communities associated with the karoo vegetation represent unique species assemblages, with an above-average representation of beetles, grasshoppers, flies, wasps and lacewings. Insects in general are widely distributed and extremely diverse. Therefore, it is not possible to list specialised communities that occur here without a dedicated study.

However, those species of conservation concern listed in Table 10 are most likely to be associated with this invertebrate habitat. Of all invertebrates on Rietfontein, those occurring in the core area will be most affected. The most profound impacts will be in the form of habitat loss and the inevitable death of those that occur in the path of prospecting activities. These impacts are however expected to be largely local.

Critical biodiversity areas and broad-scale processes

The proposed prospecting site falls within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness

and Oosthuizen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. The majority of the study site comprise of Ecological Support areas, while the Orange River is classified as Critical Biodiversity Area One and a small section on the hills as Critical Biodiversity Area Two. No protected areas occur in or near the study site.

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) also classifies the Orange River and its buffer zone to have Highest Biodiversity Importance, which constitute the highest risk for mining. The same area on the hills is also categorised as having High Biodiversity Importance and a high risk for mining. This is most likely due to the population of Quiver trees found here.

These guidelines were developed to identify biodiversity priority areas sensitive to the impacts of mining, to support mainstreaming of biodiversity issues in decision making in the mining sector.

All rivers (ephemeral and perennial), their riverbeds and associated 100 m buffers have been identified as ecological corridors within the Pixley Ka Seme District Municipality (Rumboll 2014). Here, special care must be taken with mining and agricultural practises so as to avoid water pollution and over extraction. These should be maintained to limit the potential impact of development on the water resources.

Furthermore, the proposed prospecting area falls within the Griqualand West Centre of Endemism (Van Wyk and Smith 2001), as does many other mining operations. A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics. They are extremely vulnerable; relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species.

The GWC is considered a priority in the Northern Cape, because the number of threats to the area is increasing rapidly. This is a cause of concern, because the GWC is still greatly misunderstood and under researched. Important elements might therefore be lost or disturbed due to a lack of knowledge, which could assist in protecting its fundamental processes. The cumulative effect of prospecting in this region exacerbate the potential risk of losing information on ecosystem function owing to the lack of basic research information within this area.

The Rietfontein operation itself is expected to cause habitat transformation through the excavation of open pits, and will thereby

contribute to cumulative habitat loss and the disruption of the broad-scale landscape connectivity in the region. The study area falls within a zone where one of South Africa's largest economically most important alluvial deposits of diamonds are found. The primary secondary source of alluvial diamond deposits in the Northern Cape extends along the Orange and Vaal Rivers (Gresse 2003), while the most significant crop irrigation in the Northern Cape also stretches along these rivers (Durand 2006). The cumulative impacts in the vicinity of the study area are therefore considered to be moderately high.

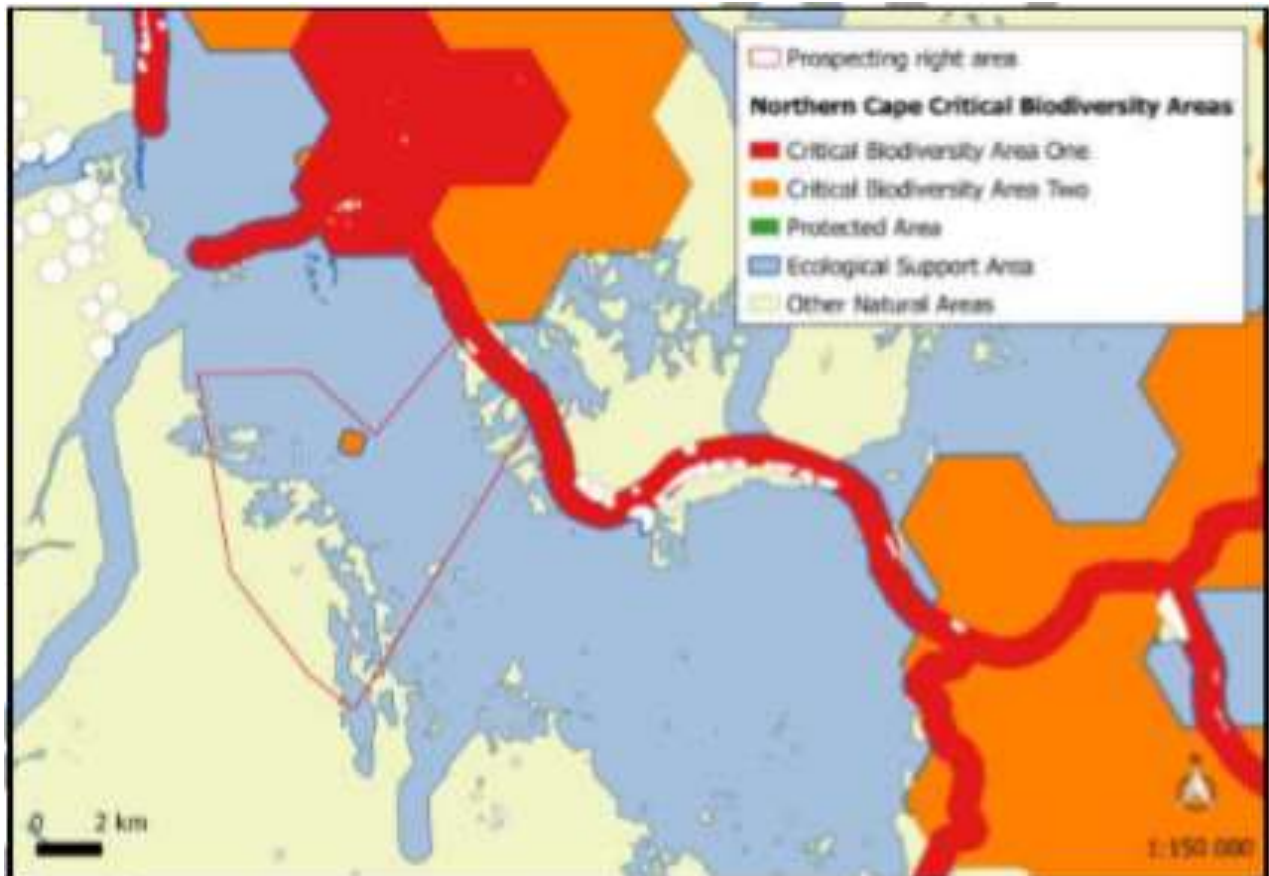


Figure 9. The study area in relation to the Northern Cape Critical Biodiversity areas. (Map taken out of the Ecological study by Dr. B Milne, 2019)

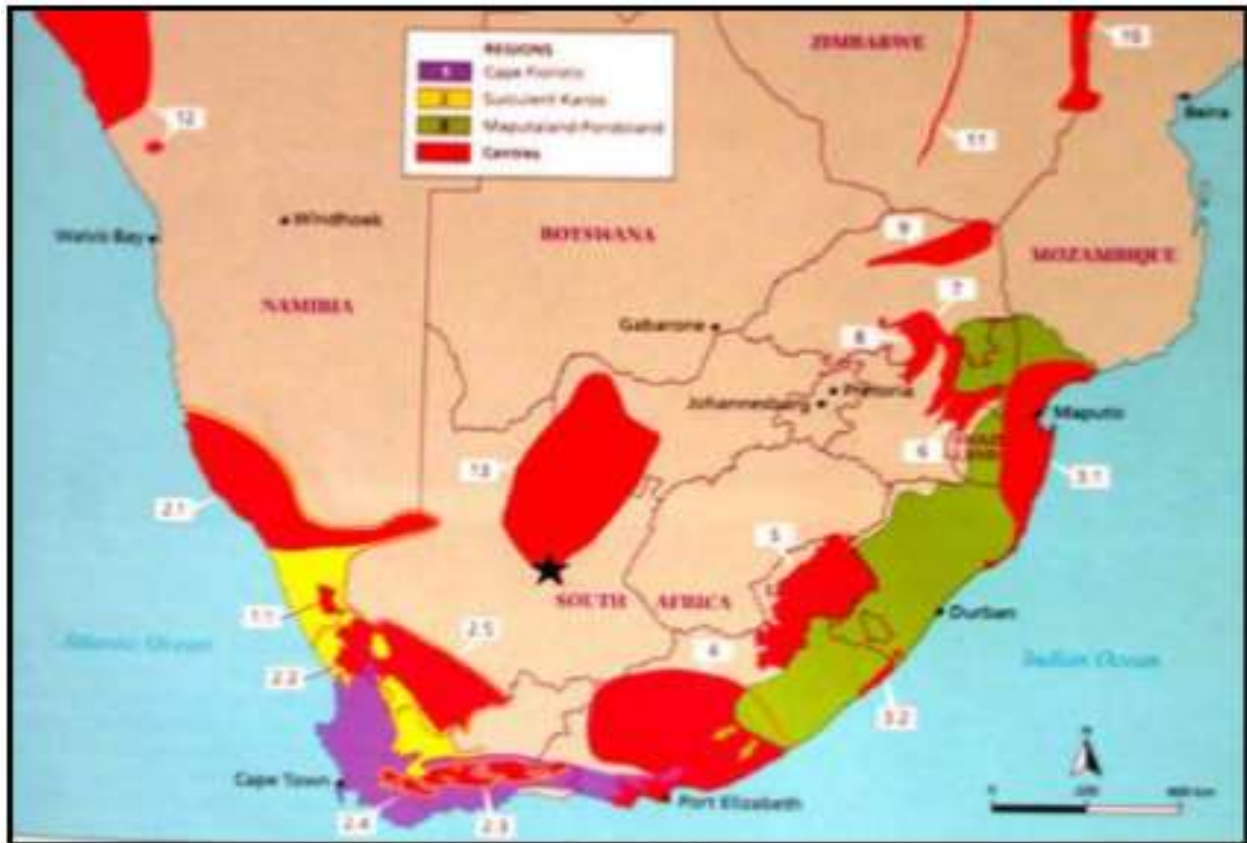


Figure 10. A map indicating the regions of floristic endemism in southern Africa, according to Van Wyk and Smith(2001), with the study site locality indicated by the black star. (Map taken out of the Ecological study by Dr. B Milne, 2019)

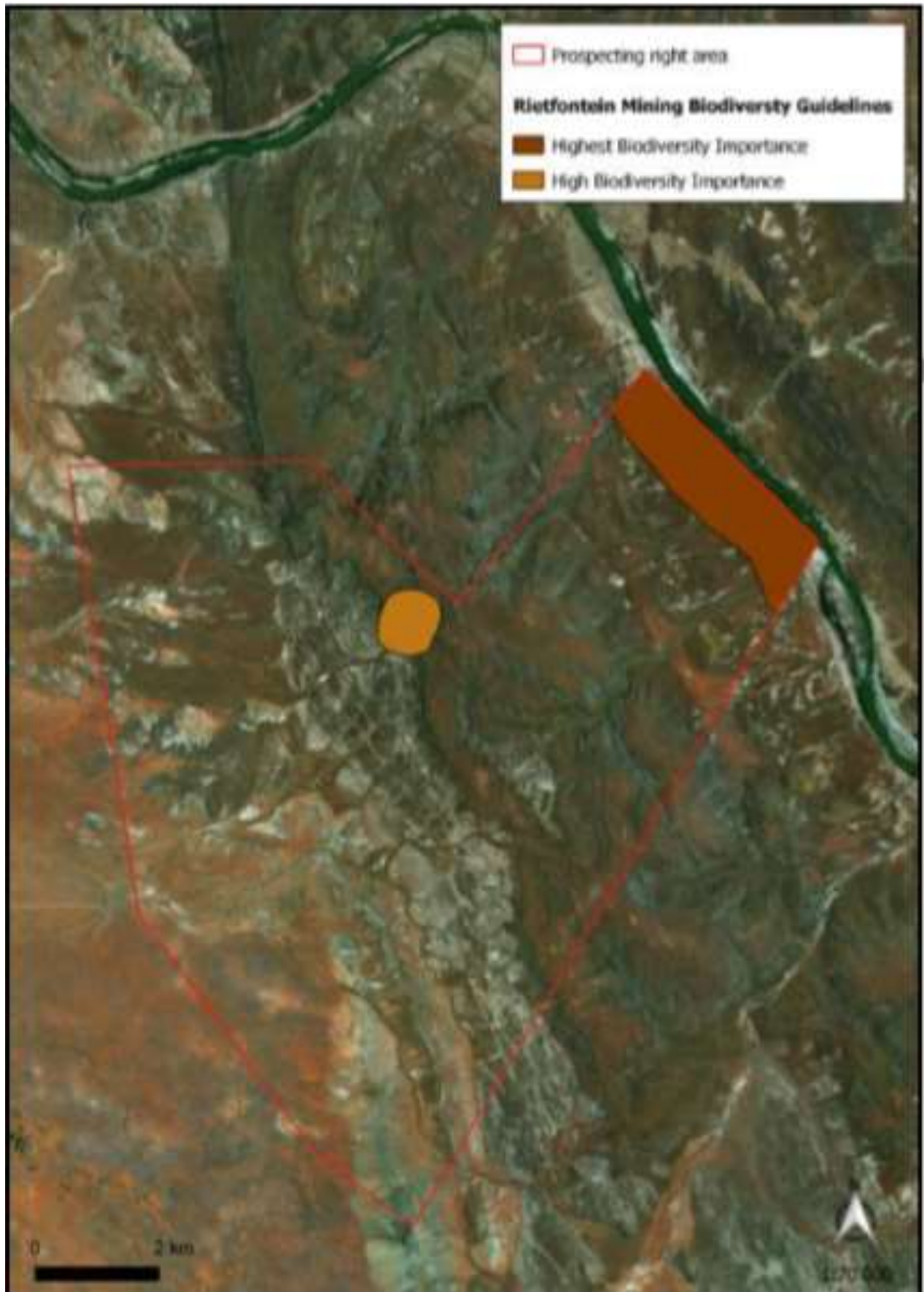


Figure 11. The study area in relation to the Mining and Biodiversity Guidelines. (Map taken out of the Ecological study by Dr. B Milne, 2019).

○ **SURFACE WATER AND DRAINAGE:**

The Orange River borders the application area. It is unlikely that the prospecting operation will negatively affect any surface water.

All rivers (ephemeral and perennial), their riverbeds and associated 100 m buffers have been identified as ecological corridors within the Pixley Ka Seme District Municipality (Rumboll 2014). Here, special care must be taken with mining and agricultural practises so as to avoid water pollution and over extraction. These should be maintained to limit the potential impact of development on the water resources.

There are a few clearly defined waterways outside the flood plain. Closer to the river in the flood plain area, small drainage features has developed where storm water is collected and discharges along defined waterways into the Orange River. Due to the low rainfall, these waterways are mainly seasonal.

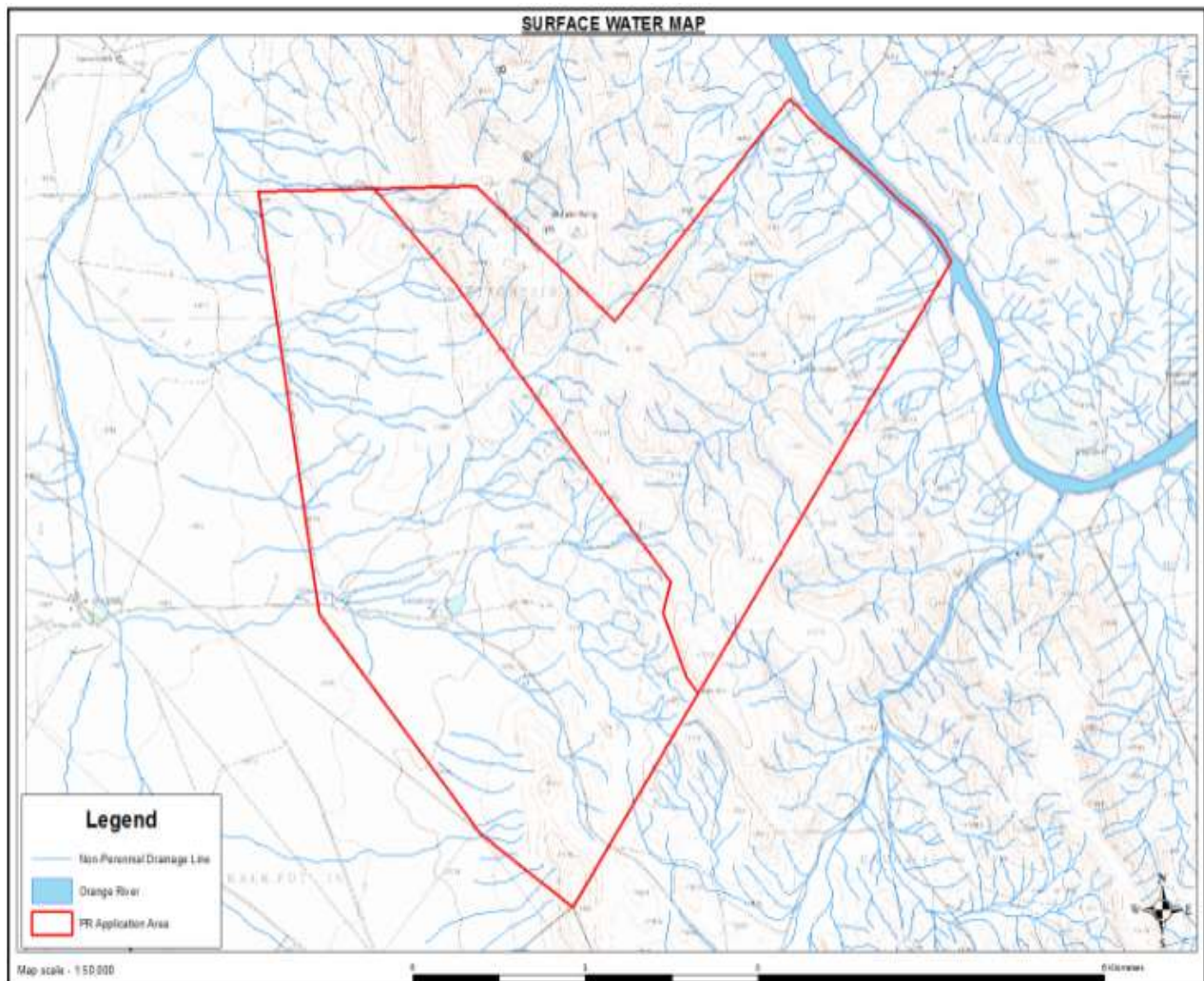


Figure 12. See dry Non- Perrennial Drainage channels indicated in blue on the proposed Prospecting area.

The surface water flow patterns are a function of the local topography:

The defined waterways in the floodplain area that is next to the Orange River and protected with a 100 m buffer zone, should be preserved as storm water drainage canals. The ecological function of these channels is to collect storm water (sheet flow) during rain events from the upper reaches before it converge with the Orange River.

Application for authorization should be submitted in terms of the NWA to extend the operation into the flood plain area. Clear management procedures should be developed to ensure that these waterways are protected or re-instated to prevent pooling and divert runoff unhindered into the Orange River.

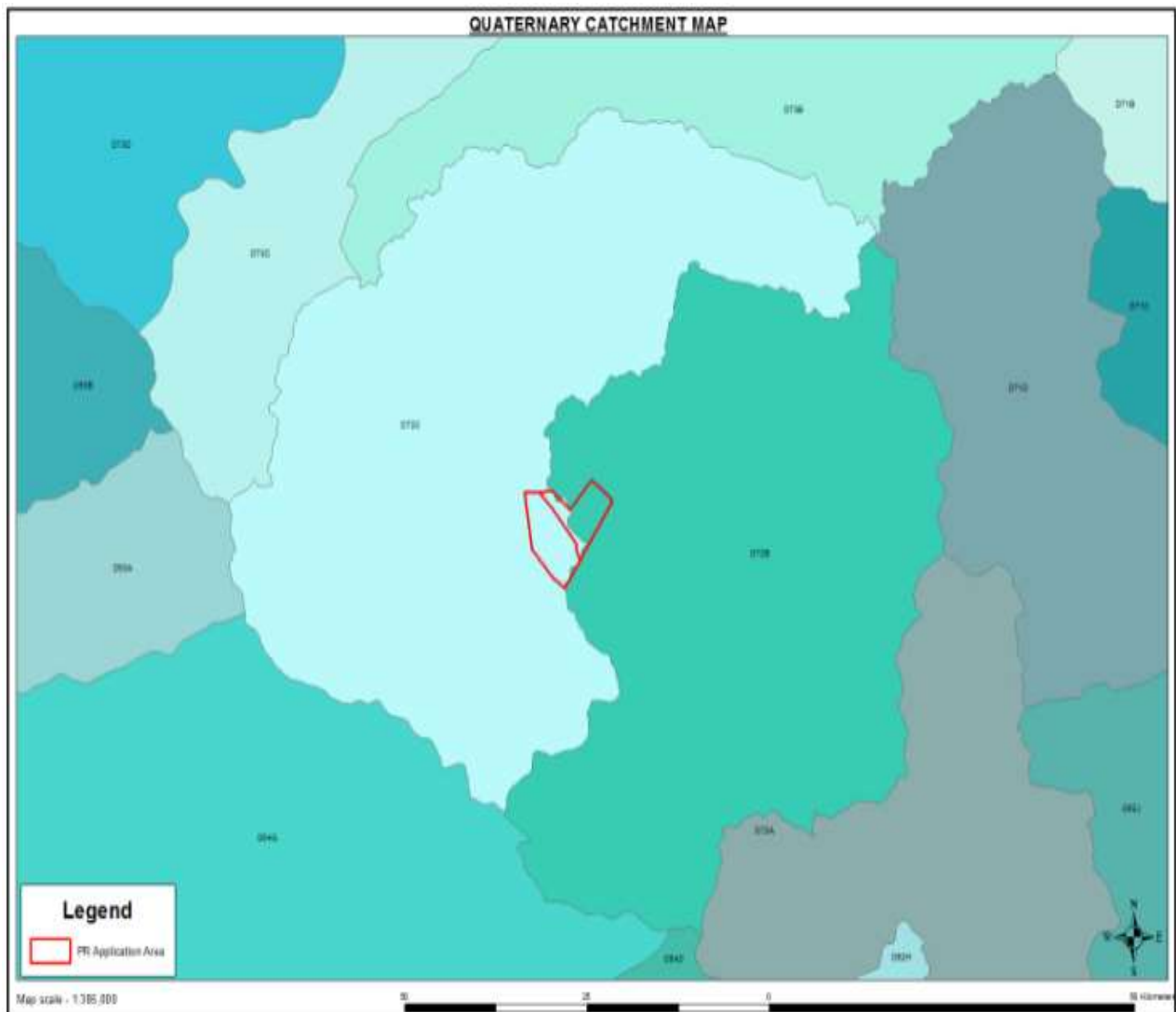


Figure 13. Catchment area

Classification of the Watercourse

The study area straddles quaternary drainage catchments D72C and D72B of the Lower Orange Water Management Area. The area is characterised by rugged terrain, with irregular hills and ridges that divide the property to slope west towards the plains and east towards the Orange River. Altitude ranges from 900 m along the river in the east and 970 on the ridges in the west, to 1 285 m above sea level on the hilltops in the centre of the property. The terrain is generally indicated by gentle slopes of 6 % running east towards the river and 3 % running west towards the plains, while steeper slopes of 30 - 50 % are found around the hilltops.

The alluvium deposits along the Orange River channel as well as those terraces occupied by scree and surface rubble will primarily be the focus of the prospecting operation.

Wetlands

There are no known dry pans which occur within the prospecting area.

○ **GROUND WATER:**

Depth of water-table(s):

Groundwater flow would follow the topography and the surface drainage direction from the higher areas towards the lower areas in towards the Orange River.

