



mineral resources

Department:

Mineral Resources

REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: HENLEY BOOYSEN

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FILE REFERENCE NUMBER SAMRAD: NC30/5/1/3/2/10686MP

1. IMPORTANT NOTICE

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

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

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

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

It is 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 BASIC ASSESSMENT PROCESS

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

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

PART A SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner: Tanja Jooste
 Tel No.: 084 444 4474
 Fax No. : 086 636 0731
 e-mail address: joostetanja@gmail.com
 Physical Address: 36 WILLIAM STREET, KESTELLHOF, KIMBERLEY,
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ii) Expertise of the EAP

(1) The qualifications of the EAP (with evidence)

Environmental Management Certificate (Skillfull) (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:	A portion of the farm Eureka 200 (4.95 ha) in the district of Kimberley
Application area (Ha)	4.95 ha (Four comma nine five hectares).
Magisterial district:	Kimberley
Distance and direction from nearest town	The farm is located just outside of Kimberley to the south next to the N12 District Kimberley, Northern Cape, South Africa.
21 digit Surveyor General Code for each farm portion	C0370000000020000000 Total Extent of application area: 4.95ha

c) Locality map

(show nearest town, scale not smaller than 1:250000)

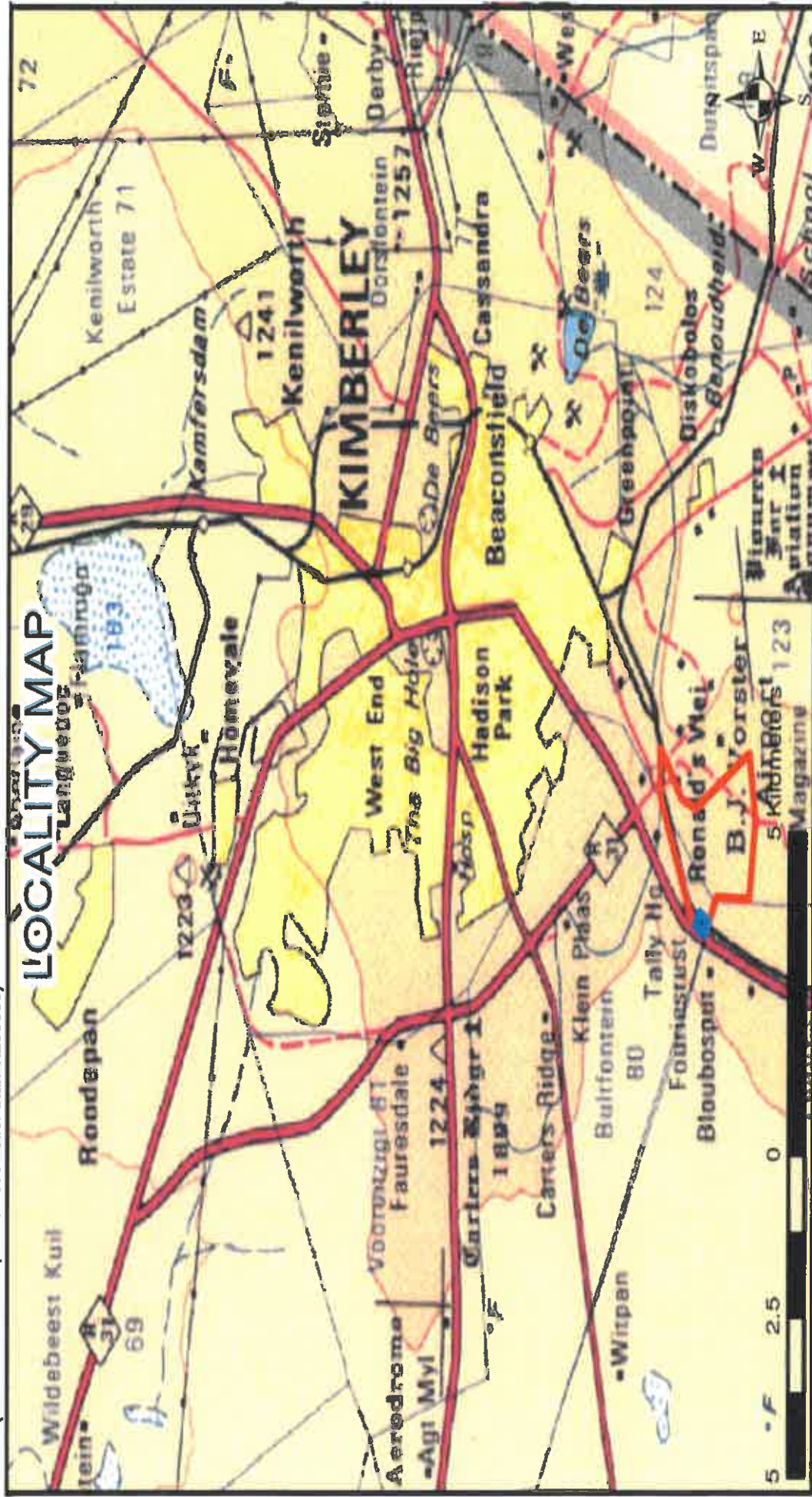


Figure 1: The locality of the proposed mining permit area indicated in blue block.

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)