Ground-water use:

At present ground water supplies drinking water to the domestic animals on the farms.

Ground-water zone:

The diamond bulk sampling does not affect the quality of the ground water in any manner. There are no harmful or toxic properties in the gravels being mined. The recycling of the water only requires sediment settling, thus no aquifers and aquicludes are on the property.

○ **AIR QUALITY:**

With reference to the Scheduled processes under the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965): No scheduled process relates to any proposed prospecting activity on the farm.

Existing sources

The current source of air pollution in the area stems from numerous mining operations within the area (Thunderflex 78 Pty Ltd, Van Wyk) and from vehicles traveling on the gravel roads of the area.

New source

The source of air pollution on the farm will be nuisance dust generated by the opencast prospecting process, the loading of gravels onto the transport trucks, the dumping of gravels over each sites primary screen or feeder bins as well as from the movement of trucks and vehicles on the prospecting roads. Gas emissions from machinery will be within legal limits.

Areas of impact

As the prevailing wind direction for the area is north to North West for the months January to September and changing from north to sometimes westerly winds during October to December, there is a potential for fall-out dust to impact on the surrounding farm properties – which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas.

The dust is controlled by watering down the roadway used by these trucks. The mineral processing is a wet process, thus no dust is generated.

A complain register for surrounding owners and the community will be kept on site and the management of dust would be guided by these additionally comments of public.

o NOISE AND VIBRATION**Existing sources:**

Noise on site will come from the large vehicles (ADT trucks, front-end loaders, back actors), from the working pan.

There are numerous mining operations on both sides of the prospecting operations. Although these operations do generate noise the overall impact can be described as Low.

The impact would be of more importance regarding the direct worker environment that should adhere to the requirements in terms of the Mine Health and Safety Act. These noise levels will be continuous and the operators will be issued with earplugs.

Noise is normally encountered during the normal operation hours at the processing plant. Processing plant noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels are monitored on the prospecting area and where necessary, protective equipment is used in certain areas where machinery is used.

o ARCHAEOLOGICAL

PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT (NO 25/1999) FOR THE PROPOSED MINE PROSPECTING ON THE REMAINING EXTENT OF PORTIONS 13 AND 9 OF THE OF THE FARM RIETFONTEIN 11, PRIESKA DISTRICT, NORTHERN CAPE PROVINCE was done by Dr Edward Matenga on 22 January 2019. The report is appended as Appendix C to this report.

EXECUTIVE SUMMARY

1. The Kimsa Mining Pty Ltd intends to lodge an application for a prospecting right on the Remaining Extent of Portions 13 and 9 of the Farm Rietfontein 11, Prieska District, Northern Cape Province. This report has been prepared in compliance with Section 38 of the National Heritage Resources Act (No 25/1999) and forms an integral part of an Environmental Impact Assessment (EIA) for the authorisation of the prospecting right.

2. Fifteen (15) sites were recorded and ranked in terms of their heritage value and the potential threat of the proposed development. The following is a summary of our findings:

3. The Stone Age

Stone tools and associated waste material in varying densities have been recorded in thirteen (13) locations. The stone tools comprise mainly scrapers, points and flakes while a few blades and cores also occur. No significant concentrations were found to suggest a settlement or regular activity.

4. The occurrence of a crude pear-shaped hand-axe is of particular interest as it seems to confirm the presence of Acheulean material in the area dating between 2 million to 250 000 years BP.

5. The Iron Age

No Iron Age relics were found on the property.

6. Early mining and commercial farming

An asbestos ore crushing and loading site was seen. A small rectangular structure is built of dressed dolomite apparently locally sourced. There are no circumstances to warrant destruction of these two structures.

7. Burial grounds

No graves or burial grounds were reported on the property.

8. Conclusion and recommendations

The mine prospecting can go ahead subject to the precautions taken to protect the two historical structures on the property. The study is mindful

that archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during development activities, such activities should be halted, and the heritage authorities notified in order for an investigation and evaluation of the finds to take place.

Palaeontological Impact Assessment for the proposed prospecting rights on Farm Rietfontein 11 and 13, Prieska District, Northern Cape Province by Prof Marion Bamford Palaeobotanist

Executive Summary

A palaeontological Impact Assessment was requested for the prospecting rights application for the Farm Rietfontein 11 Portions 9 and 13, near Prieska, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.

The geological structures suggest that the rocks are mostly too old or volcanic to contain fossils. Stromatolites (tracefossils) might occur in the Ghaap Group rocks. There is a small chance that the Dwyka Group mudstones could preserve fragment of the Glossopteris flora and invertebrates. Since there are potentially fossiliferous rocks in the vicinity a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low. No further palaeontological impact assessment is required.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the lavas and dolerite dykes do not contain fossils but the dolomites, sandstones, mudstones shales and sands are typical for the country and could contain fossil plant, insect, invertebrate and very rarely vertebrate material in the Dwyka Group mudstones. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the loose sands of the Quaternary Kalahari or in the limestones and stromatolites of the Vryburg Formations or the Schmidtsdrif Subgroup. There is a very small chance that fossils may occur in the mudstones of the Dwyka Group rocks so a Chance Find Protocol should be added to the EMP: if fossils are found once prospecting has commenced then they should be rescued and a

palaeontologist called to assess and collect a representative sample. Prospecting may proceed as far as the palaeontology is concerned.

○ **SENSITIVE LANDSCAPES:**

(Taken out of the Ecological Report by Dr. Betsie Milne). The sensitivity map for Rietfontein is illustrated in Figure 14. The riparian woodland along with the ephemeral rivers, streams and drainage lines are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. All watercourses are protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially no-go areas. Although the riparian woodland is infested with declared invasive species, it falls within the buffer zone of the Orange River and is classified as high risk areas by the Mining and Biodiversity Guidelines as well as the Northern Cape CBA map. Erosion risks after disturbances of watercourses and their associated riparian zones are also high.

The calcrete ridges and ironstone hilltops are also considered to be of very high sensitivity due to the dense population of listed *Aloidendron dichotomum* found here, along with high densities of nationally protected tree *Boscia albitrunca* and other species protected according to the NCNCA.

The remaining study area, which comprises the shrubland on rocky ridges and sandy plains, is considered to be of high sensitivity primarily due to the high occurrences of species of conservation concern that occur widespread across these units. Although these units are not regarded as no-go areas, activities should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

○ **VISUAL**

The prospecting site would possibly be visible from the secondary gravel road that travels to Maryvale. The negative visual impacts associated with open pits for the bulk sampling and the washing pan will however have a low negative impact since it will be visible to the landowners. There is however no method of reducing the impact during bulk sampling operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of open pits as prospecting progress.



Figure 14. A sensitivity map for the prospecting area. (Map taken out of the Ecological Study by Dr. Betsie Milne 2019)

○ **SOCIO-ECONOMIC STRUCTURE OF THE REGION:**

Siyathemba Municipality is a Category B Municipality (NC077), established in 2001, in accordance with the demarcation process. The Municipality is located within the central eastern parts of the Northern Cape Province on the banks of the Orange River, and falls within the boundaries of the Pixley Ka Seme District. The nearest business centre is Kimberley, which is about 220km away.

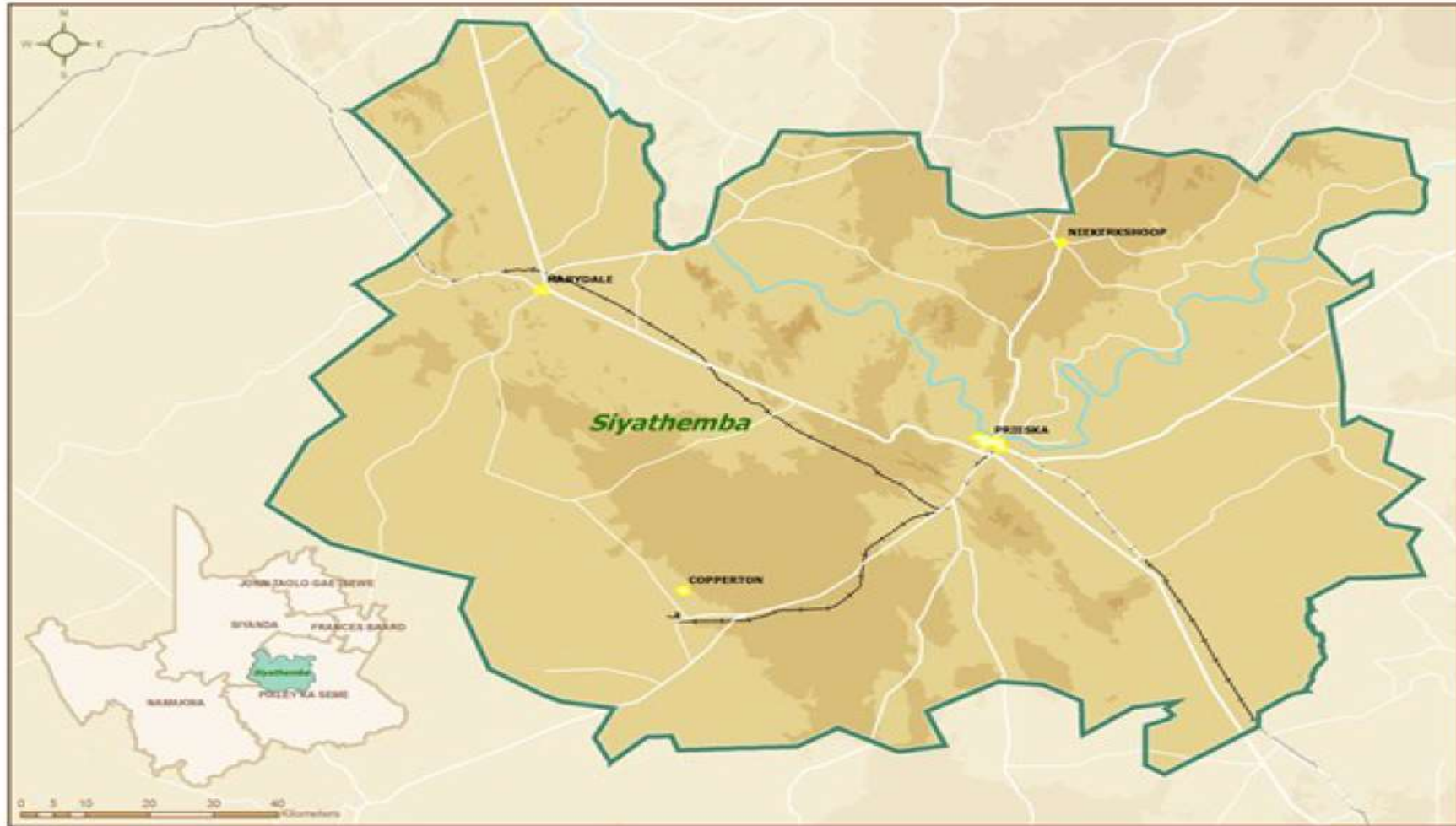


Figure 15. Locality Map

Siyathemba Municipality was initially made up of three entities, namely, Prieska, Marydale and Niekerkshoop. After demarcation the area was extended to include not only the towns and surrounding suburbs of Marydale, Niekerkshoop and Prieska but also Copperton. Copperton is an old mining town that was sold to a private owner after the closing of the Mine. The town is currently on a long terms lease by the Request Trust. Some of the houses were initially demolished and after the lease agreement was signed with the Request Trust, an agreement was reached that the rest of the houses could be retained. An agreement was reached between the Lessee and Alkantpan (Armscore) for the delivery of water, sanitation, and electricity services. Armscore also maintained one of the main roads.

The municipal area encompasses a geographic area of approximately 8,200km², which implies that Siyathemba Municipality accounts for 8% of the total district surface area and approximately 3% of the provincial area. The Municipality is divided into 4 Wards.

Table 3: Local Municipality Structure

Ward	Area
Ward 1	e'Thembenin in Prieska
Ward 2	Prieska
Ward 3	Section in Prieska including Copperton, farms and Marydale town
Ward 4	Section in Prieska, farms in Niekerkshoop

Population

The local and regional population is illustrated in the table below. From this table, it is evident that the Siyathemba Municipality had a local population of just more than 21,000 people during 2010.

Table 4: Regional Population by Age

		Population		Age Structure					
				Less than 15		15- 64		65 plus	
		2001	2011	2001	2011	2001	2011	2001	2011
DC 07	Pixley ka Seme DM	166547	186351	32.6	31.6	61.5	62.4	5.9	6.1
NC 071	Ubuntu	16375	18601	33.2	33.3	61.1	61.1	5.7	5.6
NC 072	Umsobomvu	23641	28376	33.7	31.4	61	62.8	5.3	5.8
NC 073	Emthanjeni	35785	42356	31.6	31.7	62.4	62.5	6	5.8
NC 074	Kareeberg	9488	11673	32.6	29.4	59	62.5	8.4	8.1
NC 075	Renosterberg	9070	10978	32.9	32.8	60.6	61	6.5	6.2
NC 076	Thembelihle	14467	15701	32.1	30.9	61.9	62.8	5.9	6.4
NC 077	Siyathemba	18445	21591	33.7	30.8	60.4	63.2	5.9	6
NC 078	Siyancuma	39275	37076	32.3	32.2	62.1	62.2	5.6	6

	2004	2006	2008	2010	2011
South Africa	46,745,940	47,827,370	48,911,245	49,991,472	-
Northern Cape	1,088,672	1,089,227	1,093,823	1,103,918	-
Pixley Ka Seme	190,396	185,334	180,082	179,507	186,351
Siyathemba	21,441	21,312	21,239	21,333	21,591

Source: Statistics South Africa 2011

Population Percentage per Municipality in Pixley ka Seme District

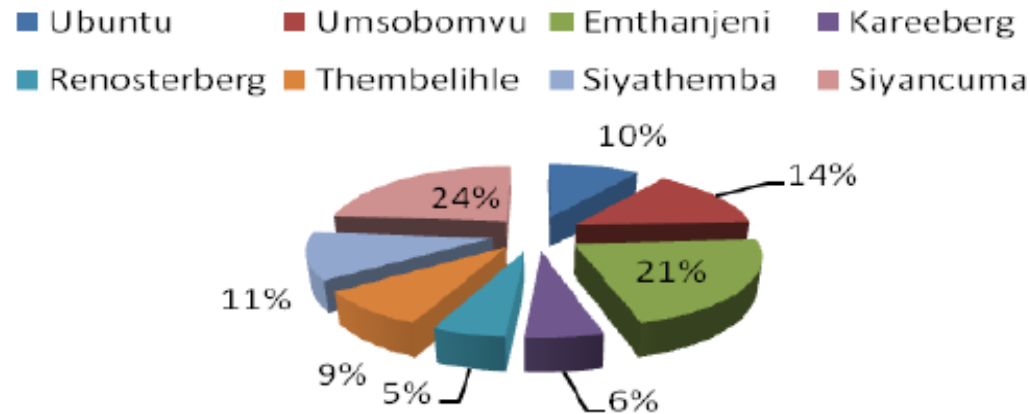


Figure 16: Population Percentage Source: Statistics South Africa 2011

In regional context, this meant that the Siyathemba Municipality contributed 11.9% to the District population (i.e. the second largest Local Municipality in the District by population) and 1.9% to the population of the Northern Cape.

The most dominant population groups is Coloured. This group represents 80% of the total population in the municipal area. The other groups are black (12%) and white (8%).

Afrikaans is the most widely spoken language (78%). There are a significant number of people which speaks other languages. A total of 824 people indicated that IsiNdebele is their first language and 91 people speak Setswana.

Age & Gender Composition

The Age & Gender Profile of the local population is illustrated by Table 5. With regards to this profile, the following observations were made:

Table 5: Age & Gender Profile

Municipality	Black African		Coloured		Indian or Asian		White		Other	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Ubuntu	2073	1890	6288	6690	51	45	702	708	114	42
Umsobomvu	8532	9222	4161	4512	96	57	780	825	120	66
Emthanjeni	6879	7179	11865	12573	153	81	1653	1734	171	66
Kareeberg	348	210	4830	5106	27	27	510	555	39	18
Renosterberg	1758	1857	3072	3225	36	21	462	480	42	21
Thembelihle	1245	1143	5508	5601	69	12	1101	954	54	15
Siyathemba	2076	1974	7659	7863	66	45	891	936	69	9
Siyancuma	6147	6075	10581	10719	144	105	1395	1383	303	222

- ❑ There were slightly more females (51.4%) than males (48.6%) among the local population during 2010. It was, however, noted that the population became slightly less female dominant since 2000, when 52.4% of the population were female.
- ❑ The working age group (15 to 64) contributed 64.4% to the local population in 2010. This age group has increased proportionately (from 58.6% to 64.4%) in relation to the other age groups. Since 2000, this group increased by approximately 1,210 people.
- ❑ The working population is slightly male dominant. Since 2000, male working age population increased by around 928 men in absolute terms while the number of women increased by about 282.
- ❑ The age dependency ratio declined from 0.7 in 2000 to 0.6 dependants (children & the elderly) in 2010 for every working age adult.
- ❑ Since 2000, the proportion of children under the age of 15 declined by 6.7%. This means that the age profile of the local population is becoming older. The number of children in the area also declined from around 14,700 during 2000 to just above 12,000 in 2010.

The population of Siyathemba declined from just over 21,370 people in 2000 to about 21,330 in 2010. This implies that the population contracted by 0.4% on average per annum. This growth rate is slightly lower in the Pixley Ka Seme District Municipality, which contracted 0.7% p.a. The decline of the Siyathemba population was mainly driven by lower fertility rates.

HIV/AIDS Prevalence	In the Draft LED Strategy for Siyathemba Municipality, reference is made to the HIV/AIDS prevalence in the area. It is indicated that data from the Actuarial Society of South Africa was used. During 2010, the HIV/AIDS prevalence rate of the Siyathemba population was 6.0% compared to the District rate of 6.5%. These rates compared well to the Northern Cape (7.6%) and South Africa (12.6%) averages in the same year.																																																																																																														
Water	<p>Table 6 below gives a comparative indication of the status of water provisioning in the district as captured during the 2001 census.</p> <p>Table 6: Source of water per Local Municipality</p> <table border="1" data-bbox="472 448 2051 1262"> <thead> <tr> <th></th> <th>Regional/local water scheme (operated by municipality or other water services provider)</th> <th>Borehole</th> <th>Spring</th> <th>Rain water tank</th> <th>Dam/pool /stagnant water</th> <th>River/ stream</th> <th>Water vendor</th> <th>Water tanker</th> <th>Other</th> <th>Grand Total</th> </tr> </thead> <tbody> <tr> <td>Ubuntu</td> <td>3477</td> <td>1215</td> <td>36</td> <td>24</td> <td>210</td> <td>6</td> <td>3</td> <td>117</td> <td>30</td> <td>5118</td> </tr> <tr> <td>Umsobomvu</td> <td>6546</td> <td>831</td> <td>12</td> <td>12</td> <td>147</td> <td>39</td> <td>33</td> <td>153</td> <td>57</td> <td>7830</td> </tr> <tr> <td>Emthanjeni</td> <td>9183</td> <td>1068</td> <td>15</td> <td>21</td> <td>33</td> <td>3</td> <td>33</td> <td>51</td> <td>36</td> <td>10443</td> </tr> <tr> <td>Kareeberg</td> <td>2298</td> <td>774</td> <td>3</td> <td>18</td> <td>24</td> <td>-</td> <td>9</td> <td>81</td> <td>12</td> <td>3219</td> </tr> <tr> <td>Renosterberg</td> <td>2394</td> <td>450</td> <td>6</td> <td>3</td> <td>69</td> <td>48</td> <td>-</td> <td>15</td> <td>9</td> <td>2994</td> </tr> <tr> <td>Thembelihle</td> <td>3117</td> <td>831</td> <td>3</td> <td>6</td> <td>21</td> <td>114</td> <td>3</td> <td>42</td> <td>3</td> <td>4140</td> </tr> <tr> <td>Siyathemba</td> <td>4539</td> <td>762</td> <td>-</td> <td>3</td> <td>66</td> <td>336</td> <td>6</td> <td>75</td> <td>30</td> <td>5817</td> </tr> <tr> <td>Siyancuma</td> <td>6348</td> <td>1677</td> <td>72</td> <td>18</td> <td>135</td> <td>780</td> <td>48</td> <td>408</td> <td>93</td> <td>9579</td> </tr> <tr> <td>Grand Total</td> <td>37902</td> <td>7608</td> <td>147</td> <td>105</td> <td>705</td> <td>1326</td> <td>135</td> <td>942</td> <td>270</td> <td>49140</td> </tr> </tbody> </table> <p>Source: Statistics South Africa 2011</p> <p>Significant progress has been made regarding the provision of water but backlogs still exist. 95% of the households in the district are provided with free basic water (FBW) which is above the provincial average of 87,7%. Only 3% of households had NO access to piped</p>		Regional/local water scheme (operated by municipality or other water services provider)	Borehole	Spring	Rain water tank	Dam/pool /stagnant water	River/ stream	Water vendor	Water tanker	Other	Grand Total	Ubuntu	3477	1215	36	24	210	6	3	117	30	5118	Umsobomvu	6546	831	12	12	147	39	33	153	57	7830	Emthanjeni	9183	1068	15	21	33	3	33	51	36	10443	Kareeberg	2298	774	3	18	24	-	9	81	12	3219	Renosterberg	2394	450	6	3	69	48	-	15	9	2994	Thembelihle	3117	831	3	6	21	114	3	42	3	4140	Siyathemba	4539	762	-	3	66	336	6	75	30	5817	Siyancuma	6348	1677	72	18	135	780	48	408	93	9579	Grand Total	37902	7608	147	105	705	1326	135	942	270	49140
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water, 46% had piped water inside dwellings by 2011. Piped water inside dwellings is about 47.00%. The table below indicates that provisioning of FBW for all municipalities in the district.

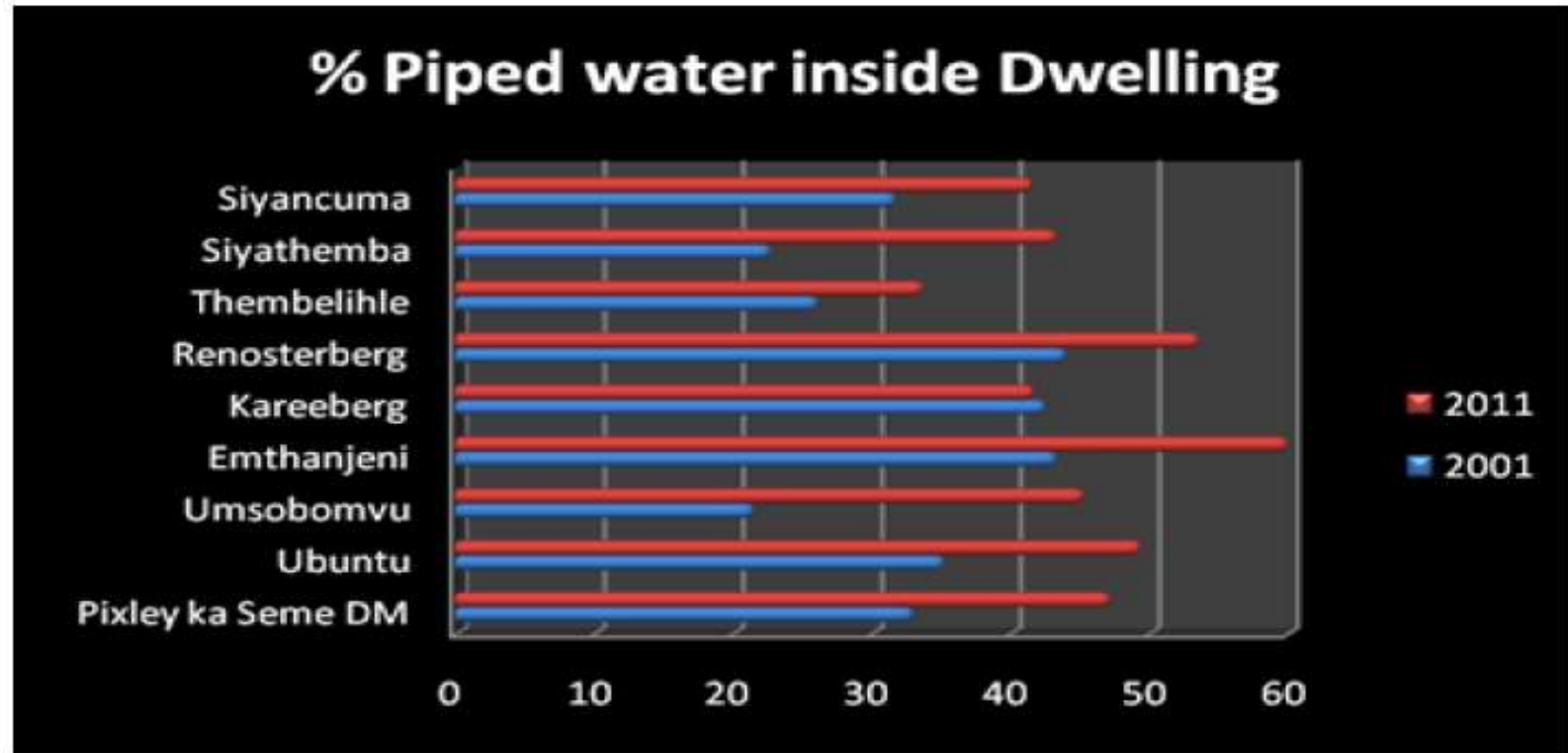


Figure 17: Piped Water inside Dwelling Source: Statistics South Africa 2011

Table 7: Access to water by households

	Piped (tap) water inside dwelling/institution	Piped (tap) water inside yard	Piped (tap) water on community stand: distance less than 200m from dwelling/institution	Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution	Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling/institution	Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution	No access to piped (tap) water	Grand Total
Ubuntu	2526	2217	282	36	9	3	48	5121
Umsobomvu	3531	3702	381	108	6	6	93	7827
Emthanjeni	6249	3741	243	108	21	6	78	10446
Kareeberg	1338	1521	225	93	9	3	33	3222
Renosterberg	1599	1233	81	51	6	6	21	2997
Thembelihle	1389	1815	471	291	63	99	15	4143
Siyathemba	2508	2958	264	21	3	3	60	5817
Siyancuma	3957	3354	1227	483	213	18	327	9579
Grand Total	23097	20541	3174	1191	330	144	675	49152

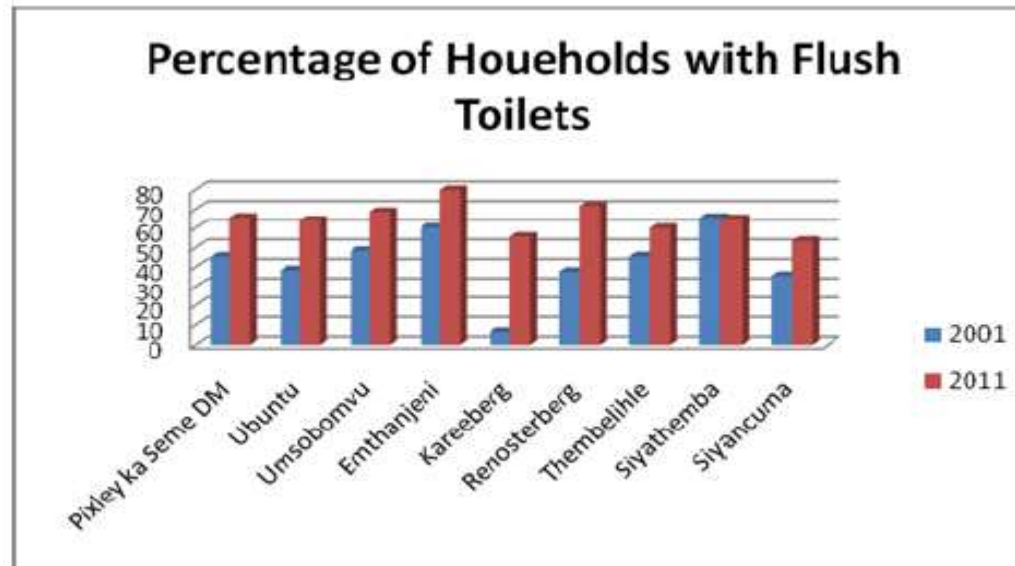
Source: Statistics South Africa 2011

Even though many urban residents in the region have access to water and improved sanitation system, some local municipalities are still have water and sanitation backlogs. Siyancuma local municipality has the highest backlog. The table below gives a reflection of the current situation in the region as at March 2011.

Table 8: Backlogs March 2011

Municipality	Water	
	Formal	Informal
Emthanjeni	2	0
Ubuntu	0	0
Umsobomvu	2	0
Renosterberg	3	0
Kareeberg	0	0
Siyathemba	31	0
Siyancuma	66	667
Thembelihle	0	0
Total	104	667

Source: Statistics South Africa 2011

**Figure 18. Households with Flush Toilets** Source: Statistics South Africa 2011

Sanitation

Sewerage and sanitation are basic needs of communities which can pose serious health and hygiene risks for communities and the environment at large if not properly managed and monitored.

According to the White Paper on Basic Household Sanitation, 2001, basic sanitation is defined as:

“The minimum acceptable basic level of sanitation is:

- Appropriate health and hygiene awareness and behaviour;
- A system for disposing of human excreta, household waste water and refuse, which is acceptable and affordable to the users, safe, hygienic and easily accessible and which does not have an unacceptable impact on the environmental; and
- A toilet facility for each household.”

Table 9 below provides an indication of the types as well as those without sanitation in the district:

Table 9: Sanitation per Local Municipality

	Flush toilet (connected to sewerage system)	Flush toilet (with septic tank)	Chemical toilet	Pit toilet with ventilation (VIP)	Pit toilet without ventilation	Bucket toilet
Ubuntu	3300	513	33	180	111	402
Umsobomvu	5388	414	222	852	75	117
Emthanjeni	8319	576	24	336	141	627
Kareeberg	1794	414	6	453	141	96
Renosterberg	2145	342	3	189	51	57
Thembelihle	2484	225	18	456	483	9
Siyathemba	3786	369	6	681	297	213
Siyancuma	5115	651	24	777	618	1152
Total	32331	3504	336	3924	1917	2673

The table and map above shows that, Pixley Ka Seme has Flush Toilets connected to sewerage at 65.70% households, Emthanjeni being the highest with 85.06% and Thembelihle being the east with 64.41%. However it must be mentioned that a project is currently in progress through funds from the Pixley Ka Seme District Municipality to replace buckets with the UDS system. The final 68 toilets have been finalised during this current financial year in Cambell. Full water borne sanitation is currently being constructed in Schmidtsdrift and the sanitation system will be completed with the completion of house structures.

Table 10: Sanitation backlogs 2011

Municipality	Sanitation	
	Formal	Informal
Emthanjeni	67	0
Ubuntu	1	0
Umsobomvu	2	205
Renosterberg	32	330
Kareeberg	0	126
Siyathemba	341	129
Siyancuma	2	872
Thembelihle	0	0
Total	445	1662

Refuse Removal

Weekly Refuse Removal in PKSA is about 72.60%. The number of households that are not provided with a refuse removal service in each municipality is indicated in the table below.

Table 11: Refuse Removal according to Census 2011

	Removed by local authority/private company at least once a week	Removed by local authority/private company less often	Communal refuse dump	Own refuse dump	No rubbish disposal	Other	Grand Total
Ubuntu	3417	39	108	1191	309	60	5124
Umsobomvu	5982	273	174	1245	132	24	7830
Emthanjeni	8709	216	90	1038	141	249	10443
Kareeberg	2283	15	15	762	111	33	3219
Renosterberg	2226	48	48	582	81	9	2994
Thembelihle	2832	33	189	564	483	39	4140
Siyathemba	4305	60	144	1062	234	15	5820
Siyancuma	5964	111	111	2568	741	84	9579
Grand Total	35718	795	879	9012	2232	513	49149

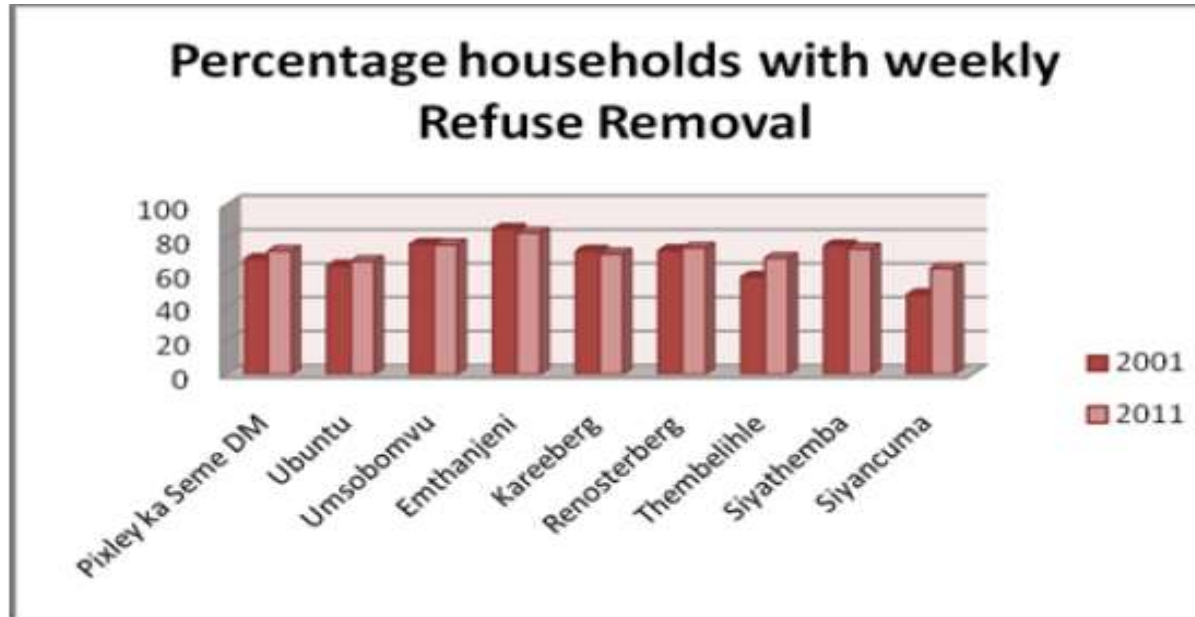


Figure 19. Households with weekly Refuse Removal Source: Statistics South Africa 2011

On refuse removal, the District has a backlog of 11 279 households. The local municipalities with the most backlogs (households that rely on their own refuse dumps or do no rubbish disposals at all) are Renosterberg, Thembelihle and Kareeberg. In Siyancuma, 3 299 out of 9 506 refuse removal backlogs (the highest backlogs in all the local municipalities). In Ubuntu, 1 416 out of 4 161 have backlogs and in Thembelihle 1 216 out of 3 592 households have refuse removal backlogs.

Electricity

The table below gives a comparative indication of the access to the source of energy in the district as captured during 2011 censuses.

The proportion of households using electricity for lighting has increased from 57% in 1996 to 84% in 2011. South Africa aims to ensure that by 2030 at least 90% of people have access to grid electricity. Increase in both demands and tariffs may slow down this last effort.

Households using electricity as a source of energy for cooking increased from 47,5% in 1993 to 73,9% in Census 2011.

Table 12: Energy for heating per Local Municipality

	Electricity	Gas	Paraffin	Wood	Coal	Animal dung	Solar
Ubuntu	3180	111	219	1356	81	3	18
Umsobomvu	2709	216	2721	1182	297	12	15
Emthanjeni	6921	258	1026	1131	402	36	42
Kareeberg	1617	141	63	1062	114	3	24
Renosterberg	1998	45	183	531	6	-	9
Thembelihle	1818	120	96	1362	9	-	24
Siyathemba	3057	69	51	2298	18	-	18
Siyancuma	5112	126	57	3480	93	3	21
Total	26412	1086	4416	12402	1020	57	171

Although relatively expensive, paraffin and gas are used on a limited scale for cooking and heating. Animal dung also features on a limited scale as energy/fuel source for cooking and heating in some rural areas.

Table 13: Energy for lighting per Local Municipality

	Electricity	Gas	Paraffin	Candles (not a valid option)	Solar
Ubuntu	4350	18	33	561	138
Umsobomvu	6801	15	135	855	15
Emthanjeni	9684	18	54	609	63
Kareeberg	2370	9	39	564	231
Renosterberg	2637	6	24	297	24
Thembelihle	3111	9	99	861	45
Siyathemba	5025	9	42	639	102
Siyancuma	7872	6	36	1551	75
Total	41850	90	462	5937	693

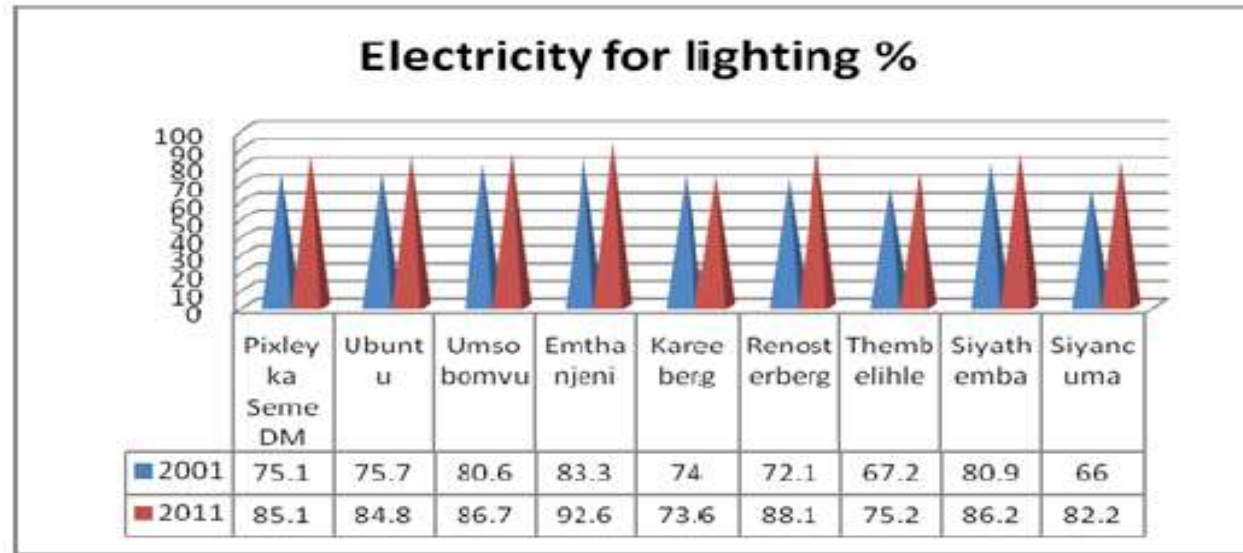


Figure 20. Electricity for lighting Source: Statistics South Africa 2011

The combination of low rainfall, relatively high population densities and the fact that most of the indigenous vegetation in the area is slow growing, have already resulted in over-utilisation of this renewable natural resource in certain places. Of major concern in this regard is wood harvesting and usage in the rural areas.

There has been an increase in the use of electricity as an energy source and a decrease in the use of paraffin, gas and candles as a source of energy/lighting. Siyancuma, Emthanjani and Ubuntu have the highest number of backlogs, representing approximately 59,5% of the backlogs in the district.

All the Recent Information indicates that much of the district households 83% households have access to electricity for lighting and cooking purposes. As much as the existing situation is encouraging, it is however very important to note that some households (17%) are still using candles and paraffin as alternative power sources for meeting their power needs.

Housing

All local municipalities are composed of various residential components varying from formal housing units to informal dwelling units as indicated in the table below. Within the District, 82,8% of households live in formal housing, 10,8% in informal housing and only 2% in traditional houses. Household in the whole PKSD is about 49 193 in respect to the Census 2011, where the average Household Size is about 3.70% and the housing owned is at 52.00%.

Table 14: Enumeration area type by Local Municipality

	Formal residential	Informal residential	Traditional residential	Farms	Parks and recreation	Collective living quarters	Industrial	Small holdings	Vacant	Commercial
Ubuntu	13926	339	-	3729	-	-	444	-	54	105
Umsobomvu	23361	1890	-	2451	45	264	222	-	96	45
Emthanjeni	39306	-	-	2499	9	3	6	483	39	9
Kareeberg	9450	-	-	2118	-	-	102	-	3	-
Renosterberg	8934	801	-	1173	-	-	-	57	15	-
Thembelihle	13989	-	-	1626	-	12	-	-	75	-
Siyathemba	18555	-	-	2763	-	-	24	162	90	-
Siyancuma	26061	2697	-	7125	-	-	486	594	114	-

Telephones

According to the table below most households in the district, approximately 66.2% do not have telephones at their homes although many of them have expressed need for the service. The existing situation results in many households still depending on public phones and other means of telecommunication. The public telephones according to Telkom authorities are vandalised frequently. The situation calls for a need to protect these facilities as they will be of help to the residents who depend on them.

It is perhaps interesting to note, as the table indicates, that only in Emthanjeni Municipal Area that a substantial number of the households have telephones at the homes and Cell phones.

Table 15: Household access to Telephones

CELL PHONE ACCESS								
	Ubuntu	Umsobomvu	Emthanjeni	Kareeberg	Renosterberg	Thembelihle	Siyathemba	Siyancuma
Yes	3651	5775	8103	2211	2169	2991	4239	7296
No	1479	2064	2352	1011	825	1152	1593	2280
TELEPHONE ACCES								
Yes	708	849	1434	504	453	585	708	1026
No	4422	6993	9024	2718	2541	3555	5124	8550

Education

Obtaining some form of income generating employment has become increasingly difficult in recent years. This is accentuated by the lack of education with the poorly educated being the ones that experience the highest incidence of poverty.

There has been a 8,3% in the number of learners that have accessed education between 1996 and 2001. There has been a 27,1% in the number of learners that have matriculated.

Approximately 3% of persons in the Pixley ka Seme district have an educational qualification higher than a matriculation certificate. Of these, approximately one third have a tertiary qualification. The percentage of the population in the formal education system is 66,5% whilst 19,7% of the population received no formal schooling. Table 16 below is a comparison between Census 2001 and 2011 regarding the number of persons between the age of 5-24 that attend school:

Table 16: Level of Education per Local Municipality

	NC071: Ubuntu	NC072: Umsobomvu	NC073: Emthanjeni	NC074: Kareeberg	NC075: Renosterberg	NC076: Thembelihle	NC077: Siyathemba	NC078: Siyancuma	Grand Total
Grade 12 / Std 10 / Form 5	2100	4050	6396	1314	1506	1926	2433	3861	23586
NTC I / N1/ NIC/ V Level 2	6	18	42	3	6	3	9	18	105
NTC II / N2/ NIC/ V Level 3	6	15	33	6	15	9	12	12	108
NTC III /N3/ NIC/ V Level 4	9	15	54	9	12	9	9	30	147
N4 / NTC 4	6	15	39	9	12	27	18	21	147
N5 /NTC 5	12	12	36	6	6	6	9	36	123
N6 / NTC 6	12	9	51	12	9	21	18	30	162
Certificate with less than Grade 12 / Std 10	3	24	30	6	9	12	6	21	111
Diploma with less than Grade 12 / Std 10	15	24	51	18	15	15	12	24	174
Certificate with Grade 12 / Std 10	66	87	141	36	69	54	84	138	675
Diploma with Grade 12 / Std 10	138	243	381	114	102	90	135	195	1398
Higher Diploma	210	297	363	93	78	153	195	315	1704
Post Higher Diploma Masters; Doctoral Diploma	18	36	30	15	12	27	24	30	192
Bachelors Degree	75	177	261	51	63	114	90	165	996
Bachelors Degree and Post graduate Diploma	42	66	84	18	27	45	27	60	369
Honours degree	30	48	99	15	30	42	48	99	411
Higher Degree Masters / PhD	24	27	69	18	6	18	27	33	222
Grand Total	2772	5163	8160	1743	1977	2571	3156	5088	30630

Persons having no schooling did never enjoy formal education, not even some primary education. Implying illiteracy in most cases, these persons are limited to perform manual labour and cannot adequately participate in society.

Over the last 15 years the rate of no-schooling have been halved across the country. The percentage of persons 20 years and older who have no schooling decreased from 19,1% in 1996 to 8,7% in 2011. This is almost halved since 2001 when 19% aged 20+ had no schooling in the Northern Cape, went from around 22% to around 11%. Whereas in PKS Education (aged 20+) No Schooling is 14.60%, Higher Education is 6.10% and Matric 20.50%. The literacy efforts for adults and the increasing influx of 20 year olds with proper levels of education are expected to drive these proportions further down in the years to come.