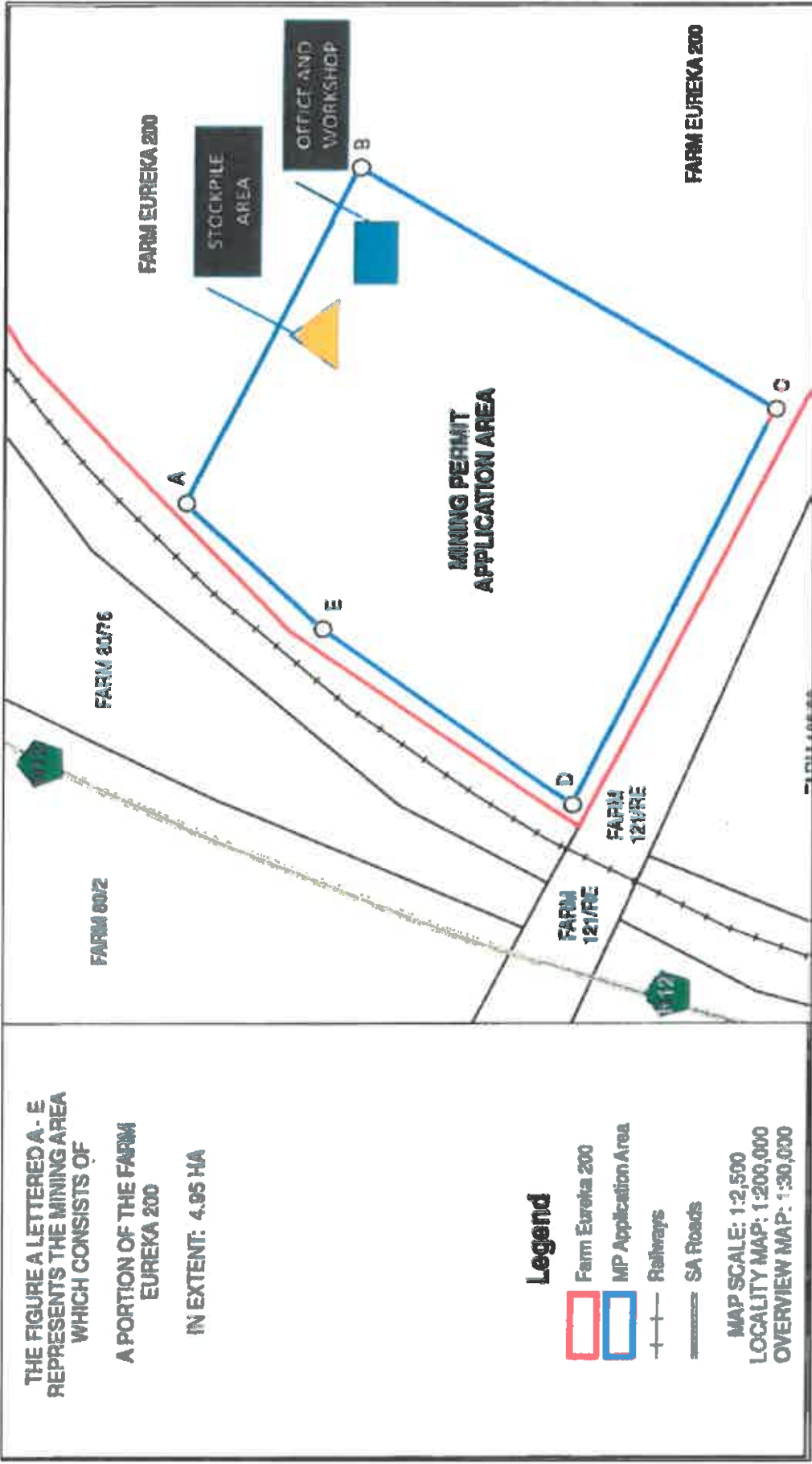


Figure 2: Map showing the aforesaid main and listed activities, and infrastructure to be placed on site

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

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)	WASTE AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)	MANAGEMENT
<p>(E.g. for prospecting – drill site, site camp, ablation facility, accommodation, equipment storage, sample storage, site office, access route, etc. ... etc. ... etc. E.g. for mining – excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablation, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. ... etc. ... etc.)</p> <p>Activity 21 of NEMA Listing Notice 1 Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p>	4.95ha	X	GNR 983		
<p>Activity 24(ii) of NEMA Listing Notice 1 The development of haul roads 15m wide with no reserve</p>	±1500m ² on the Area.	X	GNR983		
<p>Activity 56(ii) of NEMA Listing Notice 1 The continuous lengthening (and rehabilitation) of haul roads 15m wide with no reserve</p>	±1500m ² on the Area.	X	GNR983		

<p>Activity 27 of NEMA Listing Notice 1</p> <p>The clearance of an area of 1 hectare or more, but less than 20 ha of indigenous vegetation</p>	<p>A total of 4.95 hectares will be physically disturbed were the Red Ground material will be removed.</p>	<p>X</p>	<p>GNR983</p>	
<p>Activity 15 of Category A under the National Environmental Management Waste Act 59 of 2008</p> <p>The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a mining permit.</p>	<p>1225m² (35m X 35m block)</p>		<p>GNR 633</p>	<p>X</p>
<p>OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities)</p> <p>Temporary Workshop Facilities</p> <p>Storage Facilities</p> <p>Concrete Bund walls and diesel Depots</p> <p>Ablution Facilities</p>	<p>±400m²</p> <p>±400m²</p> <p>±250m²</p> <p>±25m²</p>		<p>NOT LISTED</p>	

II) Description of the activities to be undertaken

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

Red Sand (Red Soil) will be excavated using a TLB and Front end loader and loaded onto Tipper Trucks as a marketable product.

(II) Road construction