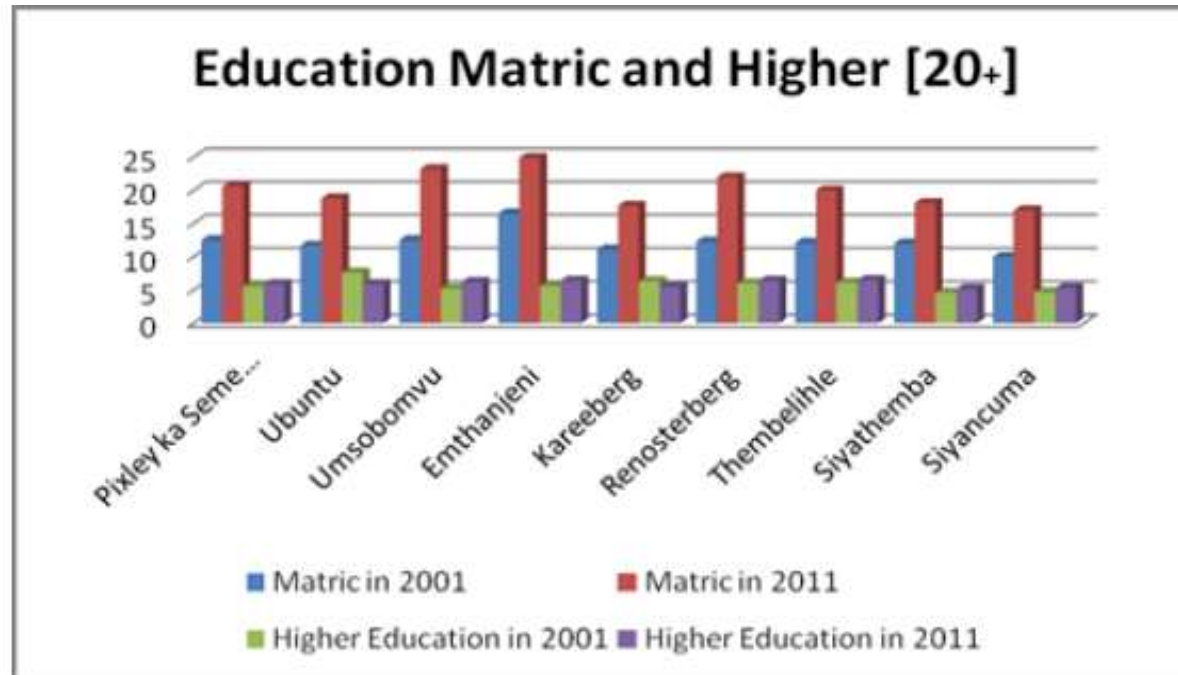


Figure 21. Education Matric and Higher Source: Statistics South Africa 2011

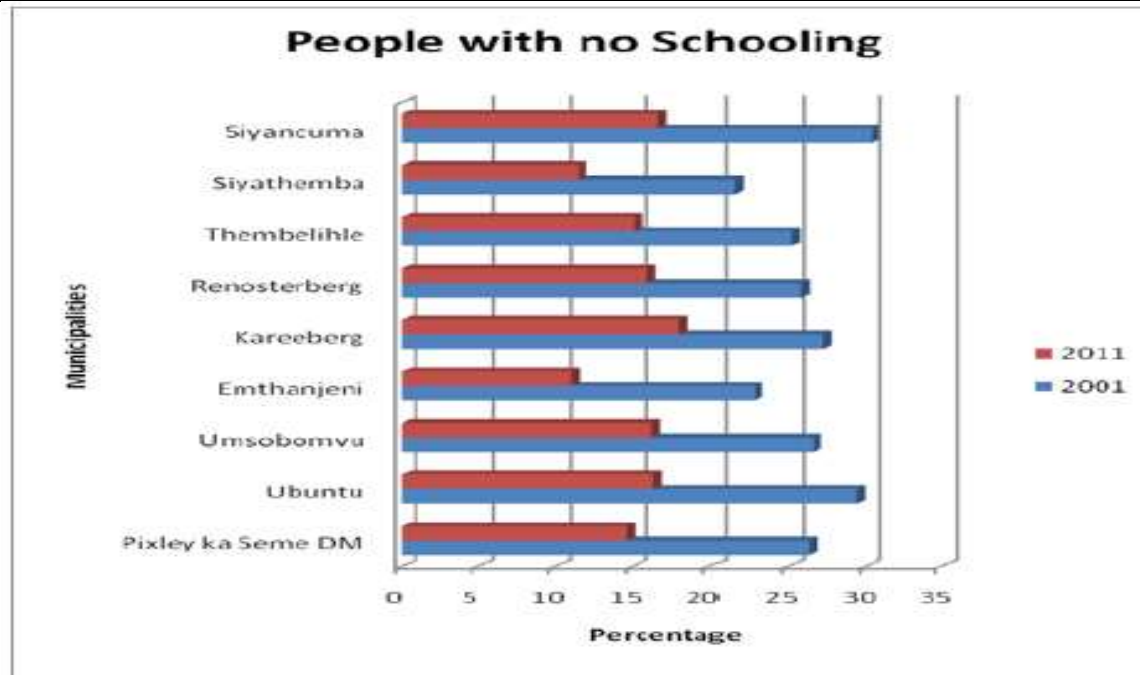


Figure 22. No schooling Source: Statistics South Africa 2011

Table 17: Schooling per Local Municipality

	% NO SCHOOLING	% HIGHER EDUCATION
Ubuntu	10.68	3.72
Umsobomvu	10.68	3.95
Emthanjeni	7.24	3.87
Kareeberg	12.49	3.57
Renosterberg	10.53	3.96
Thembelihle	10.05	3.93
Siyathemba	7.74	3.32
Siyancuma	11.00	3.21

The above table presents the level of education of PKS Municipality's labour force; the statistics for the Northern Cape and South Africa are included for comparison. The level of primary schooling is overall higher than the primary level of schooling for South Africa. Secondary education completed is overall lower than both the province and national level of education. The tertiary levels of education are the lowest, with just above 3%.

Unemployment

There has been a decrease in the number of people employed and a concomitant increase in the number of unemployed in the district between these 2001 and 2011 censuses. This is directly related to the number of businesses that has closed in the region during the period reflected and indicates the need for a retention or wholesale and retail strategy regarding these businesses. Unemployment reaching approximately 28.3% 2011 and Youth unemployment reaching 35.4% in 2011 as per Stats SA 2011 Census.

Table 18: Employment status per Local Municipality

	Employed	Total%	Unemployed	Total%	Discouraged work-seeker	Total%	Other not economically active
Ubuntu	5028	27	2064	11	507	3	3774
Umsobomvu	6117	22	3018	11	1188	4	7491
Emthanjeni	9864	23	3831	9	1203	3	11559
Kareeberg	2856	24	951	8	456	4	3030
Renosterberg	2616	24	957	9	324	3	2796
Thembelihle	3861	25	1533	10	687	4	3777
Siyathemba	5370	25	1728	8	765	4	5787
Siyancuma	7947	21	3120	8	1422	4	10575
Total	43659	192	17202	75	6552	30	48789

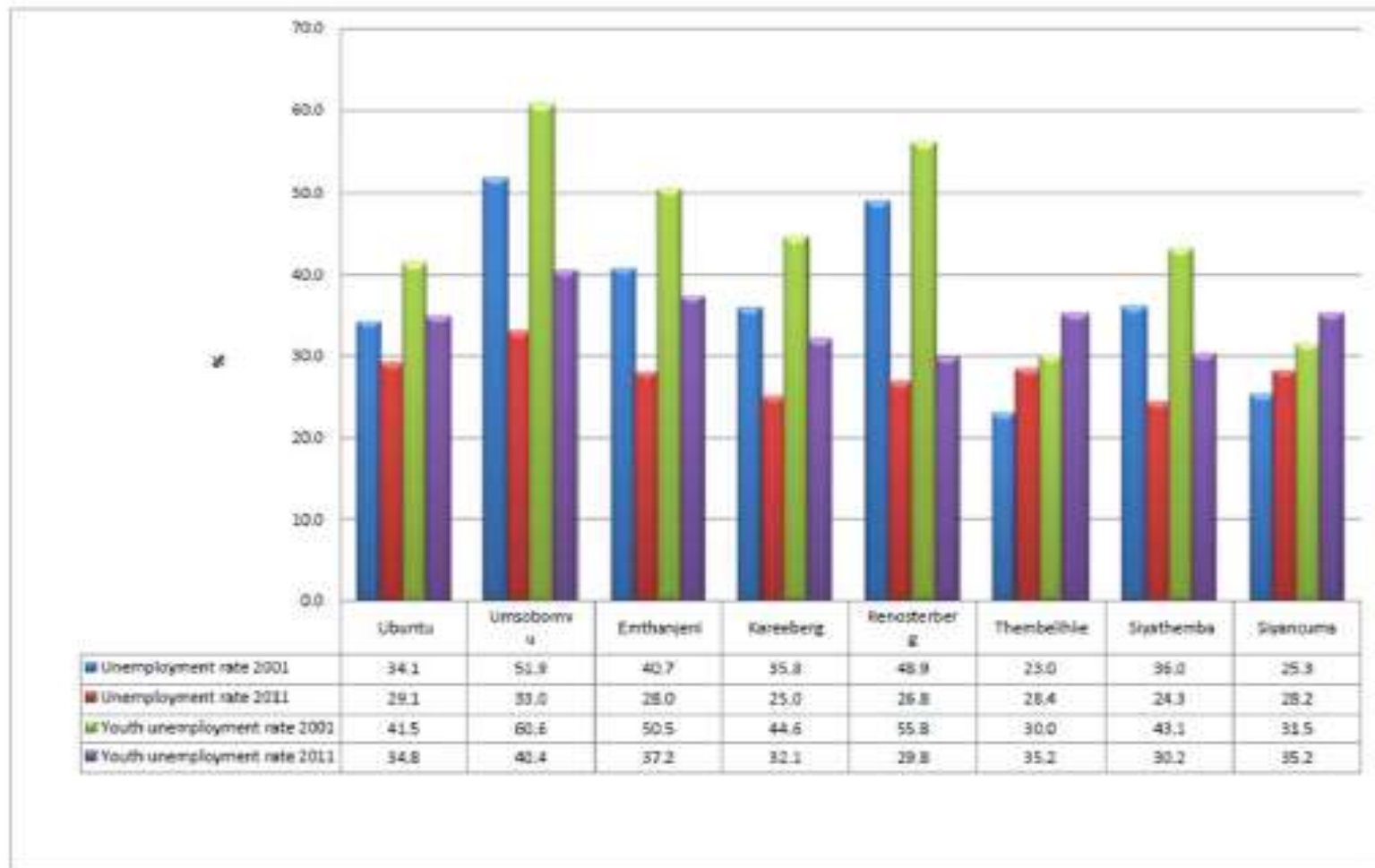


Figure 23. Unemployment & Youth Unemployment

The municipalities that have the largest percentage of unemployed are Umsobomvu and Renosterberg with unemployment rates of 30,2% and 31,5% respectively. When the actual numbers of unemployed in the districts are considered, the municipalities that have the most people in the unemployed trap are Emthanjeni, Siyanquma, Umsobomvu and Siyathemba. These account for 20 153 (70,8%) of the unemployed in the district to 7,2% provided the unemployed 20 153 are employed in these areas.

Labour	<p><i>Labour Participation Rate</i> The labour participation rate in the district is 50,43%. This indicates the labour force as a percentage of the population in the age group 15-64 years of age.</p> <p><i>Labour Dependency Ratio</i> The total number of persons supported by every person in the labour force, excluding him or herself is indicated by the labour dependency ratio. In the case of the Pixley ka Seme district this ratio is 1,81 with working individuals in the Siyathemba, Siyancuma and Thembelihle municipalities having to support approximately 2 persons. The lowest ratio in the district is to be found in the DMA area, at 0,81.</p> <p><i>Labour Youth Dependency Ratio</i> Indicates the total number of youths, aged 0-14, supported by every person in the labour force, excluding him or her. The ratio in the Pixley ka Seme district is 0,09. This indicates that working individuals support approximately one youth in the age group 0-14.</p> <p><i>Labour Aged Dependency Ratio</i> The labour aged dependency ratio indicates the total number of aged persons, older than 65, supported by every person in the labour force, excluding him or herself. The ratio for the district is 0,85.</p> <p><i>Labour Absorption Capacity</i> The labour absorption capacity is the ability of the formal sector of the economy to absorb the supply of labour in the region. Approximately 25% of the economically active population of the district is unemployed. The municipalities that have the largest percentage of unemployed in the district is Umsobomvu and Renosterberg with unemployment rates of 30% and 31% respectively. The table 17 below indicates the above ratios in each municipality in the district:</p> <p>Table 19: Labour Ratio</p>

Local Municipality	Labour Participation Rate	Labour dependency ratio	Labour youth dependency ratio	Labour aged dependency ratio
Emthanjeni	49,70	1,81	12,05	84,53
Kareeberg	54,80	1,65	13,91	79,13
Renosterberg	56,94	1,52	18,66	84,97
Siyancuma	45,81	2,09	-1,83	83,53
Siyathemba	48,19	1,99	0,36	83,92
Thembelihle	46,93	1,95	3,10	83,68
Ubuntu	54,39	1,64	13,09	86,03
Umsobomvu	51,94	1,73	8,19	86,81
	5043	1,81	8,80	84,65

Table 20: Indicates the population by municipality living below the minimum living levels in the district

Local Municipality	Population	Population below MLL	% below MLL
Emthanjeni	35 438	18,418	51.97
Kareeberg	9 356	5,433	58.07
Renosterberg	9 091	5,616	61.77
Siyancuma	35 894	22,559	62.85
Siyathemba	17 497	9,374	53.58
Thembelihle	13,716	3,843	28.02
Ubuntu	16,480	10,787	65.46
Umsobomvu	23,747	20,400	85.91
Total	164,412	98,064	59.65

An average of 60% of the population in the district lives below the minimum living level (MLL). The highest percentage is found in the Umsobomvu municipal area, at 85%, and the lowest at 28% in the Thembelihle municipal area. This represents 17,3% of the provincial population living below the MLL. The average monthly (individual) income for the district is approximately R740 which is less than the stipend received as a grante from social services departments.

Economic Characteristics*Regional Gross Domestic Product*

The district contribution to the provincial GDP has consistently been the lowest over recent years with its contribution declining from 10,6% to 9,6% between 2003 and 2004. The economy is predominantly primary sector focused with manufacturing and tourism also contributing to the district economy.

The economic sectors that contribute the most to the GDP of Pixley ka Seme are Agriculture, Mining, Tourism and Manufacturing.

Table 21 below represents the percentage contribution per economic sector by the district to the gross domestic product of the province for 2003 and 2004.

Table 21: % GDP of district municipalities per economic sector for 2003 and 2004

	% OF GDP									
	Primary		Secondary		Tertiary		Taxes - Subsidies		Total GDP	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
Namakwa	4,3	3,8	0,5	0,4	7,3	7,0	0,7	0,8	12,8	12,1
PKSDM	3,1	2,7	1,0	0,9	5,8	5,2	0,8	0,8	10,6	9,6
Siyanda	3,8	3,3	1,3	1,3	8,0	7,7	1,1	1,2	14,2	13,5
Frances Baard	6,8	6,2	3,2	3,1	26,1	28,6	2,5	2,0	38,6	40,7
Kgalagadi	16,7	16,5	1,4	1,3	4,9	5,5	0,7	0,8	23,8	24,1
NC GDP	34,7	32,6	7,3	7,1	52,1	54,0	5,8	5,6	100,0	100,0

Pixley ka Seme's total percentage contribution in 2003 was 10,6% and declined to 9,64% in 2004. The district contribution to the GDP has consistently been the lowest over recent years with its contribution declining. It is evident that the tertiary sector contributes the greatest percentage to the GDP of the Northern Cape, followed by the primary sector and then the secondary sector.

The Pixley ka Seme district displays a similar characteristic as the province with respect to its sector contributions to GDP; the economic sectors that contribute the most to the GDP of Pixley ka Seme are Agriculture, Mining, Tourism and Manufacturing, with its secondary sector contribution being the least. The manufacturing sector is part of the secondary sector which indicates that it has declined over the

period of 2003 (0,97%) and in 2004 (0,92%). To transform and diversify the status of the districts economy will require a concerted effort to improve and create development opportunities within this sector.

Location Quotient

A comparative advantage indicates a relatively more competitive production function for a product or service in specific economy than the aggregate economy. This economy therefore renders this service more efficiently. The location quotient is an indication of the comparative advantage of an economy in terms of its production and employment. A location quotient greater than 1 indicates a comparative advantage regarding the sector in one location with respect to another.

The analysis below indicates the location quotient of the Pixley ka Seme District with respect to the Northern Cape Province. The table and graph below indicates the location quotients of sectors in the district municipality with respect to the Northern Cape.

Sectors in the economy of Pixley ka Seme that have a location quotient larger than 1 are agriculture (2,35); community, social and personal services (1,19); transport, storage and communication (1,16); electricity, gas and water supply (2,19). These indicate sectors that show potential for additional development in this does not imply that sectors, that do not feature here, should not be pursued since there may be latent potential in these sectors that could be exploited.

Table 22 below indicates the location quotients of the economic sectors in the municipalities.

Table 22: Indicates the location quotients of the economic sectors in the municipalities

	Kareeberg	Emthanjeni	DMA	Renosterberg	Siyancuma	Siyathemba	Thembelihle	Ubuntu	Umsobomvu
Agriculture	1,18	0,31	1,62	0,54	1,11	1,46	1,47	1,59	0,82
Mining	0,08	0,05	0,45	0,00	4,28	0,09	0,02	0,21	0,00
Manufacturing	0,41	0,71	1,28	0,13	1,92	0,76	1,99	0,91	0,18
Electricity, gas and water supply	0,17	0,60	0,36	11,42	0,08	1,14	0,23	0,00	0,97
Construction	0,52	1,25	0,85	0,58	0,99	1,69	0,48	0,55	1,00
Wholesale and retail trade	1,12	1,05	1,20	0,56	1,02	0,94	1,17	0,79	1,13
Transport, storage and communication	0,52	1,76	0,53	0,33	0,84	0,83	1,33	0,75	0,51
Finance, insurance, real estate	1,06	1,79	0,94	0,46	0,78	0,71	0,61	0,72	0,67
Community, social and personal services	1,18	1,37	0,58	0,54	0,82	0,72	0,56	0,85	1,55

Other sectors in the district that have a distinct comparative advantage with respect to the Northern Cape and South Africa are:

- Electricity, Gas and Water Supply.
- Community, social and personal services.
- Transport, storage and communication.

The municipalities in the district that have comparative advantages with respect to the sector Electricity, Gas and Water supply are Renosterberg and Siyathemba with location quotients of 11,42 and 1,14 respectively. This resounding comparative advantage in the sector for the Renosterberg municipality is due to the presence of the Van Der Kloof Dam in the municipality. It is the only sector in which Renosterberg has a comparative advantage with respect to other municipalities in the district.

Kareeberg, Emthanjeni and Umsobomvu have location quotients, with respect to other municipalities in the district, of 1, 18, 1, 37 and 1, 55 respectively in the community, social and personal services sector. In the transport, storage and communication sector, Emthanjeni and Thembelihle have location quotients of 1, 76 and 1, 33 respectively, indicating a comparative advantage in this sector with respect to other municipalities in the district. The sectors that contribute significantly to the Northern Cape GDP is highlighted in the table above with agriculture having the highest LQ, Electricity, gas and water supply second highest LQ, etc.

The agricultural sector has the potential for growth with a number of comparative and competitive advantages for the Northern Cape and Pixley ka Seme in particular.

Tress Indicators

The level of diversification or concentration of a region's economy is measured by a tress index. A tress index of zero represents a totally diversified economy whilst the higher the index, the more concentrated or vulnerable the region's economy is to exogenous variables e.g. adverse climatic conditions and commodity price fluctuations.

The economy of the Pixley ka Seme district has a tress index of 26, 18 indicating a reliance of the Pixley ka Seme economy on the agriculture, transport and services sector. This tress index indicates that the economy is not diversified but is largely dependent on the agriculture and is vulnerable to exogenous variables such as adverse climatic conditions, commodity price fluctuations.

(b) Description of the current land uses

(1) Land Use before Mining:

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area. Land capability and Land Use was described and included in this report as part of the ecological study.

The Scope of Study

The specific terms of reference for the study include the following:

- conduct a desktop study and field investigation in order to identify and describe different ecological habitats and provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
- identify the relative ecological sensitivity of the project area;
- produce an assessment report that:
 - indicates identified habitats and fauna and flora species,
 - indicates the ecological sensitivity of habitats and conservation values of species,
 - determines the potential impacts of the project on the ecological integrity,
 - provides mitigation measures and recommendations to limit project impacts,
 - indicate ecological responsibilities pertaining to relevant conservation legislation.

This ecological assessment report attached as Appendix B describes the ecological characteristics of the proposed prospecting area, identifies the source of impacts from prospecting operation, and assesses the impacts, as well as the residual impacts after closure.

Currently, major land uses in the region include activities related agriculture and, to a lesser extent, mining. The land capability for the majority of the study site is non-arable with low potential grazing land, with the mountainous sections on the property being classified as wilderness areas. The agricultural region is demarcated for sheep farming with a grazing capacity of 32 Ha/LSU, but extensive crop irrigation, i.e. cotton, lucerne, table grapes and sultanas occur on the deeper alluvial soils along the Orange River (Rumboll 2014). Apart from the KIMSWA diamond prospecting right application, the property was also subjected to asbestos and lead mining in the past. Currently, the farm is utilised for grazing by cattle, goat and sheep, while a portion along the river is used for crop irrigation. A number of

homesteads on the farm are currently occupied by land owners, tenants and workers. (Taken out of the Ecological Study done by Boscia Ecological Consultants, Dr. Betsie Milne 2019).

(2) Evidence of Disturbance:-

On the application area there are existing roads and some evidence is spread over the area of old asbestos mining into the mountains. The diamond target areas and asbestos target areas are fortunately not the same.

(3) Existing Structures:-

The only structures on the application area are the existing roads, some houses and small agricultural lands next to the Orange River. The prospecting will have impact on the agricultural lands as the diamond bearing gravels is next to the river.

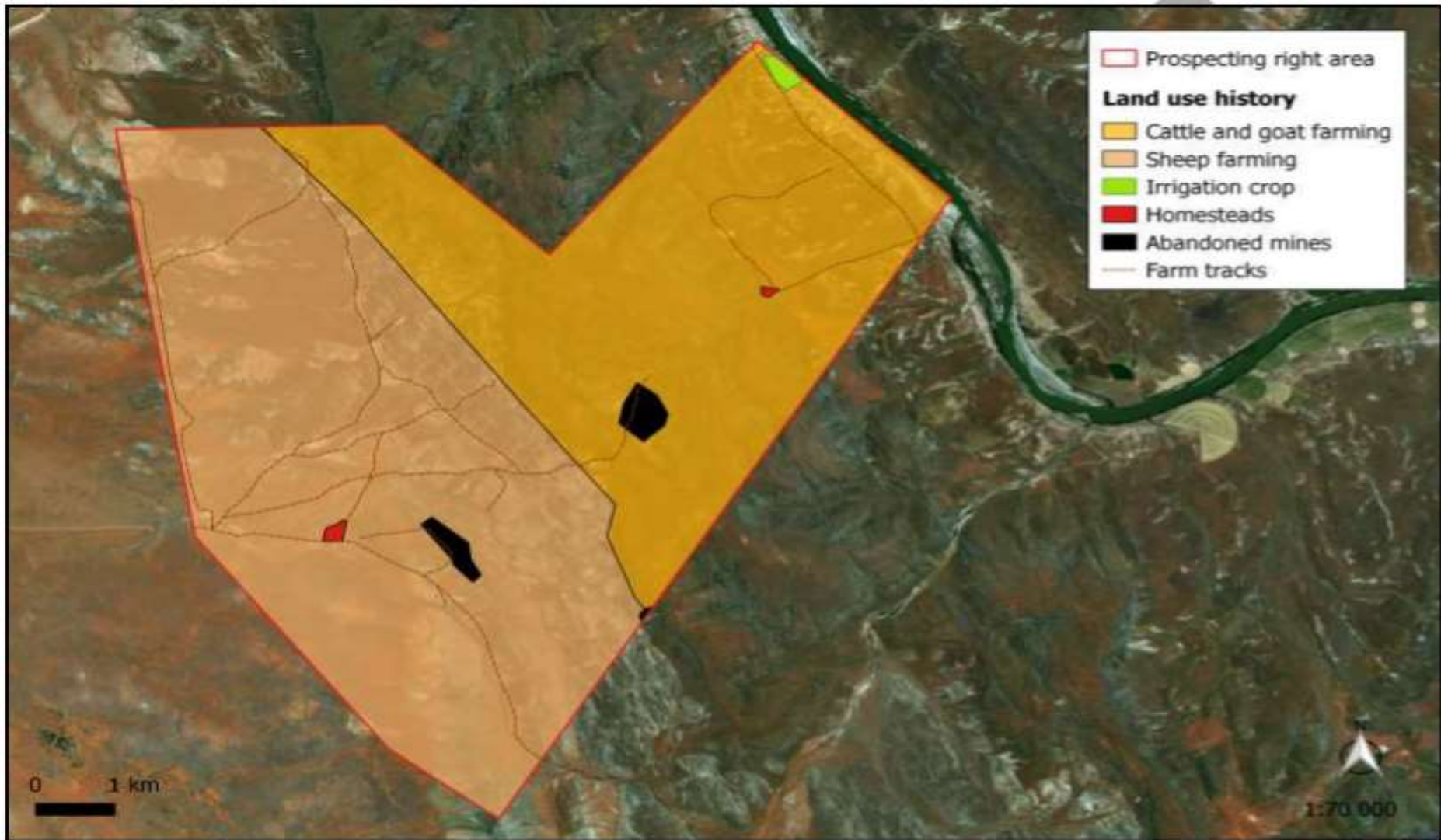
All 100m safety borders from infrastructure will be kept.

(c) Description of specific environmental features and infrastructure on the site

The infrastructure on site is comprehensively discussed in section d(ii) as part of the prospecting methodology discussion, as well as in section g as part of the prospecting footprint description. Furthermore, a comprehensive description of the environment was presented in section g (iv) (A) as part of the baseline report.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

**Figure 24.** Environmental and current land use map

v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated)

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Highly unlikely	Operational and Decommissioning	insignificant Site	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Medium High	High	Construction and Operational	Low Site	<ul style="list-style-type: none"> • Prospecting continuously, if possible and does not influence prospecting and safety requirements. • Employ effective rehabilitation strategies to restore surface topography of prospecting areas and plant site. • Stabilise the mine residue deposits. • All temporary infrastructures should be demolished during closure.
Soils	Soil Erosion Construction of infrastructure; topsoil removal; potential runoff.	Medium High	High	Permanent	Medium High Site	<ul style="list-style-type: none"> • All attempts must be made to avoid exposure of dispersive soils. • Re-establishment of plant cover on disturbed areas must take place as soon as possible,

						<p>once activities in the area have ceased.</p> <ul style="list-style-type: none">• Ground exposure should be minimised in terms of the surface area and duration, wherever possible.• The soil that is stockpiled should be stock-piled in layers and protected by berms to prevent erosion.• All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.• Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.• Audits must be carried out at regular intervals to identify areas where erosion is occurring.• Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.• Dust suppression must take place.
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						<ul style="list-style-type: none"> Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Loss of soil fertility During the removal of topsoil; stockpiling.	Medium High	High	Permanent	Medium High site	<ul style="list-style-type: none"> Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. Topsoil stockpiles must be kept separate from sub-soils. The topsoil should be replaced as soon as possible onto the cleared areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Soil pollution	Medium	Medium	Construction and Operational	Low Site	<ul style="list-style-type: none"> Refuelling must take place in well demarcated areas and

	Spillage of hazardous material; runoff.					<p>over suitable drip trays to prevent soil pollution.</p> <ul style="list-style-type: none"> • Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. • All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles and machinery should be regularly serviced and maintained.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Very Low	Possible	Short term	Minimal Site	Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Very low	Possible	Short term	Minimal Site	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon Spills Hydrocarbon spills from vehicles and fuel storage areas	Medium	Possible	Construction	Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be

	may contaminate the groundwater resource locally					sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Surface Water	<ul style="list-style-type: none"> • Ground works and stripping of vegetation resulting in a changed land profile. • Runoff from stockpiled soil and vegetation may contain high levels of silt. • Significant levels of dust may emanate from the use of heavy vehicles which in turn will impact on runoff water quality. • Materials used may impact negatively on the 	Medium to Low	Possible	Construction	Low Local	<p>Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources.</p> <p>Dirty storm water trenches should be inspected regularly (once before the rainy season and after each occurrence of a storm) to clean the trench from excess soil particles to prevent overtopping of the channel wall during a sudden storm which will result in mixing of the dirty and clean water systems.</p> <p>Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social</p>

	runoff water quality.					environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to minimize the impacts are as follows:
	<ul style="list-style-type: none"> • Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP. • A high potential of soil erosion exists due to an increased percentage of bare surfaces. 	High	Possible	Operational	Low to Moderate Site	<ul style="list-style-type: none"> • Only environmental friendly materials must be used to minimize pollution of surface water runoff and/or underground water resources. • Pipe leakages should be minimized. • Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
	<ul style="list-style-type: none"> • Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution. • Removal of vegetation could lead to erosion and sediment transportation. • Significant dust levels will 	Moderate to High	Possible	Closure	Low Site	<ul style="list-style-type: none"> • Non mining waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area. • The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will

	emanate from the use of heavy vehicles.					reduce soil erosion and improve natural re-vegetation.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	Loss of and disturbance to indigenous vegetation Construction of roads, plant site, as well as other necessary infrastructure; placement of stockpiles; and the clearing of vegetation for prospecting, materials storage and topsoil stockpiles; vehicular movement.	Low Medium	Certain for life of operation Definite	Construction and operational	Low to Medium Site	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of mined areas. • Encourage the growth of natural plant species. • Ensure measures for the adherence to the speed limit.
	Loss of flora with conservation concern Removal of listed or protected plant species; during Construction of	High	Possible for life of operation Definite	Residual Construction and Operational	Low to Medium Site	<ul style="list-style-type: none"> • Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting. • It is recommended that these plants are identified and marked prior to prospecting.

	roads, plant site, as well as other necessary infrastructure; the placement of stockpiles; and clearing of vegetation for prospecting.					<ul style="list-style-type: none"> • However, if threatened of destruction by prospecting, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
	Proliferation of alien vegetation Clearing of vegetation; prospecting activities	High	Possible Temporarily	Residual Construction and Operational	Low Site	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of mined areas. • Encourage the growth of natural plant species. • Mechanical methods (hand pulling) of control to be implemented extensively. • Annual follow-up operations to be implemented.
	Encouragement of bush encroachment Clearing of vegetation; disturbance through prospecting activities.	Medium	Possible temporarily	Residual Construction and Operational	Low Site	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of mined areas. • Encourage the growth of natural plant species. • Mechanical methods (hand pulling) of control to be implemented extensively.

						<ul style="list-style-type: none"> Annual follow-up operations to be implemented.
Fauna	<p>Loss, damage and fragmentation of natural habitats</p> <p>Clearance of vegetation; Prospecting activities</p>	High	Certain for life of operation	Residual Construction and Operational	Regional	<ul style="list-style-type: none"> Prospecting activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).
	<p>Disturbance, displacement and killing of fauna</p> <p>Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from prospecting activities.</p>	Low-Medium	Certain frequently	Decommissioning	Low Site	<ul style="list-style-type: none"> Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint. The extent of the proposed prospecting should be demarcated on site layout plans. The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must

						<p>ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <ul style="list-style-type: none">• All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.• All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.• The environmental induction should occur in the appropriate languages for the workers who may require translation.• Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.• Employ measures that ensure adherence to the speed limit.
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Air Quality	Sources of atmospheric emission associated with the prospecting operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of road dust.	Low	Certain	Decommissioning	Low Site	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.
SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil	Medium	Possible	Pre- Construction and Construction	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Construction activities Noise increase at the prospecting site.	Medium	Possible	Pre- Construction and Construction	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Construction of internal Roads	Medium	Possible	Pre- Construction and Construction	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Assembly plant equipment	Medium	Possible	Pre- Construction and Construction	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers

	Noise increase at the prospecting site.					specifications on acceptable noise levels
	Construction of the Mine Residue dump, soil stock pile and material stock pile. Noise increase at the prospecting site.	Medium	Possible	Pre- Construction and Construction	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Clearing of new open cast prospecting areas, stripping and stockpiling of topsoil. Noise increase at the prospecting site.	Medium	Possible	Operational	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Diesel generators Noise increase at the prospecting site.	Medium	Possible	Operational to closure	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.
	Additional traffic to and from the mine	Medium	Possible	Operational to closure	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Maintenance activities at the different sites.	Medium	Possible	Operational to closure	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels

	Back fill of prospecting footprint area	Medium	Possible	Decommissioning	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Planting of grass and vegetation at the rehabilitated areas	Medium	Possible	Decommissioning	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Planting of grass and/or vegetation should be limited to daytime only
	Removal of infrastructure	Medium	Possible	Decommissioning	Low Site	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Removal of infrastructure should be limited to daytime only. Noise survey to be carried out to monitor the noise levels during these activities.
Visual impacts	Potential visual impact on R386	Medium Regional	Certain	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low.
	Potential Visual Impact on the surrounding land users/ residents	Medium Regional	Highly Likely	Construction, Operation and Decommissioning	Medium Local Site	The design of the proposed prospecting development will determine the visual impact.

	Potential visual impact of the proposed development on the commercial activities located within 1 km.	Medium Regional	Highly Likely	Construction, Operation and Decommissioning	Medium Local Site	The design of the proposed prospecting development will determine the visual impact.
	Potential visual impact of the proposed development on the Sense of Place	Medium Regional	Highly Likely	Construction, Operational and Decommissioning	Medium Local Site	Design of the proposed development can ensure that the development forms part of the area and is aesthetically pleasing.
	Potential visual impact of the proposed development on the construction phase of the surrounding land users in close proximity	Medium Regional	Highly Likely	Construction	Low Local Site	<p>Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact.</p> <ul style="list-style-type: none"> • Ensure that the design fits into the surrounding environment and it is aesthetically pleasing; • Ensure that rubble, litter and disused construction materials are managed and removed regularly; • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; • Reduce and control construction dust emitting activities through the use of approved dust suppression techniques; and

	Potential visual impact of the proposed development on the operational phase of the surrounding land users in close proximity.	Medium Regional	Highly likely	Operational	Medium Local Site	<p>Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact.</p> <ul style="list-style-type: none"> • Ensure that the design fits into the surrounding environment and it is aesthetically pleasing. • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; • Rehabilitation of disturbed areas and re-establishment of vegetation;
Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low likelihood	Decommissioning	Low Local Site	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.
Heritage resources	The Deterioration of sites of cultural and heritage importance.	Medium to Low	Certain	Construction, Operational	Low Site	Any heritage and cultural resources (e.g. ruins, historic structures, etc.) must be protected and preserved by the delineation of a no go zone. Should any further resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Burial remains should not be disturbed

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	Population Impacts Employment Opportunities and skills Inequities	Medium Positive	Probable	Start-up and Construction	Medium Positive Local Site	<ul style="list-style-type: none"> • Training of potential future employees, contract workers and/or community members should focus on prospecting related skills which would furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily the preferred training and skills development method. • Training courses should be accredited and certificates obtained should be acceptable by other related industries.
	Impact on daily living and movement patterns	Low Negative	Probable	Start-up and Construction	Low Negative Local Site	<ul style="list-style-type: none"> • Dust suppression methods should be strictly implemented if and where required • All vehicles should be in a good condition and adhere to the road worthy standards • Dust creation should be kept to the minimum by adhering to the speed limits on the gravel road

						<ul style="list-style-type: none"> • The construction of additional access roads should be limited. • Speeding of vehicles must be strictly monitored.
	Safety and Security Risks	Low Negative	Highly Probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> • A Fire / Emergency Management Plan should be developed and implemented at the outset of the prospecting operation. • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site and workers should be appropriately trained for fire fighting • The prospecting area should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation. • The prospecting site should be clearly marked and “danger” and “no entry” signs should be erected. • Speed limits on the local roads surrounding the prospecting sites should be enforced. • Speeding of mining vehicles must be strictly monitored

						<ul style="list-style-type: none"> Local procurement and job creation should receive preference.
	Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> Maximise the employment of locals where possible First aid supplies should be available at various points at the prospecting site The general health of mining workers should be monitored on an on-going basis
	Community Infrastructure Needs Impact on Infrastructure and Services	Low Negative	Highly probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> Maximise the employment of locals where possible Maintenance of the roads frequently used by prospecting traffic e.g. R386 should be discussed and negotiated with the Northern Cape Department of Roads and Public Works
	Heritage Features	Low Negative	Highly probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> Any heritage features (e.g. buildings and/or artefacts) on site must be protected and monitored Should it be necessary, such heritage features should be assessed and be recorded by an accredited Heritage Impact Specialist or archaeologist
	Intrusion Impacts Visual Impact and Sense of Place	Low Negative	Probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> The prospecting site should be kept litter free Site rehabilitation on certain sections of the site should

						<p>occur as soon as the prospecting process allows</p> <ul style="list-style-type: none"> The recommendations made by the Visual Impact Assessment should be adhered to.
	Noise Impact	Low Negative	Probable	Construction	Low Negative Local Site	<ul style="list-style-type: none"> The mitigation measures of the Noise Impact Assessment should be implemented Vehicles should be in a good working order Prospecting activities should be kept to normal working hours e.g. 7 am until 5 pm during weekdays
	Intrusion Impacts Visual Impact and Sense of Place	Low Negative	Highly Probable	Operational	Low Negative Local Site	<ul style="list-style-type: none"> Recommendations and mitigation measures as part of the EMP should be strictly implemented. Prospecting areas should be rehabilitated as soon as the Prospecting Works Programme allows
	Noise Impact	Low Negative	Probable	Operational	Low Negative Local Site	<ul style="list-style-type: none"> Recommendations and mitigation measures proposed by the Noise Impact Assessment should be strictly implemented Noise generating activities should be kept to normal working hours (e.g. 7 am until 5 pm) where possible

Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the mining company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local Site	Ensure continuous and transparent communication with IAP's
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- vi) **Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks**(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

Methodology used in determining and ranking the nature, severity, consequences, extent, duration and probability of potential environmental impacts and risks

The Different environmental components on which the project (can) have an impact are:

1. **Geology**
2. **Topography**
3. **Soil**
4. **Land Capability**
5. **Land Use**
6. **Flora (Vegetation)**
7. **Fauna**
8. **Surface Water**
 - **Wetlands (drainage channels and Orange River)**
9. **Ground Water**
10. **Air Quality**
11. **Noise and vibration**
12. **Archaeological and Cultural Sites**
13. **Sensitive Landscapes**
14. **Visual Aspects**
15. **Socio-Economic Structures**
16. **Interested and Affected Parties**

Impact Assessment

Before the impact assessment could be done the different project Activities/infrastructure components were identified.

1	Processing Plant : 1 X 16 feet
2	Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
3	Clean & Dirty water system: Berms It is anticipated that the operations will establish storm water control berms and trenches to separate clean and dirty water on the prospecting site.
4	Fuel Storage facility (Concrete Bund walls and Diesel tanks): The development of facilities or infrastructure for the storage and handling of dangerous goods (fuel), where such storage occurs in containers with a combined capacity of more than 80 cubic meters.
5	Prospecting Area : Although the total area will never be mined and the footprint with the bulk sampling is calculated to be ± 40 ha. 20 Trenches/ 150 pits will be sampled in pits (2 m x 3 m) and trenches (100 m x 50 m) by means of an opencast method using heavy earthmoving machinery. Vegetated soil or overburden will be stripped and the underlying gravels will be excavated, screened and treated through a rotary plan plant before fed to an x-ray machine for final recovery. The rough diamond product will then be removed for further beneficiation. No processing reagents are required or used in the treatment of the gravel. An estimated total volume of 500 000 m ³ will be processed over 5 years.
6	Salvage yard (Storage and laydown area).
7	Gravel Stockpile area. The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a prospecting right. Gravel stockpiles Tailing Stockpiles Topsoil Stockpiles
8	Waste disposal site Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: <ul style="list-style-type: none"> • Small amounts of low level hazardous waste in suitable receptacles. • Domestic waste. • Industrial waste.
9	Roads (both access and haulage road on the prospecting site): Access

	<p>The development of access roads 6 m in width with no reserve. Roads (both access and haulage road on the prospecting site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 10 km of roads, with a width of 6 meter.</p> <p>Haul The development of — (iv) a road catering for more than one lane of traffic in both directions;” Roads (both access and haulage road on the prospecting site):</p> <p>Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the prospecting operation will create an additional 10 km of roads, with a width of 15 meter.</p>
10	Temporary Workshop Facilities and Wash bay.
11	<p>Water distribution Pipeline.</p> <ul style="list-style-type: none"> • Pipelines for the bulk transportation of water with a diameter of < 0.36 m and a peak throughput of < 120 L/s. • Pipelines for the bulk transportation of slimes with a diameter of < 0.36 m and a peak throughput of < 120 L/s. • Pipelines for the bulk transportation of return water with a diameter of < 0.36 m and a peak throughput of < 120 L/s.
12	<p>Water tank : It is anticipated that the operation will establish 3m x 3m = 9m² each (1 x 10 000) litre water tanks with purifiers for potable water.</p>

The criteria used to assess the significance of the impacts are shown in the table 23 below/overleaf. The limits were defined in relation to prospecting characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

$$(\text{Severity} + \text{Extent} + \text{Duration}) \times \text{Probability weighting}$$

For the impact assessment, the different project activities and associated infrastructure were identified and considered in order to identify and analyse the various possible impacts.

Table 23: Significance of impacts is defined as follows.

SIGNIFICANCE				
Colour Code	Significance rating	Rating	Negative Impact	Positive Impact
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive

	Medium-Low	23 -33	Acceptable/Not desirable	Moderately Positive
	Medium	34 - 48	Generally undesirable	Beneficial
	Medium-High	49 - 56	Generally unacceptable	Important
	High	57 - 70	Not Acceptable	Important
	Very High	90 - 102	Totally unacceptable	Critically Important

Significance of impacts is defined as follows:

Very Low - Impact would be negligible. Almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple.

Low - Impact would have little real effect. Mitigation and/or remedial activity would be either easily achieved or little would be required or both.

Medium Low- Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and fairly easily possible.

Medium - Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be feasible and possible.

Medium High- Impact would be real but could be substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and possible but may be difficult and or costly.

High - Impacts of substantial order. Mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these.

Before any assessment can be made the following evaluation criteria need to be described.

Table 24: Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring

5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring
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Table 25: Explanation of EXTENT of impact

Weight	Extent of Impact	Explanation of Extent
1	Footprint	Direct and Indirect impacts limited to the activity, such as footprint occurring within the total site area of impact only.
2	Surrounding Area Site	Direct and Indirect impacts affecting environmental elements within 2 km of site
3	Local Municipality Local	Direct and Indirect impacts affecting environmental elements within the Prieska area (Siyathemba)
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within District (Pixley Ka Seme District)
5	Provincial	Direct and Indirect impacts affecting environmental elements in the Northern Cape Province

Table 26: Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Temporary (Very Short)	Less than 1 year
2	Short term	1 to 5 years
3	Medium term	6 to 15 years
4	Long term (Life of project)	16 to 50 years
5	Very Long term	Longer than 50 years
6	Permanent	Permanent

Table 27: Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive

		impacts other means other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

vii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

During the operational stages of the prospecting operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and stockpiles/dumps will alter the topography by adding features to the landscape. Prospecting will change the current topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for prospecting and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. Most of the site has a land capability for grazing, but the area has been converted due to the dumping of the kimberlite material with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be affected, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources (drainage lines) during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Prospecting activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

viii) The possible mitigation measures that could be applied and the level of risk

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered)

Geology and mineral resource

Level of risk: Very low

Mitigation measures

- Ensure that optimal use is made of the available mineral resource through proper planning.
- The prospecting should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by mine manager.

Topography

Level of risk: Low

Mitigation measures

- prospecting continuously if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled dumping and plant site;
- Stabilise the mine residue deposits;
- All temporary infrastructures should be demolished during closure.

Soil erosion

Level of risk: High

Mitigation measures

- All attempts must be made to avoid exposure of dispersive soils;
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased;
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible;
- The prospecting operation must co-ordinate different activities in order to optimise the utilisation of the area and thereby prevent repeated and unnecessary dumping;
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses;
- Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate;
- Audits must be carried out at regular intervals to identify areas where erosion is occurring;
- Appropriate remedial action, including the rehabilitation of eroded areas, must occur;
- Dust suppression should take place;

- Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion;
- Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions;
- Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired;
- Topsoil stockpiles must be kept separate from sub-soils;
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil;
- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution;
- Spill kits to clean up accidental spills from earthmoving machinery must be well marked and available on site;
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures;
- All facilities where dangerous materials are stored must be contained in a bund wall;
- Vehicles and machinery should be regularly serviced and maintained.

Soil pollution

Level of risk: Low

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.
- All facilities where dangerous materials are stored must be contained in a bund wall.
- Vehicles and machinery should be regularly serviced and maintained.

Land capability and land use

Level of risk: Medium

Mitigation measures

- Ensure that optimal use is made of the available land through consultation with land owner and proper planning of prospecting activities.
- Employ effective rehabilitation strategies to restore land capability and land use potential of the farm.
- All activities to be restricted within the demarcated areas.

Ground water

Level of risk: Low

Mitigation measures

- Training and awareness

- Make all employees aware of water conservation/water demand management, water pollution avoidance and minimization measures reporting procedure and registry of incidents.
- Train all employees to reduce water consumption.
- Make one (1) individual person at a management level responsible for the management of the overall mine water balance. Train departmental heads in the managing of water balance, water pollution and water conservation within their sectors.
- Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage management, monitoring and record keeping).
- Minimise and manage the loss in water resource
- Allow for a safe working environment

Surface water

Level of risk: Low - Medium

Mitigation measures

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The prospecting site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmental friendly materials must be used to minimize pollution of surface water runoff and/or underground water resources.
- Pipe leakages should be minimized.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non prospecting waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.

- The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.

Indigenous flora

Level of risk: High

Mitigation measures

- Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;
- It is recommended that these plants are identified and marked prior to prospecting.
- However if threatened of destruction by prospecting these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- Minimise the footprint of transformation
- Encourage proper rehabilitation of mined areas
- Encourage the growth of natural plant species (diverse selection of natural plant species).
- Annual follow-up operations to be implemented.
- Ensure measures for the adherence to speed limit.
- Maintenance of firebreaks;
- No trees felled for firewood;

Alien invasive plants

Level of risk: High

Mitigation measures

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of mined areas.
- Encourage the growth of natural plant species.
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.

Fauna

Level of risk: Low- Medium

Mitigation measures

- Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).

- Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.
- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The environmental induction should occur in the appropriate languages for the workers who may require translation.
- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit.
- Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.
- The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;
- Snares & traps removed and destroyed; and

Habitat

Level of risk: High

Mitigation measures

- Prospecting activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No personnel or vehicles may leave the demarcated areas except those authorised to do so.

Air quality

Level of risk: Low-Medium

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for prospecting only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet

suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.

- The length of time where open areas are exposed should be restricted. Prospecting should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may / are exposed for long periods of time.
- For all prospecting activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
 - Speed limits;
 - Spraying of surfaces with water;
 - Prospecting and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Medium

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Noise monitoring on a quarterly basis.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Haul roads to be levelled on a regular basis to avoid the formation of potholes.

Visual impacts

Level of risk: Low Medium

Mitigation measures

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and

Secondary measures designed to specifically address the remaining negative effects of the final development proposals:

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the prospecting activities, by "blending" with the surrounding areas. Such measures will include rehabilitation of the disturbed area, such as the prospecting areas by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.
- During the prospecting phases the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.

- Restrict the activities and movement of workers and vehicles to the immediate site and existing access roads.
- Ensure that rubble, litter and disused materials are managed and removed regularly.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.
- Reduce and control dust emitting activities through the use of approved dust suppression techniques; and
- Restrict activities to daylight hours in order to negate or reduce the visual impacts associated with lighting or restrict lighting to certain areas.
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that the design fits into the surrounding environment and it is aesthetically pleasing.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

Traffic and road safety

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

Heritage resources

Level of risk: Medium

Mitigation measures

- The heritage and cultural resources (e.g. ruins, graves, historic structures, etc.) must be protected and preserved by the delineation of a no go zone.
- Should any further heritage or cultural resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist.

Socio-economic

Level of risk: Low-Medium

Mitigation measures

In order to ensure that negative impacts are minimised and positives are enhanced, the following is recommended:

- Implement the mitigation measures as proposed in this report.
- As job creation is one of the most pressing socio-economic needs in the local community, through the development of The Kimswa operation should focus on SMME development and related local job creation, whilst considering the limitations of the available local skills.
- The Kimswa operation should assist their employees to find suitable housing in the towns surrounding the prospecting area to limit additional impacts on the provision of services and infrastructure by the SPM.