This phase entails the grading of an estimated distance of 1 kilometres of new tracks. The farm already has an existing road network which will be used as far as possible.

e) Policy and Legislative Context

Table 2: Policy and Legislative Context

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.)	Reference where applied	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).
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	<ul style="list-style-type: none"> - This Act establishes a framework for the National, 	

13 of 2005)	Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) 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.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	<ul style="list-style-type: none"> - Entire Act. - Regulations GN R527 	<ul style="list-style-type: none"> - A Mining Permit has been applied for (NC) 30/5/13/2/10691 MP. - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	<ul style="list-style-type: none"> - 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) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.

<p>National Environmental Management: Air Quality Act (Act 39 of 2004)</p>	<p>2015 in terms of NEMA (Financial Provision)</p> <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.
<p>National Environmental Management: Biodiversity Act (Act 10 of 2004)</p>	<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> <p>Publication of lists of critically endangered, vulnerable and protected species GNR 151/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. Control measures are to be implemented upon the approval of the EMPR.

<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> <p>National Environmental Management: Waste Management Act (Act 59 of 2008)</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 fo 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) - Chapter 2 lists all protected areas. 	
		<ul style="list-style-type: none"> - Not applicable. The mining operation does not fall within any protected area.
	<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) 	<ul style="list-style-type: none"> - To be implemented upon the approval of the EMPR.