- Assistance in terms of skills development for those that would be employed during the project, as well as for permanent employees during the operational phase of the project would be necessary. Education is critical to sustain the socio-economic development of the community members living in the area. Continued support for training and capacity building thus remain important.
- Possible SMME links to the mine should be pursued to maximise local business benefits;

Interested and affected parties

Level of risk: Low

Mitigation measures

- Maintain active communication with IAPs.
- Ensure transparent communication with IAPs at all times.
- IAPs must be kept up to date on any changes in the prospecting operation.
- A complaints management system should be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately.

ix) Motivation where no alternative sites were considered

No alternative location for the proposed prospecting operation was considered, as the alluvial gravel resources have been deposited in this area. There is therefore no other alternative with regard to the overall operation footprint.

x) Statement motivating the alternative development location within the overall site (Provide a statement motivating the final site layout that is proposed)

Not applicable. There is no alternative development location for the site as this is the area with the mineable resource.

h) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity (Including (i) a description of all environmental issues and risks that are identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures)

Not applicable. There is no alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

i) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)...	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	SIGNIFICANC E IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANC E IF MITIGATION
Processing Plant: 1 X 16 feet pans	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Medium
Ablution Facilities Chemical Toilets	Soil contamination Possible Groundwater contamination	Soil Groundwater	Construction Commissioning Operational Decommissioning	Low	Maintenance of sewage facilities on a regular basis. Removal of chemical toilets on closure	Very Low

			Closure			
Clean & Dirty water systems:	Surface disturbance Soil contamination Surface water contamination	Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Low	<p>It will be necessary to divert storm water around dumps areas by a berm that will prevent surface run-off into the drainage areas.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipes will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p>	Low
Fuel Storage facilities (Diesel tanks)	Groundwater contamination	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	<p>Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point.</p>	Low

	<p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>				<p>Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.</p> <p>Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.</p> <p>Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.</p> <p>All facilities where dangerous materials are stored must be contained in a bund wall.</p> <p>Vehicles and machinery should be regularly serviced and maintained.</p>	
Prospecting Area.	<p>Dust</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Air quality</p> <p>Fauna</p> <p>Flora</p> <p>Groundwater</p> <p>Noise and vibration</p> <p>Soil</p> <p>Surface Water</p> <p>Topography</p> <p>Safety</p>	<p>Commissioning</p> <p>Operational</p> <p>Decommissioning</p> <p>Closure</p>	Medium	<p>Access control</p> <p>Dust control and monitoring</p> <p>Noise and vibration control and monitoring</p> <p>Continuous rehabilitation</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p> <p>Drip trays</p> <p>MRD stability control and monitoring</p> <p>Erosion control</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer</p>	Low

					<p>zones are essential to ensure healthy functioning and maintenance of wetland.</p> <p>The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).</p> <p>Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</p> <p>All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p> <p>Employ measures that ensure adherence to the speed limit.</p>	
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					Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall prospecting footprint. The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; Snares & traps removed and destroyed;	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Low
Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Medium	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer;	Low

					Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Low
Roads (both access and haulage road on the prospecting site):	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Low
Temporary Workshop	Groundwater contamination	Groundwater Soil Surface water	Construction Commissioning Operational	Medium	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low

Facilities and Wash bays	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination		Decommissioning Closure			
Water distribution Pipelines	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Low
Water tanks: 1 X 10 000 litre water tanks and purifiers for potable water for each site.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) **Summary of specialist reports**

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p>TERESTRIAL ECOLOGICAL ASSESSMENT REPORT Kimswa (Pty) Ltd Diamond Prospecting Operation Farms</p> <p>Report by Dr. B Milne from Boscia Ecological Consulting</p> <p>2019</p> <p>Appendix B</p>	<p>Six plant communities were identified on site of which the riparian woodland along with the ephemeral rivers, streams and drainage lines are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. The calcrete ridges and ironstone hilltops are also considered to be of very high sensitivity due to the dense population of listed <i>Aloidendron dichotomum</i> found here, along with high densities of nationally protected tree <i>Boscia albitrunca</i> and other species protected according to the NCNCA. The remaining study area, which comprises the shrubland on rocky ridges and sandy plains, is considered to be of high sensitivity primarily due to the high occurrences of species of conservation concern that occur widespread across these units.</p> <p>The most profound impacts are expected to be related to the loss of plant species of conservation concern as well damages to the burrows of fossorial mammals that occur on the alluvial plains. The disruption of ecological corridors and the hydrological regime if any of the tributaries to the Orange River are cut off is also considered to be a major impact.</p> <p>Species of conservation concern that are found in the prospecting area include <i>Ruschia intricata</i>, <i>Sarcostemma viminalis</i>, <i>Aloe claviflora</i>, <i>Aloidendron dichotomum</i>, <i>Boscia albitrunca</i>, <i>Euphorbia avasmontana</i>, <i>E. gregaria</i> and <i>Olea europaea</i> subsp. <i>africana</i>. Similarly, the prospecting operation will result in the large-scale clearance of indigenous vegetation. Permit applications regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation.</p> <p>Similarly, if any of the <i>Boscia albitrunca</i> trees are to be affected, a licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries three months prior to any potential disturbances to these trees.</p> <p>To conclude, it is clear that the destruction of the natural habitat within the study area is inevitable.</p> <p>The significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the</p>	<p>X</p>	<p>Contained in the mitigation measures and EMPR</p>

	<p>prospecting area. In my opinion, authorisation can be granted if the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures. Furthermore, the application should only be granted if the applicant commits to exclude the areas where dense populations of <i>Aloidendron dichotomum</i> and <i>Boscia albitrunca</i> occur from the mining footprint.</p>		
<p>PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT (NO 25/1999) FOR THE PROPOSED MINE PROSPECTING ON THE REMAINING EXTENT OF PORTIONS 13 AND 9 OF THE OF THE FARM RIETFONTEIN 11, PRIESKA DISTRICT, NORTHERN CAPE PROVINCE by Dr Edward Matenga</p> <p>January 2019</p> <p>Appendix C</p>	<p>CONCLUSION AND RECOMMENDATIONS</p> <p>The mine prospecting can go ahead subject to precautions taken to protect the two historical structures on the property. The study is mindful that archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during development activities, such activities should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.</p>	X	Contained in the mitigation measures and EMPR
<p>Palaeontological Impact Assessment for the proposed prospecting rights on Farm Rietfontein 11 and 13, Prieska District, Northern Cape Province, Desktop Study by Prof Marion Bamford Palaeobotanist</p>	<p>Assumptions and uncertainties</p> <p>Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the lavas and dolerite dykes do not contain fossils but the dolomites, sandstones, mudstones shales and sands are typical for the country and could contain fossil plant, insect, invertebrate and very rarely vertebrate material in the Dwyka Group mudstones. The sands of the Quaternary period would not preserve fossils.</p> <p>Recommendation</p>		Contained in the mitigation measures and EMPR

Appendix D	Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the loose sands of the Quaternary Kalahari or in the limestones and stromatolites of the Vryburg Formations or the Schmidtsdrif Subgroup. There is a very small chance that fossils may occur in the mudstones of the Dwyka Group rocks so a Chance Find Protocol should be added to the EMP: if fossils are found once prospecting has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. Prospecting may proceed as far as the palaeontology is concerned.		

Attach copies of the Specialist Reports as appendices (All studies attached as Appendices from A – D)

k) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

- The Processing plant may have a medium impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Ablution facilities will have a very low impact on groundwater and soil in case of an emergency spill after mitigation.
- The Clean & Dirty water systems may have a low impact on groundwater, soil and surface water after mitigation.
- The Fuel Storage facilities (Diesel tanks) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Prospecting Area may have a medium impact on air quality fauna, flora, noise, soil, surface water and topography after mitigation.
- The Salvage yard (Storage and laydown area) may have a low impact on fauna, flora, groundwater, soil and surface water after mitigation.
- The Stockpile area may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The waste disposal sites (domestic and industrial waste) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Roads (both access and haulage road on the prospecting site) may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Workshops and Wash bays may have a low impact on groundwater, soil and surface water after mitigation.
- The Water distribution Pipelines may have a low impact on fauna, flora, and surface water after mitigation.
- The Water tanks may have a low impact on fauna, flora, and surface water after mitigation.

From the assessment of impacts throughout all the phases it is clear that though the impacts may occur directly as a result of the proposed start in prospecting operations, the impacts are mostly of medium significance before mitigation. According to the assessment carried out by the EAP the majority of the impacts can be reduced to a low significance with the appropriate mitigation measures in place.

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion based on the presented specialist assessments and impact assessment that the Environmental Authorization application should be authorised.

The following mitigation measures are crucial and should form part of the environmental authorisation to ensure that the applicant manages impacts adequately:

- Adhere to the approved Environmental Management Programme
- Adhere to the Emergency procedures Report and implement spill clean-up procedures

- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation if applicable.
- Major spills should be reported within 24hr to the Department of Water and Sanitation and the NCDENC.

The nature of impacts can vary widely depending on the type of physical environment, the size of the activity and the perceptions and values of each of the affected parties. It was the objective of the assessment to identify both positive and negative impacts. The existing information was reviewed to assess the present status of the environment and the extent to which they have already been modified. The planned activities and associated infrastructure was used as reference to assess potential impacts.

In general, the environmental impacts associated to the prospecting operation are rather negative, while the social impacts are more beneficial. Impacts on vegetation are likely to be most profound, because the prospecting operation will constitute clearance of indigenous vegetation and most likely also the removal of protected species if any is encountered. Soil erosion and surface water deterioration are likely to be possible important impacts if appropriate management strategies are not practised.

Positive impacts include the demarcation and subsequent protection of heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous economic benefits.

To conclude, it must be accepted that any activities will have both physical and social impacts. Therefore the destruction of the natural environmental features within the prospecting area is inevitable. The significance of the impacts will however be affected by the success of the mitigation measures implemented and the rehabilitation programme for the prospecting area.

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 22)**

The final site map below indicates the prospecting application area in which all prospecting will take place. Existing roads are also depicted.

The sensitivity map for Rietfontein is illustrated in Figure 20. The riparian woodland along with the ephemeral rivers, streams and drainage lines are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. All watercourses are protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially no-go areas. Although the riparian woodland is infested with declared invasive species, it falls within the buffer zone of the Orange River and is classified as high risk areas by the Mining and Biodiversity Guidelines as well

as the Northern Cape CBA map. Erosion risks after disturbances of watercourses and their associated riparian zones are also high.

The calcrete ridges and ironstone hilltops are also considered to be of very high sensitivity due to the dense population of listed *Aloidendron dichotomum* found here, along with high densities of nationally protected tree *Boscia albitrunca* and other species protected according to the NCNCA.

The remaining study area, which comprises the shrubland on rocky ridges and sandy plains, is considered to be of high sensitivity primarily due to the high occurrences of species of conservation concern that occur widespread across these units. Although these units are not regarded as no-go areas, activities should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

The only other buffers that must be implemented is the 100m away from any fixed infrastructure like the roads that runs on the farm in terms of the Mine Health and Safety Act, 1996 (Act no 29 of 1996) Regulations relating to surveying, mapping and mine plans. These regulations states that a mine must take reasonable measures to ensure that-

No prospecting operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams or any other structure whatsoever including such structures beyond the prospecting boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with;

Please see Final Site Map below.

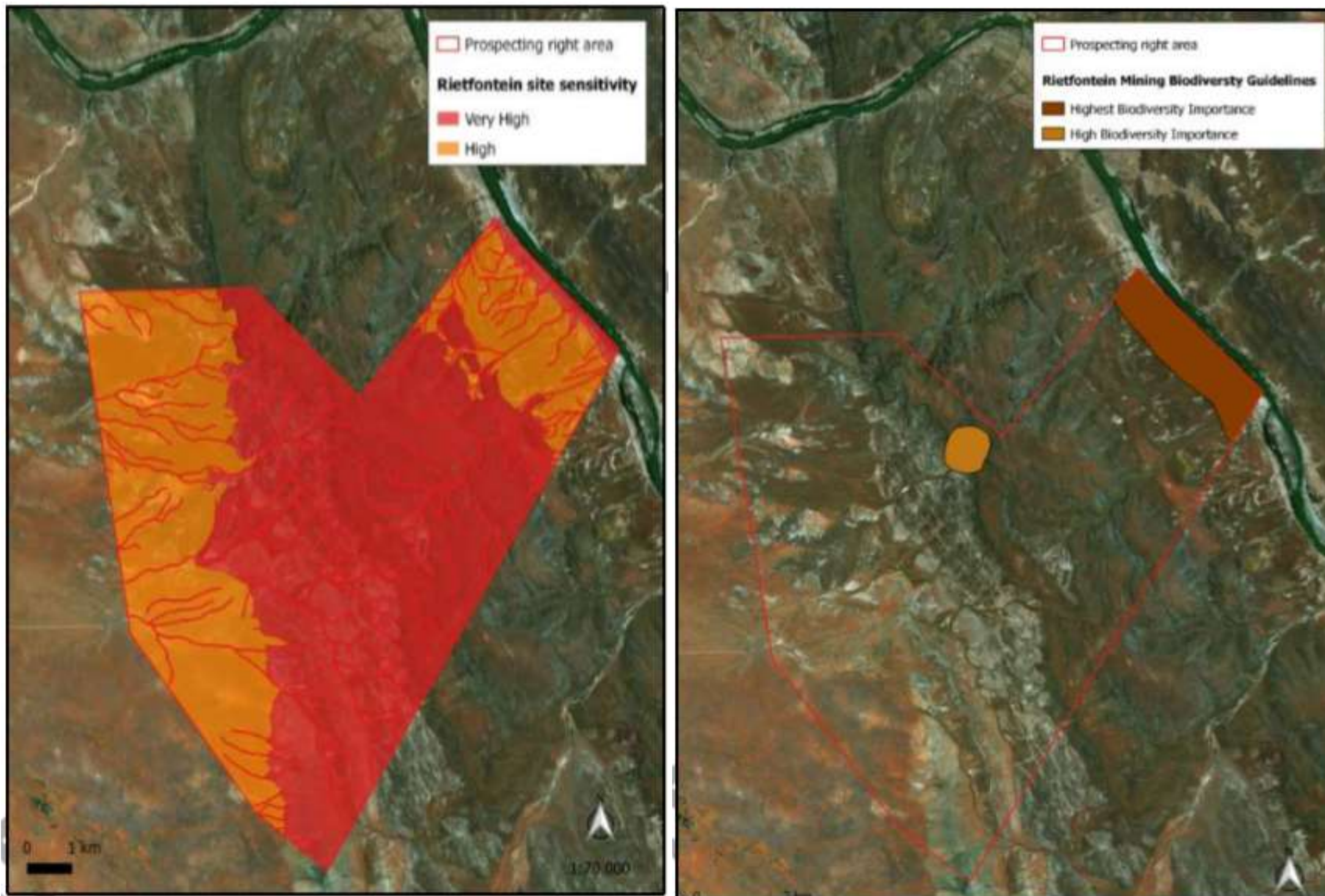


Figure 25. Final Site Surface layout map with sensitivity map on the left and mining biodiversity on the right side (Dr. B Milne, Ecological report).

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

As mentioned before, the specific occurrence of diamonds in the area dictates the selection of the specific prospecting site and there are no alternatives in terms of project location.

In terms of alternative land use, the proposed prospecting operation will be done in such a way that grazing will still be possible as the site will be rehabilitated in such a way that it allows the establishment of grass cover again.

The prospecting operation will provide ± 15 jobs and will also add to the increased economic activity and the area surrounding the farm.

The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. Most of the site has a land capability for grazing, but grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources (drainage lines) during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablation facilities are available then workers

might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any dumping within the drainage lines will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation.

Prospecting activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and prospecting activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to operational activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road, activities on the farm areas and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other prospecting operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

In terms of the Social Impact Assessment findings derived from the information available at this stage it is concluded that the likely benefits of the proposed project outweigh the potential social risks and/or threats to the local communities. However, as indicated earlier in the report, the possible impact on the infrastructure and service needs due to the inflow of an additional workforce should be addressed. It would remain the responsibility of the Local Municipality, but considering the social framework within which the mine operates, it is important for the mine to engage with the SPM in this regard to minimise any possible negative impacts. Such engagement should also contribute to meaningful contributions to the communities situated in close proximity to the mine.

The prospecting activities and associated infrastructure by itself will thus not introduce new social risks and hazards, but only increase the probability and scale of those already associated with the existing prospecting activities

On a more detailed level, the following **positive** impacts are anticipated:

- The creation of job opportunities in the area, and associated local economic development;
- Economic and revenue contribution to the local municipal area, as well as the District and adjacent municipalities;
- The involvement of Kimsa with regards to training and capacity building of its employees and subsequent improvement of the livelihoods of the employees' families, as well as its efforts in sustaining the socio-economic development of the communities in close proximity to the operation;
- The positive impact of prospecting activity on the regional and local economy; and
- Positive impact of extensive local procurement focus.

Negative impacts as a result of the prospecting activity refer to:

- Inconvenience and intrusion impacts during the project such as the inflow of an additional workforce to the area, the possible influx of jobseekers, possible increase in the criminal activities (safety and security issues), disruption of social networks, as well as possible health risks;
- Disruptions in the daily living and movement patterns (increased traffic and possible dust pollution);
- Additional pressure on infrastructure development and maintenance;
- General intrusion impacts such as visual and noise pollution

From a social perspective it can be concluded that the proposed Kimsa Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to e.g. ongoing environmental management and rehabilitation once the mine reaches its end of life.

I) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as conditions of authorisation.

Topography

- All prospecting areas must be rehabilitated if and when possible and made safe so as to reflect as far as possible the pre-mining topography of the area.
All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

Soil

- In all places of development the first 300mm of loose or weathered material found will be classified as a growth medium. The topsoil must be removed where possible, from all areas where physical disturbance of the surface will occur.
- In all areas where the above growth medium will be impacted on, it must be removed and stockpiled on a dedicated area. The maximum height of stockpiles may not exceed 2 meters.
- The growth medium/topsoil must be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.
- If any soil is contaminated during the life of the prospecting, it must either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company.
- Erosion control in the form of re-vegetation and contouring of slopes must be implemented on disturbed areas in and around the site.

- Topsoil must be kept separate from overburden and may not be used for building or maintenance of access roads.
 - The stored topsoil must be adequately protected from being blown away or being eroded.
 - Compacted areas must be ripped to a depth of 300mm, where possible, during the continuous rehabilitation, decommissioning and closure phases of the operation in order to establish a growth medium for vegetation.
- Vehicle movement must be confined to establish roads for as far as practical in order to prevent the compaction of soils.

Flora

- No trees or shrubs must be felled or damaged for the purpose of obtaining firewood.
- Management must take responsibility to control declared invader or exotic species on the site. The following control methods must be used:
 - 'The plants will be uprooted, felled or cut off and can be destroyed completely.'
 - The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.
- Valid permits from DAFF must be obtained before any protected plant species are removed or damaged if encountered.
- Continuous controlled dumping and spreading of previously stored topsoil over the rehabilitated areas.
- All rehabilitated areas, where applicable and possible must be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to prospecting activities commenced if the natural succession of vegetation is unacceptably slow.
- Fires may only be allowed in facilities or equipment specially constructed for this purpose. The end objective of the re-vegetation program must be to achieve a stable self-sustaining habitat unit.

Fauna

- To ensure a minimum of impact to animals the following management guidelines will be followed:
 - Speed limits of vehicles inside the application area must be strictly controlled to avoid road kills.
 - Continuous controlled dumping.
 - Operational areas must be low angled as a preventative measure to ensure an escape route for animals.
 - No hunting (snares) must be allowed at the application area or in the surrounding area.

Surface water

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.

- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water Affairs for all actions to be performed which requires authorization in terms of water uses.
- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.
- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.
- Buffer zones must be placed around all non-perennial drainage lines in which no prospecting may take place.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
 - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
 - All efforts must be made to move the broken down vehicle or piece of equipment to the maintenance area.
 - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.
- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).

- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel at fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
Ensure good housekeeping rules.

Air Quality

- To limit the creation of nuisance dust the following management guidelines must be followed:
- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the prospecting operation with water.
- Speed limits of vehicles inside the prospecting area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

Noise

- Working hours must be kept between sunrise and sunset as far as possible.
- As a minimum, ambient noise levels emanating from the prospecting activities may not exceed 82dBA at the site boundary.
- The Company must comply with the Occupational Noise Regulations of the Occupational Health and Safety Act, Act 85 of 1993.
- The company must comply with the measures for good practice with regard to management of noise related impacts during the operation.
- The management objective must be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant area and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection must be provided to all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

Mechanical equipment

- All mechanical equipment must be in good working order and vehicles must adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation must be equipped with a silencer on its exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, must be appropriately calibrated / adjusted.

Safety

- No employees may reside on the prospecting site.
- Access and haul roads must be maintained.
Security access point to ensure monitoring of access to the site.

Archaeology:

- All operators of equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered:
 - All activity in the immediate vicinity (50m radius of the site) should cease.
 - The heritage practitioner should be informed as soon as possible.
 - In the event of obvious human remains the SAPS should be notified.
 - Mitigation measures (such as refilling) should not be attempted.
 - The area in a 50m radius of the find should be cordoned off with hazard tape.
 - Public access should be limited.
 - No media statement should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.

Visual

- Security Lights must be fixed at an angle to ensure that it does not cause a disturbance to the surrounding environment at night
- Prospecting Areas must be subject to progressive controlled backfilling and made safe (including the re-establishment of vegetation).
- Permanent structures or features that are part of the proposed prospecting operation must be kept neat and well presented.
- Waste material of any description must be removed from the prospecting area on a regular basis and be disposed of at a recognized landfill facility.

The **impact management objectives** for the Kimsa planned prospecting operation should include:

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.

- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- The non-perennial stream is classified as a water system according to GN704 and is a natural storm water accumulation stream. No water system shall be mined before an authorization is obtained from DWS. This water system will however not be mined.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed prospecting development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

The location of the mine is determined by the geological location of the mineral resource. The application area has been disturbed by previous mining and is not a pristine site. Asbestos were discovered in this general area on the farms and have been extensively worked on a small-scale by early diggers and previous mining companies.

The location of the central prospecting site and associated infrastructure is primarily based on proximity to the access roads, proximity to the areas earmarked for prospecting and limited additional impact on the environment and heritage resource.

The prospecting activities and methodologies associated with prospecting of diamonds is the only economic viable method currently being used by the diamonds fraternity. There is no alternative prospecting method for the prospecting of diamonds in alluvial gravels.

n) Aspects for inclusion as conditions of Authorisation

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

The application should only be granted if the applicant commits to exclude the areas where dense populations of *Aloidendron dichotomum* and *Boscia albitrunca* occur from the mining footprint.

o) Description of any assumptions, uncertainties and gaps in knowledge

(Which relate to the assessment and mitigation measure proposed)

The above mitigation measures are tried and tested over many years in the diamond prospecting industry. The Company must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate and that the information provided is correct.

p) Reasoned opinion as to whether the proposed activity should or should not be authorised

i) Reasons why the activity should be authorized or not.

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the prospecting operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority should take all the necessary steps to ensure that the prospecting operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation.

(1) Specific conditions to be included into the compilation and approval of EMPr

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

The application should only be granted if the applicant commits to exclude the areas where dense populations of *Aloidendron dichotomum* and *Boscia albitrunca* occur from the mining footprint.

(2) Rehabilitation requirements

A Detailed rehabilitation plan is included in the EMPr as alluvial diamond prospecting consist of continuous stripping and backfilling operations. The Mine had to provide to the DMR, a financial rehabilitation guarantee to the amount as calculated in terms of the financial quantum Guideline and approved by the DMR.

Infrastructure areas

On completion of the prospecting operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into any open pits. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

All infrastructures, equipment, plant, and other items used during the operational period will be removed from the site.

On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

Topsoil and Stockpile Deposits:

Disposal Facilities: Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the prospecting area and disposed of at a recognized landfill facility. It should not be permitted to be buried or burned on the site.

Ongoing Seepage, Control of Rain Water:

Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.
- Provide analytical water quality information describing trends (present conditions and changes).

The objectives are to limit the adverse effect of pollutants in the water resource. The setting of in-stream Resource Water Quality Objectives (RWQO) is based on the South African Water Quality Guidelines.

Water Monitoring Points

Surface water: The Orange River which may be impacted by the prospecting activity is perennial. Monitoring takes place by collecting surface water samples every quarter if possible.

Long Term Stability and Safety: It should be the objective of mine management to ensure the long term stability of all rehabilitated areas including the backfilled depressions. This should be done by the monitoring of all areas until a closure certificate has been issued.

Final rehabilitation in respect of erosion and dust control: Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is deemed necessary, unless vegetation growth is not returned to a desirable state by the time of mine closure.

Final Rehabilitation Roads:

- After rehabilitation has been completed, all roads should be ripped or ploughed, fertilized and providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Submission of Information:

- Reports on rehabilitation and monitoring should be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55 and NEMA (amended).

Maintenance (Aftercare):

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.

- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore all agreed commitments should be implemented by Mine Management.

After-effects Following Closure:

Acid Mine Drainage: No potential for bad quality leachate or acid mine drainage development is associated with diamond mine closure.

Long Term Impact on Ground Water: No after effect on the groundwater yield or quality is expected.

Long-term Stability of Rehabilitated Land: One of the main aims of any rehabilitated ground should be to obtain a self-sustaining and stable end result. The concurrent monitoring of all material and replacement of topsoil where available should be ensured.

q) Period for which the Environmental Authorisation is required

5 years. With the option to renew for a further 3 years.

r) Undertaking

Confirm 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 and the Environmental Management Programme Report.

The undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the Kimswa site as it stands currently (risking premature rehabilitation) is estimated to be **R758 302** according to the DMR calculations.

ii) Confirm that this amount can be provided from operating expenditure

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining Work Programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be)

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

t) **Deviations from the approved scoping report and plan of study**

i) **Deviations from the methodology used in determining the significance of potential environmental impacts and risks**

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)

Not applicable – No deviations from the methodology proposed in the Scoping Report.

ii) **Motivation for the deviation**

Not applicable – No deviations from the methodology proposed in the Scoping Report.

u) **Other information required by the competent Authority**

i) **Compliance with the provisions of sections 24 (4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998), the EIA Report must include the:-**

(1) Impact on the socio-economic conditions of any directly affected person (Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 therein)

From a social perspective it can be concluded that the proposed Kimsa Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area; therefore, the monitoring activities cannot be expressed in financial terms.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as

Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

PHASE I HERITAGE IMPACT ASSESSMENT (INCLUDING PALAEOANTHROPOLOGICAL ASSESSMENT) REQUESTED IN TERMS OF SECTION 38 OF THE NATIONAL HERITAGE RESOURCES ACT (NO 25/1999) FOR THE PROPOSED MINE PROSPECTING ON THE REMAINING EXTENT OF PORTIONS 13 AND 9 OF THE OF THE FARM RIETFONTEIN 11, PRIESKA DISTRICT, NORTHERN CAPE PROVINCE was done by Dr Edward Matenga on 22 January 2019. The report is appended as Appendix C to this report.

EXECUTIVE SUMMARY

1. The Kimsa Mining Pty Ltd intends to lodge an application for a prospecting right on the Remaining Extent of Portions 13 and 9 of the Farm Rietfontein 11, Prieska District, Northern Cape Province. This report has been prepared in compliance with Section 38 of the National Heritage Resources Act (No 25/1999) and forms an integral part of an Environmental Impact Assessment (EIA) for the authorisation of the prospecting right.

2. Fifteen (15) sites were recorded and ranked in terms of their heritage value and the potential threat of the proposed development. The following is a summary of our findings:

3. The Stone Age

Stone tools and associated waste material in varying densities have been recorded in thirteen (13) locations. The stone tools comprise mainly scrapers, points and flakes while a few blades and cores also occur. No significant concentrations were found to suggest a settlement or regular activity.

4. The occurrence of a crude pear-shaped hand-axe is of particular interest as it seems to confirm the presence of Acheulean material in the area dating between 2 million to 250 000 years BP.

5. The Iron Age

No Iron Age relics were found on the property.

6. Early mining and commercial farming

An asbestos ore crushing and loading site was seen. A small rectangular structure is built of dressed dolomite apparently locally sourced. There are no circumstances to warrant destruction of these two structures.

7. Burial grounds

No graves or burial grounds were reported on the property.

8. Conclusion and recommendations

The mine prospecting can go ahead subject to the precautions taken to protect the two historical structures on the property. The study is mindful that archaeological deposits are usually buried underground. Should archaeological artefacts or skeletal material be exposed in the area during development activities, such activities should be halted, and the heritage authorities notified in order for an investigation and evaluation of the finds to take place.

Palaeontological Impact Assessment for the proposed prospecting rights on Farm Rietfontein 11 and 13, Prieska District, Northern Cape Province by Prof Marion Bamford Palaeobotanist

Executive Summary

A palaeontological Impact Assessment was requested for the prospecting rights application for the Farm Rietfontein 11 Portions 9 and 13, near Prieska, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.

The geological structures suggest that the rocks are mostly too old or volcanic to contain fossils. Stromatolites (tracefossils) might occur in the Ghaap Group rocks. There is a small chance that the Dwyka Group mudstones could preserve fragment of the Glossopteris flora and invertebrates. Since there are potentially fossiliferous rocks in the vicinity a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low. No further palaeontological impact assessment is required.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the lavas and dolerite dykes do not contain fossils but the dolomites, sandstones, mudstones shales and sands are typical for the country and could contain fossil plant, insect, invertebrate and very rarely vertebrate material in the Dwyka Group mudstones. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the loose sands of the Quaternary Kalahari or in the limestones and stromatolites of the Vryburg Formations or the Schmidtsdrif Subgroup. There is a very small chance that fossils may occur in the mudstones of the Dwyka Group rocks so a Chance Find Protocol should be added to the EMP: if fossils are found once prospecting has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. Prospecting may proceed as far as the palaeontology is concerned.

- v) Other matters required in terms of sections 24(4)(a) and (b) of the Act** (the EAP managing the application, must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4**)

There are no alternatives, as the application area applied for is the area where the applicant has proven diamonds and has found potential for a diamond prospecting operation.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

- a) Details of the EAP** (Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required)

I hereby confirm that the requirement for the provision of the details and expertise of the EAP is already included in Part A as required.

- b) Description of the Aspects of the Activity** (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required)

I hereby confirm that the requirement for the aspects of the activity is already included in Part A as required.

c) Composite Map

(Provide a map (Attached as an Appendix) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)

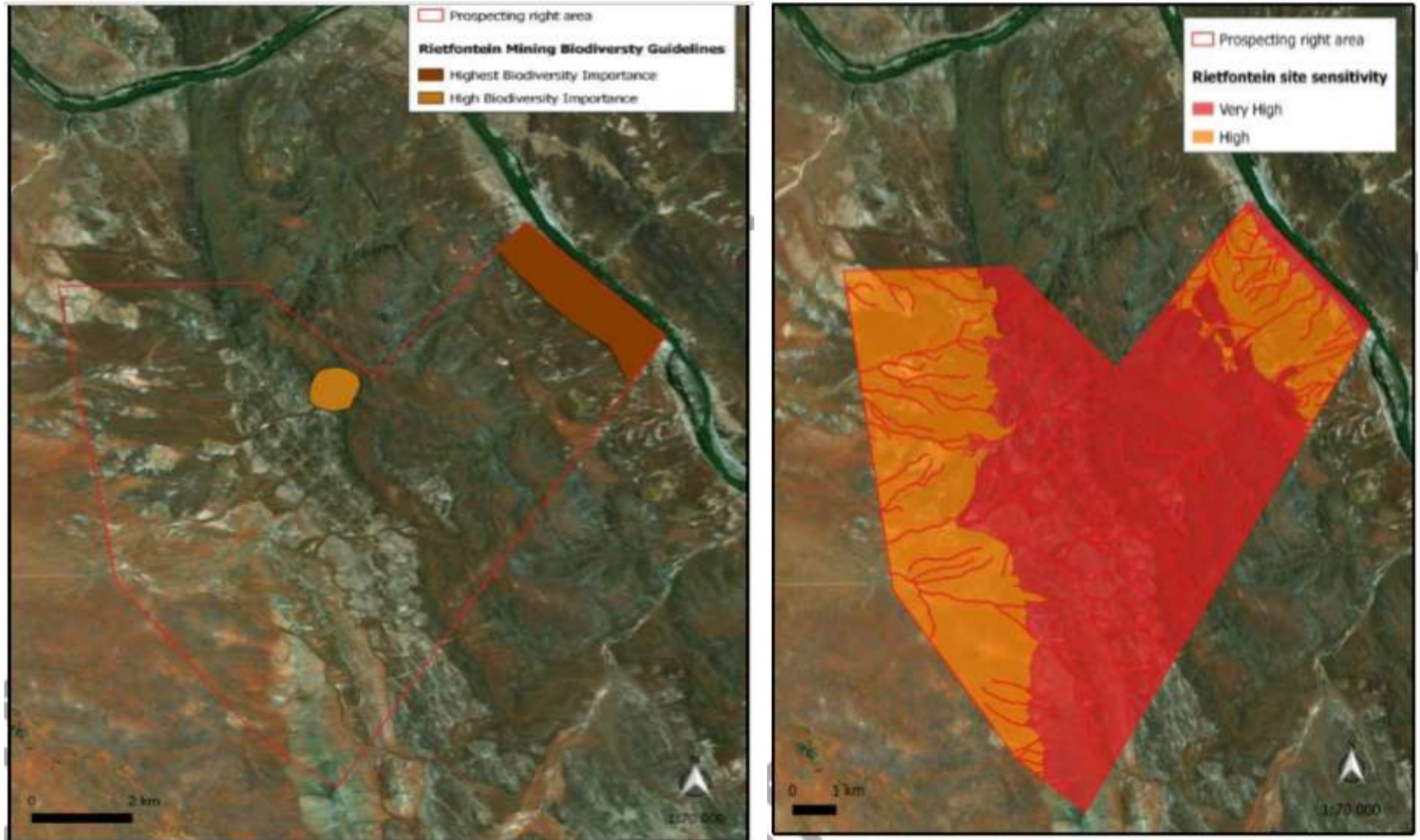


Figure 26. Composite map for the proposed prospecting area.

d) Description of impact management objectives including management statements

i) Determination of closure objectives (ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The main closure objectives of the Company's planned prospecting operation are:

- To restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any diamond reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.
- To establish a stable and self-sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability.
- To limit and manage the visual impact of the prospecting activities.
- To safeguard the safety and health of humans and animals on the site.
- To close the prospecting operation efficiently, cost effectively and in accordance with Government Policy.

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas should be left in a stable, self-sustainable state. Proof of this should be submitted at closure. Specific objectives include:

Rehabilitation of infrastructure areas

The objectives for the removal of infrastructure and the subsequent rehabilitation of the areas they occupied include:

- To ensure that infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.
- The removal, decommissioning and disposal of all prospecting infrastructure, will comply with all conditions contained in the MPRDA. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
- The plant and associated disused infrastructure will be dismantled or demolished. Any building foundations will be removed and land exposed to the demolition and dismantling of infrastructure and all other disturbed land will be rehabilitated.

- Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.
- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Mine Residue Dump

The objectives pertaining to the effective management and rehabilitation of the Mine Residue Dump include:

- To ensure that the Mine Residue Dump deposits are stable and that there is an acceptably low risk of failure of these deposits during the decommissioning phase and following mine closure; To establish self-sustainable vegetation cover on the Mine Residue dump so that the visual impact of the Mine Residue dump is improved and in order to prevent erosion.

Management principles pertaining to Mine Residue dump include:

- The Mine Residue dump /s will continuously be inspected by a suitable qualified professional engineer to ensure their stability. If they are unstable, the appropriate remedial measures will be implemented.
- Inspection and monitoring should continue until a suitable qualified profession engineer has confirmed the long-term stability of the Mine Residue dump.
- Any infrastructure or facilities that serve the Mine Residue dump will be maintained to ensure that they are both stable and functional.

Maintenance

The necessary agreements and arrangement will be made by the Kimswa operation to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time.

- Such processes include erosion of the rehabilitated areas, Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.

- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

Performance assessments

As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, the Kimswa operation will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of this EMPR;
- Conduct performance assessments of this EMPR; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will be annually. An independent and competent person will undertake all performance assessments.

Decommissioning and closure objectives

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas will be left in a stable, self-sustainable state. Proof of this will be submitted at closure. Specific objectives include:

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Keep relevant authorities informed of the progress of the decommissioning phase;
- Submit monitoring data to the relevant authorities;
- Maintain required pollution control facilities and rehabilitated land until closure.

Negative economic impacts

The objective is to alleviate the negative socio-economic impacts that will result from mine closure. Management principles to achieve this include:

- The Kimswa operation will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.

- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.
- The Kimswa operation will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the mine, the local and regional economies and associated abandonment of community infrastructures surrounding the mine.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity

There is won't be a need for this, as based on the specialist reports. No pitting or trenching will go deep enough to encounter any groundwater.

iii) Potential risk of Acid Mine Drainage (Indicate whether or not the mining can result in acid mine drainage)

No potential risk for Acid Mine Drainage exists.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

Not applicable, there is no potential risk of acid mine drainage.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Not applicable, there is no potential risk of acid mine drainage.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

There is no residual or cumulative impact that may result from acid mine drainage.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation

The only activity relating to the cost of water in the prospecting operation relates to dust suppression in the prospecting area and on the roads when hauling and transporting material to the processing plant on the farms as part of the rehabilitation process.

It must however be noted that the water supply to the activities will be sourced from the Orange River. The necessary Water Use Licence will be submitted as soon as the EIA EMP are submitted to the DMR as this is a minimum requirement. The only other cost will be the pumping cost.

The processing plant (diamond pan) scrubbers and final recovery will have an impact on the cost of water used. The cost of water will have an upward trend over time as a result of the national capacity and demand situation. Water are however recycled as far as possible and redirected to the processing plant.

viii) Has a water use licence been applied for?

The necessary Water Use Licence will be submitted as soon as the EIA /EMP is submitted to the DMR as this is a minimum requirement.

ix) Impact to be mitigated in their respective phases

Measure to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc... etc... etc.).	PHASE of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE of disturbance (volumes, tonnages and hectares or m ²)	MITIGATION MEASURES (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when Required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Processing Plant 1 x 16ft rotary pan plants with de-watering screens	Construction Commissioning Operational Decommissioning Closure	±0.4 Steel, concrete, electric wires	Access control Maintenance of processing plant Dust control and monitoring Noise control and monitoring		Removal of processing plant upon closure of prospecting right.

			Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Ablution facilities Chemical toilets	Construction Commissioning Operational Decommissioning Closure	Chemical toilets for	Maintenance of chemical toilets Removal of chemical toilets upon closure		Removal of chemical toilets upon closure of the Prospecting Right.
Clean & Dirty water systems: Berms	Construction Commissioning Operational Decommissioning Closure	The surface width of the haul road is 15m. This area also includes the re-fuel and lubrication station, wash bay and office area. Due to the nature of activity in this area, lining of this catchment dam is proposed. The storage water will be used for prospecting activities for example dust suppression,	Maintenance of berms and trenches Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation)

		prospecting process, wash bay, etc.			
Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	250m ² Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Prospecting Right.
Prospecting Area.	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 40 hectares at any one time.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Dump control and monitoring Erosion control		Upon cessation of the individual activity (continuous rehabilitation)

Salvage yard (Storage and laydown area)	Construction Commissioning Operational Decommissioning Closure	5000m ² or 0.5 ha No construction material, area to be levelled with a grader and fenced with a gate and access control	Access control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill		Removal of fence around salvage yard and ripping of salvage yard area upon closure of the prospecting right.
Gravel Stockpile area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 500m ² for the stockpile area at any one time.	Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control. Immediately clean hydrocarbon spills. Rip disturbed areas to allow re-growth of vegetation cover		Ripping of stockpile area upon closure of prospecting right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m ²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road = 1000m x 20m (wide) = 20 000m ²	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits		Upon cessation of the individual activity (continuous rehabilitation)

			Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		Ripping of roads upon closure of the prospecting right.
Workshop and Wash bay	Construction Commissioning Operational Decommissioning Closure	300m ² Concrete and Steel	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the prospecting right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m ²	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the prospecting right.

e) Impact Management Outcomes

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

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)....	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	STANDARD TO BE ACHIEVED (impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Processing Plant 1 X 16 feet pans	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				<p>Selecting equipment with lower sound power levels; Installing silencers for fans; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p>	
Ablution facilities Chemical Toilets	Soil contamination Possible Groundwater contamination	Soil Groundwater	Construction Commissioning Operational Decommissioning Closure	Maintenance of sewage facilities on a regular basis. Removal of chemical toilets on closure	Minimize the potential for a chemical spill on soil, which could infiltrate to groundwater.
Clean & Dirty water systems:	Surface disturbance Groundwater Contamination	Soil Groundwater Surface Water	Construction Commissioning Operational Decommissioning	It will be necessary to divert storm water around dump areas by construction of a cut-off	Safety ensured. Minimize potential for hydrocarbon spills to

	<p>Soil contamination</p> <p>Surface water contamination</p>		<p>Closure</p>	<p>berm that will prevent surface run-off into the prospecting area.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.</p>
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					Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.	

				stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	
Prospecting Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				<p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland.</p> <p>Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.</p> <p>The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental</p>	
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				<p>Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.</p> <p>All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p>	
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				<p>Employ measures that ensure adherence to the speed limit.</p> <p>Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</p> <p>The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;</p> <p>Snares & traps removed and destroyed; and</p> <p>Maintenance of firebreaks.</p> <p>It will be necessary to divert storm water around dump areas by construction of a temporary berm that will prevent surface run-off into the drainage lines.</p> <p>The re-vegetation of disturbed areas is</p>	
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				important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Gravel Stockpile area	Dust Noise Removal and disturbance of vegetation cover and	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

	natural habitat of fauna Surface disturbance			Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.
Roads (both access and haulage road on the prospecting site):	Dust Noise Removal and disturbance of vegetation cover and	Air quality Fauna Flora Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

	<p>natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>			<p>Storm water run-off control</p> <p>Erosion control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Rehabilitation standards and closure objectives met.</p> <p>Erosion potential minimized.</p>
Workshop and Wash bay	Removal and disturbance of vegetation cover and	Groundwater Soil Surface water	Construction Commissioning Operational	Concrete floor with oil/water separator	Minimize potential for hydrocarbon spills to

	natural habitat of fauna Soil contamination		Decommissioning Closure	Storm water run-off control Immediately clean hydrocarbon spills	infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures	Safety ensured. Rehabilitation standards and closure objectives to be met.

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (c)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)...	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: 1 x 16ft rotary pan plants	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover	Removal of processing plant upon closure of Prospecting right.	The following must be placed at the site and is applicable to all activities: <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

	Surface disturbance	<p>Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p>		<p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Ablution Facilities Chemical Toilets.	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of facility on closure	Removal of facility upon closure of the Prospecting Right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations

				<ul style="list-style-type: none"> • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Clean & Dirty water systems: Berms	Surface disturbance Groundwater Contamination Soil contamination	It will be necessary to divert storm water around prospecting areas by construction of a berm that will prevent surface run-off into the prospecting area.	Upon cessation of the individual activity (continuous rehabilitation)	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts;

	<p>Surface water contamination</p>	<p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p> <p>Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc.</p>	<p>Levelling of stormwater berms upon closure of Prospecting Right</p>	<ul style="list-style-type: none"> • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
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			Effluents and waste should be recycling and re-use as far as possible.		
Fuel facility (tanks)	Storage (Diesel)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Prospecting Right.	The following must be placed at the site and is applicable to all activities: <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the

				<p>contents of these documents, and to adhere thereto.</p> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Prospecting Area.	<p>Dust</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>	<p>Access control</p> <p>Dust control and monitoring</p> <p>Noise and vibration control and monitoring</p> <p>Continuous rehabilitation</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p> <p>Drip trays</p> <p>Dump stability control and monitoring</p> <p>Erosion control</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Taking advantage during the design stage of natural topography as a noise buffer;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Maintain a buffer zone of 100 m around the streams. Note that</p>	<p>Upon cessation of the individual activity (continuous rehabilitation)</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan.

		<p>these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.</p> <p>Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).</p> <p>Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.</p> <p>All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting</p>		<ul style="list-style-type: none"> Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
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		<p>species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.</p> <p>The environmental induction should occur in the appropriate languages for the workers who may require translation.</p> <p>Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.</p> <p>Employ measures that ensure adherence to the speed limit.</p> <p>Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.</p> <p>The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting;</p> <p>Snares & traps removed and destroyed; and</p>		
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		<p>Maintenance of firebreaks.</p> <p>It will therefore be necessary to divert storm water around dump areas by construction of a berm that will prevent surface run-off into the drainage channels.</p> <p>The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.</p>		
Salvage yard (Storage and laydown area)	<p>Surface Water contamination</p> <p>Groundwater contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>	<p>Access Control</p> <p>Maintenance of fence</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spill</p>	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p>

	Surface water contamination			<ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
Stockpile area	<p>Surface Water contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p> <p>Surface water contamination</p>		<p>Dust Control and monitoring</p> <p>Noise control and monitoring</p> <p>Drip trays</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Develop a mechanism to record and respond to complaints.</p>	<p>Dust levels minimized</p> <p>Minimize potential for hydrocarbon spills to infiltrate into groundwater</p> <p>Noise levels minimized</p> <p>Rehabilitation standards and closure objectives to be met.</p> <p>Erosion potential minimized.</p>

Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination Contamination of soil Surface water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres</p>
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				to the contents of the EIA and EMPr documents.
Roads (both access and haulage road on the prospecting site):	<p>Dust</p> <p>Surface Water contamination</p> <p>Groundwater contamination</p> <p>Noise</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p> <p>Surface disturbance</p>	<p>Maintenance of roads</p> <p>Dust control and monitoring</p> <p>Noise control and monitoring</p> <p>Speed limits</p> <p>Storm water run-off control</p> <p>Erosion control</p> <p>Immediately clean hydrocarbon spills</p> <p>Rip disturbed areas to allow re-growth of vegetation cover</p> <p>Noise control</p> <p>Well maintained equipment</p> <p>Selecting equipment with lower sound power levels;</p> <p>Develop a mechanism to record and respond to complaints.</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	<p>Upon cessation of the individual activity (continuous rehabilitation)</p> <p>Ripping of roads upon closure of the prospecting right.</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	<p>Surface Water contamination</p> <p>Removal and disturbance of vegetation cover and natural habitat of fauna</p> <p>Soil contamination</p>	<p>Concrete floor with oil/water separator</p> <p>Storm water run-off control</p> <p>Immediately clean hydrocarbon spills</p>	<p>Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right</p>	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the

				<p>contents of these documents, and to adhere thereto.</p> <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
Water distribution Pipeline	Surface disturbance	<p>Monitor pipeline for water leaks</p> <p>Maintenance of pipeline</p> <p>Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.</p>	Removal of pipeline upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> • Relevant Legislation; • Acts; • Regulations • COP's • SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan.

				<ul style="list-style-type: none"> Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMP documents.</p>
Water tanks:	Surface disturbance	Maintain water tanks and structures	Removal of water tank and steel structure upon closure of the prospecting right.	<p>The following must be placed at the site and is applicable to all activities:</p> <ul style="list-style-type: none"> Relevant Legislation; Acts; Regulations COP's SOP's <p>Management and staff must be trained to understand the contents of these documents and to adhere thereto.</p> <ul style="list-style-type: none"> Environmental Awareness training must be provided to employees.