	<ul style="list-style-type: none"> - 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) 	
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 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure are attached to the PIA.

	<p>otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority.</p> <p>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.</p> <p>Regulation GN R548 published on 2 June 2000 in terms of NHRA</p>	
<p>National Water Act (Act 36 of 1998) and regulations as amended, <i>inter alia</i> Government Notice No. 704 of 1999</p>	<ul style="list-style-type: none"> - Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses <p>In terms of Section 21 a licence is required for:</p> <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; <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>Regulation GN R1352, published on 12 November</p>	<ul style="list-style-type: none"> - A water use application will not be a requirement for this application Control measures are to be implemented upon the approval of the EMPR.

	<p>1999 in terms of the National Water Act (Water use to be registered)</p> <ul style="list-style-type: none"> - 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 (l)) - 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) - 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), (l)) 	
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- 	<ul style="list-style-type: none"> - Control measures are to be implemented upon the approval of the EMPR.

	employed persons to persons other than their employees.	
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- 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).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Northern Cape Planning and Development Act (Act 7 of 1998)	- To control planning and development	- To be implemented upon the approval of the EMPR.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- 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	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R239 published on 23 March 2015 in terms of SPLUMA - 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,	- Determines amount, see S7(b)(ii)	- To take note.

GG14765, 30/04/2004)			
Land Survey Act (Act 8 of 1997)) and regulations, more specifically GN R1130	- 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	- 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)

The activity is based on Opencast mining by semi mechanized system of removing loose soils using a TLB, Front End Loader and tippers/lorries. No need for drilling and blasting.

No exploration is carried out. The quantity and quality of Red Soil available in the area can be easily confirmed by visual survey.

It is being loose sedimentary topsoil and soft in nature, the Red Soil is removed by a system of TLB and tipper combination. The Red Soil will be loaded directly to the trucks/ tippers/lorries for transportation to the needy customers' site like road/construction projects, for filling and levelling of low lying areas and for other infrastructure development work in and around the District.

It is being soft in nature and accumulated as loose soil, will be excavated from the surface up to a depth of 1.0m – 2.0m and hence there is no need to form a bench. However the slope will be maintained at 45° horizontal.

g) Motivation for the overall preferred site, activities and technology alternative

In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. Motivation for the footprint of the actual mining operation (i.e. excavations) will not be provided here, as the location of the mine is determined by the geological location of the mineral resource.

Mine Site Location

Mining infrastructure was strategically placed by incorporating mining project demands, environmental sensitivities and IAP concerns, as identified during the EIA process. Thus, the mining site location is primarily based on proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment and heritage resource. This renders the consideration of further alternative locations in terms of the mine site location, unnecessary.

h) Full description of the process followed to reach the proposed preferred alternatives within the site

NBII – 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.

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 of the mining operation

do not form part of the discussion as the location of the mine is determined by the geological location of the mineral resources.

Land Use

No specialist comparative land use assessments were conducted, but the mining area has a low agricultural potential. The farm has been mined in the past and a old borrow pit is located on the farm but not within the Mining Permit area. Therefore mining has been determined as the most feasible alternative.

Project Infrastructure

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

Mining Method

The activity is based on Opencast mining by semi mechanized system of removing loose soils using a TLB and tippers/lorries. No need for drilling and blasting.

No exploration is carried out. The quantity and quality of Red Soil available in the area can be easily confirmed by visual survey.

It is being loose sedimentary topsoil and soft in nature, the Red Soil is removed by a system of TLB, Front end loader and tipper combination. The Red Soil will be loaded directly to the trucks/ tippers/lorries for transportation to the needy customers' site like road/construction projects, for filling and leveling of low lying areas and for other infrastructure development work in and around the District.

It is being soft in nature and accumulated as loose soil, will be excavated from the surface up to a depth of 1.0m – 2.0m and hence there is no need to form a bench. However the slope will be maintained at 45° horizontal.

Proceed without the Mine (No Go)

Land Use

The current land use is grazing, with a low stocking rate for the farm. If the mining operation does not continue, the farming will persist. Cumulative aspects associated with grazing include overgrazing, with potential of desertification.