				<ul style="list-style-type: none">• The operation must have a rehabilitation and closure plan.• Management and staff must be trained to understand the contents of these documents, and to adhere thereto. <p>Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.</p>
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i) Financial Provision**(1) Determination of the amount of Financial Provision****(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2)(d) as described in 2.4 herein.**

The key aim of decommissioning and closure is to ensure that all the significant impacts are ameliorated and that the environment is returned to its original state, based on the baseline information, as far as is practically possible. Therefore, all rehabilitated areas should be left in a stable, self-sustainable state and proof of this should be submitted at closure.

The baseline environmental information is usually determined by reviewing all applicable information available for the site and the overall region. This information is gathered through a combination of on-site observations, spatial information and specialist baseline studies. Information regarding current land uses and existing biophysical environment gathered from interested and affected parties during the public consultation process are also taken into consideration when describing the baseline environment.

General closure objectives include the following:

Adhere to all statutory and other legal requirements;

Identify potential post-closure land uses in consultation with the future landowner, surrounding land owners and land users; well in advance, before closure and preferably during the operational phase of the mine;

Remove, decommission and dispose all infrastructures, and ensure that these processed comply with all conditions contained in the MPRDA

Rehabilitate disturbed land to a state suitable for its post-closure uses, and which are stable, sustainable and aesthetically acceptable on closure;

Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;

Physically stabilise remaining structures to minimise residual risks;

Ensure the health and safety of all stakeholders during closure and post closure and that future land users are not exposed to unacceptable risks;

To alleviate the negative socio-economic impacts that will result from closure;

Promote biodiversity and ecological sustainability as far as practically possible;

Keep relevant authorities informed of the progress of the decommissioning phase;

To ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state, for two years after closure, or for long as deemed necessary at the time and to submit such monitoring data to the relevant authorities;

Maintain required facilities and rehabilitated land until closure.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

Kimswa Mining and the surface owners have been in consultation which is still ongoing. Some agreements have been reached.

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

The rehabilitation of land disturbed by the operation during the life of the Prospecting Right will be accompanied by ongoing monitoring of the environment, until a stable state is reached. The main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the area and habitats to a condition acceptable for obtaining a closure certificate.

Final rehabilitation of the site is expected to be within 5 years after the right has been granted. Final rehabilitation will be executed systematically and will consist of the elements and procedures as listed below. More realistic closure elements will be fully determined by a Professional Mine Surveyor once the operation is active.

Dismantling of processing plant and related structures:

- The processing plant in total is expected to cover an area of ± 400 m², of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and other items used during the processing activities, such as conveyor belts, pipelines and power lines.
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of steel buildings and structures:

- All steel buildings and structures are expected to amount to 500 m². These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.
- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;

- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of reinforced concrete buildings and structures

- All brick buildings and concrete structures are expected to amount to ± 250 m². These include French drains, wash bays, refuelling depots and concrete floors. Those in disuse and which cannot be donated or used for future purposes should be demolished.
- The foundations of these buildings should also be demolished and to a depth of 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Rehabilitation of access roads

- Mine roads in total, is expected to cover an area of 4 000 m². After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition and rehabilitation of electrified railway lines

- There are no electrified railway lines associated with the Prospecting activities.

Demolition and rehabilitation of non-electrified railway lines

- There are no non-electrified railway lines associated with the Prospecting activities.

Demolition of housing and/or administration facilities

- There are no other housing or administration facilities associated with the Prospecting activities, other than those in the form of mobile containers. These were however included in the section for demolition of steel buildings and structures.

Opencast rehabilitation including final voids and ramps

- Opencasts and ramps associated with the Prospecting activities are expected to cover 5 ha.

- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the Prospecting activities.

Rehabilitation of overburden and spoils

- The total final overburden and spoils are estimated to amount to 0.5 ha and includes waste dumps as well as earth walls. Pre-planning should be conducted in order to decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with pollution potential

- No processing waste deposits and evaporation ponds with pollution potential are associated with the Prospecting activities.

Rehabilitation of processing waste deposits and evaporation ponds with no pollution potential

- The processing waste deposits on the Prospecting area is estimated to cover an area of ± 3 ha. Pre-planning should be conducted in order to decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;

The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;

- For backfilled trenches the topography should be shaped to be in line with the natural contours, but where compaction occurred, the areas should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Storm water management

Storm water runoff arising from the upper and outer slopes of the rehabilitated residue deposit should be managed to

- (1) prevent uncontrolled runoff from the residue deposit, which in turn creates surface erosion and resultant damage to the cover material and could also expose deposited material;
- (2) route the runoff arising from the rehabilitated residue deposit into the surrounding surface water drainage regime in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure; and
- (3) allow for the control routing of the runoff collected on the rehabilitated residue deposit across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the residue deposit.

Current practice allows for two broad approaches to handle runoff arising from the rehabilitated residue deposit:

- Collection of the runoff arising from the benches in chutes to route this water to the toe of the residue deposit. Chutes must be constructed from concrete or other suitable material to cater for the high flow velocities that could be encountered.
- Collection of runoff arising from the modified outer slopes on the benches itself and allowing this water to evaporate on the benches. Under these circumstances bench width could be wider than the normal 5 m width, with parapet walls provided on the outer edges of the benches. These walls must be designed for at least the 1:200 year rainfall events. The residue deposit material must also be suitable for this type of storm water contaminant and must not be susceptible to slumping under saturated conditions.

Rehabilitation of subsided areas

The EAP is not currently aware of any areas of subsidence on site. However, any potential for such occurrences should be actively investigated and should be included in the rehabilitation plan, if and when such areas are identified.

General surface rehabilitation

- Final surface rehabilitation of areas disturbed by mining and related activities should be aligned to the selected final land use. General surface rehabilitation encompasses the reinstatement of natural topography, the top soiling and the re-vegetation of all those areas where infrastructure have been dismantled and removed or demolished. It also includes any industrial waste or scrap material that need to be removed from site. The total area that will need general surface rehabilitation at the time mine closure is estimated to be ± 0.5 ha.

River diversions

No river diversions are planned.

Fencing

It is not known at this stage if any fencing is planned.

Water management

No treatment of water will be necessary for the Prospecting activities.

Maintenance and aftercare

Maintenance and aftercare should be planned for two to three years after mine production have ceased and should include the following:

- Annual fertilising of rehabilitated areas.
- Monitoring of surface and subsurface water quality,
- Control of alien plants, and
- General maintenance, including rehabilitation of cracks and subsidence.
- Erosion control and monitoring of the slopes of the slimes dams;

Specialist study

- A screening level risk assessment should be completed by a specialist environmental practitioner during mine closure in order to ensure that all of the rehabilitation objectives have been met and that all of the potential risks have been eliminated and/or are controlled. This assessment should specifically emphasis on those risks relating to river disturbances, groundwater quality and slope stabilities, but should not neglect progress made in natural vegetation restoration or success in alien invasive eradications. The current average specialist fees are estimated at R 50 000.

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

The rehabilitation plan was primarily designed with the closure objectives in mind and therefore it relates to all the various objectives as set out above in Section 1) g) 1) a) of this EMPR. In general, the main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the prospecting area to a condition acceptable for obtaining a closure certificate. Each and every element in the rehabilitation plan was designed in order to meet these closure objectives.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The current, preliminary mine closure and rehabilitation costs amounts to R 758 302

Table 27: Financial Quantum

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures	m3	1200	13.72	1	1	16464
2 (A)	Demolition of steel buildings and structures	m2	500	191.16	1	1	95580
2(B)	Demolition of reinforced concrete buildings and structures	m2	250	281.71	1	1	70427.5
3	Rehabilitation of access roads	m2	4000	2	1	1	8000
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	332.01	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	181.1	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	382.32	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	5	194579.4	0.04	1	38915.88
7	Sealing of shafts adits and inclines	m3	0	102.62	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0.5	133609.85	1	1	66804.925
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	1	166408.65	1	1	166408.65
8 (C)	Rehabilitation of processing waste deposits and evaporation	ha	0	483329.59	1	1	0
9	Rehabilitation of subsided areas	ha	0	111878.12	1	1	0
10	General surface rehabilitation	ha	1	105841.53	1	1	105841.53
11	River diversions	ha	0	105841.53	1	1	0
12	Fencing	m	0	120.73	1	1	0
13	Water management	ha	0	40243.93	1	0.6	0
14	2 to 3 years of maintenance and aftercare	ha	0	14085.38	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum	0			1	0
						Sub Total 1	568442.485
1	Preliminary and General		34106.5491			weighting factor 2 1	34106.5491
2	Contingencies					56844.2485	56844.2485
						Subtotal 2	659393.28
						VAT (15%)	98908.99
						Grand Total	758302

(f) Confirm that the financial provision will be provided as determined.

It is hereby confirmed that the financial provision will be provided as determined.

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

- g) Monitoring of Impact Management Actions
- h) Monitoring and Reporting Frequency
- i) Responsible persons
- j) Time Period for Implementing Impact Management Actions
- k) Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-prospecting slopes are stable, free draining and no slopes have an angle in excess of 20°.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an <i>annual basis</i> or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the mine minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in prospecting areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an <i>annually basis</i> to investigate species diversity and abundance.
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a <i>twice a year basis</i> (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant	The engineer during the construction phase and the responsible person (Engineering/	Quarterly reports on fall-out noise monitoring will be conducted as required by legislation.

	To control the incidence of unacceptable noise levels on site.	and that which may migrate outside the plant area.	Environmental Department) during the Operational phase of the project. The site engineer and independent qualified environmental noise and vibration specialist.	If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off.	There are no sources in the vicinity of the mine. The non-perennial stream will be monitored by collecting surface water samples during the rainy season.	Site Manager/Water Supply	The Orange River and other drainage channels may be impacted by the prospecting activity. Monitoring takes place by collecting water samples quarterly out of the Orange River.

l) Indicate the frequency of the submission of the performance assessment report

Auditing of compliance with environmental authorisation, the environmental management programme and the closure plan should be conducted annually by an independent EAP and an Environmental Audit Report should be compiled in such a way that it meets the requirements in terms of Regulation 34 of the National Environmental Management Act 107 of 1998): Environmental Impact Assessment Regulation, 2014.

The rehabilitation plan should also be reviewed annually in order to fulfil the requirements of Section 41(3) of the MPRDA and should be conducted by an independent EAP. Subsequently, an Annual Rehabilitation Plan should be developed to meet the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

These reports should be submitted annually to the Northern Cape DMR offices in Kimberley.

m) Environmental Awareness Plan

The objective of the environmental awareness plan is to ensure that:

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training;
- All employees are aware of the impact of their activities
- Procedures are established and maintained to make appropriate employees aware of:
 - The significant environmental impacts (actual or potential) of their work activities and environmental benefits of improved personal performance,
 - Their roles and responsibilities in achieving conformance with environmental policies, procedures, and any implementation measures,
 - The potential consequences of departure from specified operating procedures.
- Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and / or experience.

Environmental awareness will be part of the existing training and development plan. Key personnel with environmental responsibilities will be identified and the following principles will apply:

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;

Top management will build awareness and motivate and reward employees for achieve environmental objectives;

- Environmental policies will be availed to mine employees and contractors;
- Environmental inductions will be conducted for employees, contractors and visitors;
- There will be an ongoing system of identifying training needs.

General environmental awareness training as part of the induction at the Kimsa operations should focus on the following:

- General environmental awareness
- The mine policies and vision concerning environmental management
- Legal requirements
- Mine activities and their potential impacts
- Different management measures to manage identified impacts
- Mine personnel's role in implementing environmental management objectives and targets.

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

It is the responsibility of management to ensure that all employees, contractors and visitors are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible. Environmental awareness should be part of the existing training and development plan. Key personnel with environmental responsibilities should be identified and the following principles should be applied:

- Procedures should be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness should focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management should build awareness and motivate and reward employees for achieving environmental objectives;
- There should be an ongoing system of identifying training needs.
- An environmental, health and safety induction programme should be provided to all employees, contractors and visitors prior to commencing work or entering the site, and they should sign acknowledgement of the induction. An attendance register and agenda/programme should be filed for each induction.
- A daily "toolbox talk" should be held prior to commencing work, which will include discussions on health, safety and environmental considerations. The toolbox talks should be led by the site manager or the appointed supervisor/s.
- Refresher training should also be given to permanent employees and long-term contractors on an annual basis, to ensure that all are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

General environmental awareness training as part of the induction at Kimsa should focus on the following:

- General environmental awareness, which incorporates environmental, ecological and heritage elements;
- The mine policies and vision concerning environmental management;
- Legal requirements;
- Mine activities and their potential impacts;
- Different management measures to manage identified impacts;
- Mine personnel's role in implementing environmental management objectives and targets.

Environmental awareness topics to be covered in training should include:

- Natural resource management and conservation;
- Biodiversity awareness and conservation principles;
- Heritage resource awareness and preservation principles;
- Hazardous substance use and storage;
- Waste management; and
- Incident and emergency actions and reporting;

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

Environmental incident reporting will be a vital part of communication in order to deal with risks and ultimately avoid pollution or the degradation of the environment. Such communication should take place through the management, administrative and worker sectors of the operation, as well as contractors and visitors. Employees should be required to report any and all environmentally related problems, incidents and pollution, so that the appropriate mitigation actions can be implemented timeously. In the event of an environmental incident, the reporting procedure as indicated in the table below should be followed.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	The first person causing or observing the incident shall report the incident to an immediate supervisor where the environmental incident is observed.
Line management in the relevant area of responsibility where the incident occurred	<p>Line management in the relevant area of responsibility where the incident occurred shall:</p> <ul style="list-style-type: none"> • Investigate the incident and record the following information: <ul style="list-style-type: none"> - How the incident happened; - The reasons the incident happened; - How rehabilitation or clean up needs to take place; - The nature of the impact that occurred; - The type of work, process or equipment involved; - Recommendations to avoid future such incidents and/or occurrences; • Inform the environmental manager/ECO and the Operations Manager on a daily basis of all incidents that were reported on site; • Consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Assist the Environmental Manager and/or Operations Manager with applicable data in order to accurately capture the incident into the reporting database; • Ensure that remediation measures are implemented as soon as possible.

Site managers	<p>The site managers shall:</p> <ul style="list-style-type: none">• Forward a copy of the incident form to other line managers;• Forward a copy of the incident form to the Environmental manager/ECO;• Inform the relevant department/person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Operations Manager by telephone or email to ensure immediate response/action.• Forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.
Environmental manager/ECO	<p>The appointed environmental manager or ECO shall:</p> <ul style="list-style-type: none">• Complete an incident assessment form to assess what level of incident occurred;• Make recommendations for clean-up and/or appropriate alternate actions;• Enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager;• Enter the incident onto the database in order to monitor the root causes of incidents;• Include the reported incidents in an appropriate monthly/quarterly report;• Highlight all incidents for discussion at HSEC meetings.

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

According to Section 41(3) of the MPRDA the holder of a prospecting right must annually assess (and revise, if necessary) the total quantum of environmental liability for the operation and ensure that financial provision are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-operation liability.

An Annual Rehabilitation Plan should be developed to match the various requirements set out in the NEMA regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

A biennially (every second year) audit report will be submitted to the DMR.

Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the site at that time.

It is hereby confirmed that the financial provision shall be reviewed annually.

2) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from stakeholders and I&APs;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.



Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting Pty Ltd

Name of Company:

Date: 18 November 2019

- END -

APPENDIX 1

DIE UNIVERSITEIT
VAN DIE ORANJE-
VRYSTAAT



THE UNIVERSITY
OF THE ORANGE
FREE STATE

HIERMEE WORD VERKLAAR DAT DIE GRAAD THIS IS TO CERTIFY THAT THE DEGREE

Magister in Omgewingsbestuur Master in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

ROELINA HENRIËTTE OOSTHUIZEN

NADAT AAN DIE STATUTE EN REGULASIES VAN IN ACCORDANCE WITH THE STATUTES AND
DIE UNIVERSITEIT VOLDOEN IS, AS BEWYS REGULATIONS OF THE UNIVERSITY, AS
DAARVAN PLAAS ONS ONS ONDERSKEIE WITNESS OUR RESPECTIVE SIGNA-
HANDTEKENINGE EN DIE SEËL VAN DIE TURES AND THE SEAL OF THE
UNIVERSITEIT HIERONDER. UNIVERSITY BELOW.



A-J Boetse

.....
VISEKANSELIERVICE-CHANCELLOR

G. Nwan Wijk.

.....
DEKAAN/DEAN

[Signature]

.....
REGISTRATEUR/REGISTRAR

.....
BLOEMFONTEIN
2009-09-16

Appendix 2

CURRICULUM VITAE

Roelina Henriette Oosthuizen

Cell: 084 208 9088

E-Mail: roosthuizen950@gmail.com

1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female Marital status:

Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

2. SYNOPSIS OF PROFESSIONAL CAREER

Roelina Henriette Oosthuizen has 22 years of experience in the environmental management field. She started her career in the area of Environmental Impact Assessment (EIA) evaluation in 1997. A major project during her early years as an environmental consultant was that of the EIA for a Game Reserve and Lodge development near Barkly-Wes. After moving to industry in 2005, (A Canadian Group of Companies), Roelien became involved in the practical aspects of environmental management. She worked closely with operations personnel in dealing with ongoing management of environmental impacts at the Mine (e.g. monitoring, auditing, operating procedures). She was also centrally involved in liaison with the authorities and with stakeholders in neighbouring areas.

During her time at the Canadian Group of Companies, Roelien was the environmental manager overseeing operations in the Barkly-West, Prieska and Douglas areas. She was responsible for preparing the environmental compliance documents for each operation which included Performance Assessments and Financial Quantum submissions as well as new applications for Prospecting Rights and Mining Rights with the relevant Scoping, EIA / EMP documents. Her activities included liaison with stakeholders and also with the relevant Departments. During this time, Roelien became increasingly involved in environmental policy and strategy work, as well as the environmental aspects of corporate governance.

She has assisted a range of clients with Environmental Due Diligence audits and compliance audits. Roelien has also undertaken numerous environmental audits, particularly compliance and due diligence audits for clients in the mining industry. Thus, she is familiar with best practice standards in environmental auditing.

Roelien have also represented the South African Diamond Producers Organisation (SADPO) on the Environmental Policy Committee (EPC) at the Chamber of Mines between 2005 and 2011.

In a nutshell, Roelien has wide ranging experience and is thus well-positioned to assist clients in any matter related to sustainability and environmental management. This is achieved through her own skills base and on drawing on specialists.

3. QUALIFICATIONS

MEM (Master in Environmental Management) University of the Orange Free State
B – Comm NWU

4. TRAINING COURSES

Roelien have attended various mining and environmental conferences and seminars to stay abreast with the latest changes in legislation, legal compliance and policy positions in the sector.

October 1997	Mineral Laws Administration & Environmental Management (University of Pretoria)
July 2002	Project Management for Environmental Systems (University of the Orange Free State)
August 2004	Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI)
September 2005	Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg)
November 2006	Mine waste disposal and Achievement of Mine Closure
February 2007	Introduction to ArcGis 1
April 2010	Mining Law Update Conference (IIR BV South Africa)
November 2010	Social Labour Plans for Mining Workshop (Melrose Training)
August 2011	Mineral Resources Compliance and Reporting (ITC)
May 2012	Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences)
August 2012	Mineral Resources Compliance and Reporting 4th Annual (ITC)
March 2013	1st EnviroMining-Ensuring Environmental Compliance and Reporting
March 2014	4th Annual EnviroMining Conference
March 2015	5th Annual EnviroMining Conference

5. PROFESSIONAL REGISTRATION

Registered as a professional at IAIAAsa (International Association for Impact Assessment South Africa).

Applied for registration at EAPASA.

6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

Environmental Management Systems (EMS) and Environmental Auditing

Development of EMS and Compilation of INCIDENT REPORT AND INVESTIGATION FORM for the EMS of the Canadian group of Companies on various sites.

Undertaking of a range of due diligence and performance audits for operations, including those listed below:

Performance Assessment reports for a mining company with various infrastructure and mining operations near Barkly-West and Windsorton.

Performance Assessment reports for a mining company near Douglas

Preparation of an environmental auditing checklist / protocol for a Community project with restitution ground in assisting the community to determine environmental legal compliance at their operations.

Environmental audit as part of a closure with another specialist. This Annual Rehabilitation Plan has been developed to match the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015). This project had the objective of ensuring that this company are accounting for environmental liabilities and risks adequately. The plan distinguishes between (a) those environmental rehabilitation liabilities pertaining to drilling, for which the Company was legally responsible and (b) those environmental rehabilitation liabilities pertaining to historic mining activities, for which the Company is not legally responsible, but consider performing as part of their best practice environmental principals. Three costing scenarios were explored in order to evaluate the most feasible rehabilitation plan, i.e. (1) Total cost (worst-case scenario) including risks, (2) legally required cost and (3) features currently available that do not involve any risks.

Sustainability projects: policies, guidelines, strategies and performance reporting

Involved in the compilation of 43-101 technical documents for listed companies which included information on sustainability and performance in rehabilitation and sustainable mining.

Alien species eradication project guideline and strategy near Barkly-Wes in terms of Regulations that have been promulgated in terms of the Conservation of Agricultural Resources Act, No. 43 of 1983 further make it unlawful to allow various species of weeds and invader plants to grow. The target species was Wild tobacco (declared weed), Pink Tamarisk (declared weed) and Mexican poppy, it also involved the community for job creation and training (2008).

Investigations for a Company near Prieska on Development of a biodiversity offsets policy for the applications for forestry tree licences for protected tree species.

Strategic Environmental Studies and Environmental Impact Assessment (EIA)

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (½m²) OF SOIL WITHIN 100M OF THE HIGH WATER MARK OF THE SEA. A Positive Record of Decision (ROD) Granted (2010).

Undertaking of an ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PROGRAMME SUBMITTED FOR AN APPLICATION FOR A MINING RIGHT IN TERMS OF SECTION 39 & OF REGULATION 50 & 51 OF THE MPRDA, 2002 (ACT NO. 28 OF 2002) near Boshof for a Diamond Mining Company (2015)

Undertaking of a strategic environmental review and amendment for a Chinese group of Companies near Postmasburg. The study provided baseline environmental information and a high-level review of the potential impacts of various components of the development (2014 – 2016).

Environmental Impact Assessments for various developments including the proposed mining project for the former retrenchees of De Beers in Kimberley. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialist with contributions of specialist reports to compile the EIA EMP report.

7. CAREER PATH

01 April 1997 to 28 February 2005

DEPT OF MINERALS & ENERGY

Senior Environmentalist - Assistant Director Environment

MAIN JOB FUNCTIONS

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the rehabilitation of land surfaces.
- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.
- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.
- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.

- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

01 March 2005 – 30 September 2012

Appointed as professional Mineral Law Administration and Environmental Manager for a **Canadian group of Companies.**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.

Undertaking of environmental reviews, audits and management plans:

Formulation of an environmental policy and guidelines for the Group.

Participation in the development of the budget for environmental expenditure.

Co-ordination of technical studies (e.g. monitoring of groundwater quality).

Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).

Development of environmental guidelines for contractors on sites.

Liaison with regulatory authorities on compliance with environmental legislation.

Documentation of environmental incidents.

Environmental awareness and training.

Development of a public participation strategy.

Formulation of a complaint's procedure.

01 October 2012 to Present

Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.

Undertaking of environmental reviews, audits and management plans.

Formulation of an environmental policy and guidelines for the Mine.

Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.

Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).

Development of environmental guidelines for contractors.

Liaison with regulatory authorities on compliance with environmental legislation.

Documentation of environmental incidents.

Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaints procedure.

01 October 2012 to Present part time

Appointed as EAP on some projects

Wadala Mining and Consulting Pty Ltd

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.

Undertaking of environmental reviews, audits and management plans.

Liaison with regulatory authorities on compliance with environmental legislation.

Environmental awareness and training.