Socio-Economy

Henley Booyesen's mining project plan is to employ 7 people. The non-approval of this mining operation would impact negatively on the employment rate for the region 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 Henley Booysen's mining will have a potential impact on the biodiversity through removal of indigenous vegetation and destruction of habitats. If no mining 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 mining 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 mining operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off of graves or any other resources.

A specialist study was done by Peter Beaumont in 2007 in which the conclusion to the study was that the inspected property showed a sparse lithic scatter below the superficial red sands, but no sites of archaeological significance, and my conclusion is therefore that the subdivision of Eureka, except for the southern hillside will have no impact on the heritage resources of the Northern Cape (taken out of the report by Peter B Beaumont, 2007).

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Appendix 3 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.

The property on which or location where it is proposed to undertake the activity

The property on which the mining operations (i.e. excavations) are planned to be undertaken is determined by the geological location of the mineral resource (as discussed in section f). Therefore, there are no alternatives for the location of the activity, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

The type of activity, technology and operational aspects

The planned mining activities, as discussed in section d) ii), The mining method of The activity is based on Opencast mining by semi mechanized system of removing loose soils using a TLB and Front end Loader and tippers/lorries. No need for drilling and blasting.

No exploration is carried out. The quantity and quality of Red Soil available in the area can be easily confirmed by visual survey.

It is being loose sedimentary topsoil and soft in nature, the Red Soil is removed by a system of a TLB and Front end loader and tipper combination. The Red Soil will be loaded directly to the trucks/ tippers/lorries for transportation to the needy customers' site like road/construction projects, for filling and leveling of low lying areas and for other infrastructure development work in and around the District.

It is being soft in nature and accumulated as loose soil, will be excavated from the surface up to a depth of 1.0m and hence there is no need to form a bench. However the slope will be maintained at 450 horizontal.

The design or layout of the activity

The site Infrastructure will need to be strategically placed by incorporating mining project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the access roads, proximity to the areas earmarked for mining as well as limited additional impact on the environmental and heritage resources.

The option of not implementing the activity

Potential land use includes grazing and mining. The majority of the area is classified to have low to moderate potential for grazing land and low suitability for crop yield. Therefore, mining activities are believed to be the most economically beneficial option for the area. The farming of livestock will only be able to continue in areas not affected by mining operations. Cumulative impacts associated to grazing include overgrazing and destruction of natural vegetation, but the cumulative effect of mining activities on the property are expected to outweigh any potential negative effects that agriculture might have.

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 initial consultation process with interested and affected parties was completed.

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. The landowner is also the applicant.

Registered letters were sent to all Government Departments and the Municipality on 24 August 2018.

An Advert (Notice) was placed in the DFA on 2018 to notify all other interested and affected parties.

iii) Summary of issues raised by I&APs

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

Table 3: Summary of issues raised by I&APs

Interested and Affected Parties	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
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted				
AFFECTED PARTIES				
Landowner/s Henley Booysen	X			
Lawful occupier/s of the land				
There are no lawful occupiers.				
Landowners or lawful occupiers on adjacent properties	X			
Transnet PO Box 32666 Braamfontein 2017	Registered letter 24 August 2018			
Municipal Councillor	X			
Municipality	X			
Sol Plaatje Municipality Private Bag X5030 Kimberley 8300	Registered letter 24 August 2018			
Frances Baard District Municipality Private Bag X6068 Kimberley 8300	X Registered letter 24 August 2018			
Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS SANRAL P.O. Box 415 Pretoria 0001 Department of Public Works	X Registered letter 24 August 2018			
	X			

National and provincial P.O. Box 1931 Kimberley 8300	Registered letter 24 August 2018				
National Dept. of Public Works Private Bag X5002 Kimberley 8300	X Registered letter 24 August 2018				
Department of Agriculture, Forestry & Fisheries Directorate: Forestry Management P.O. Box 2782 Upington 8800	X Registered letter 24 August 2018				
Dept. of Agriculture, Land & Rural Development Private Bag X5108 Kimberley 8300	X Registered letter 15 August 2018				
Department of Rural Development and Land Reform Private Bag X5007 Kimberley 8300	X Registered letter 24 August 2018				
ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development P.O. Box 606 Kimberley 8300	X Registered letter 24 August 2018	03 September 2018			This notice affects the existing Eskom Distribution's power lines, Kimberley/Spyfontein 1 132kV Overhead Line which traverses the proposed mining area. The approximate positions of these services are indicated on the attached locality Map. Eskom Distribution will raise no objection to the proposed Mining operations on the above mentioned properties provided Eskom's rights and services are acknowledged and respected at all times. Eskom's rights are protected by Wayleave Agreements and Servitudes. The approximate positions of these services are indicated on the attached sketches. Further to the above the following conditions must be adhered to and accepted in writing before any development and or construction:
Eskom Division PO Box 356 Bloemfontein 9300	X Registered letter 24 August 2018				
Department of Water &	X				

Sanitation Private Bag X6101 Kimberley 8300	Registered letter 24 August 2018			
SAHRA P.O. Box 4637 Cape Town 8000	X Registered letter 24 August 2018	03 September 2018 e-mail	<p>Thanks you for notifying SAHRA of the proposed development. Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS). We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions.</p> <p>Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorization Application process. As per section 38(8) of the National Heritage Resources Act, Act 25 of 1989 (NHRA), an assessment of heritage resources must form part of the process and the assessment must comply with section 38(3) of the NHRA.</p>	
Northern Cape Department of Roads and Public works PO Box 3132 Squarehill Park Kimberley 8300	X Registered letter 24 August 2018			
Communities				
Dept. Land Affairs Department of Land Affairs and Rural Development Private Bag X5018 Kimberley 8300	X Registered letter 24 August 2018			
Traditional Leaders No Traditional Leaders				
Dept. Environmental Affairs				
Dept. of Environment & Nature Conservation Private Bag X6102 Kimberley 8300	X Registered letter 24 August 2018			
Other Competent Authorities affected				
<u>OTHER AFFECTED PARTIES</u>				
<u>INTERESTED PARTIES</u>				

- 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)

1) **Geology:**

Rocks of Archaean age, the Ventersdorp Supergroup, the Griqualand West and Karoo Sequences, a variety of Senozoic sediments and intrusive rocks are found in the area.

The Archaean rocks, which crop out as windows in the area, comprise granite, gneiss, amphibolite and pegmatite.

The Ventersdorp Supergroup has a dominantly volcanic origin. It consist of quartz porphyry and quartz-feldspar porphyry of Makwassie Formation at the base, andesitic lava, volcanic breccia, tuff and chert of the Rietgat Formation, quartzite and conglomerate of the Bothaville Formation and andesite of the Allanridge Formation which forms the top of the sequence. The Priel unconformity separates the Rietgat and the Bothaville Formations; otherwise the sequence is concordant. The supergroup is tectonically fairly undisturbed and the most conspicuous structure is an anticline southwest of Warrenton.

The Griqualand West Sequence follows unconformably on the Ventersdorp Supergroup. It comprises a concordant sequence which grades from the coarse-to fine-grained clastic rocks of the Vryburg Formation at the base through alternating stromatolitic dolomite, limestone, sandstone and shale of the Schmidtsdrift formation to limestone and dolomite of the Ghaapplato Formation.

The Karoo Sequence overlies the older formations unconformably. At the base the Dwyka Formation comprises glacial and fluvio-glacial rocks which include tillite, varved shale, mudstone with pebbles and conglomerate. The Ecca Group, which follows concordantly on the Dwyka, consist almost exclusively of deep-water, fine grained clastic sediments and the lithological monotony of this sequence is only interrupted by the characteristic black, carbonaceous shale of the Whitehill Formation which is underlain and overlain respectively by dark-grey mudstone and shale of the Prins Albert and Tierberg Formation.

Dolerite occurs widely spread as dykes, sills and funnel-shaped bodies in the area. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar and pyroxene. These rocks are highly durable and thus are often seen capping the sandstone and mudstone hills.

The applicant targets sandy to loamy soils 0.6 to 1.2m deep.

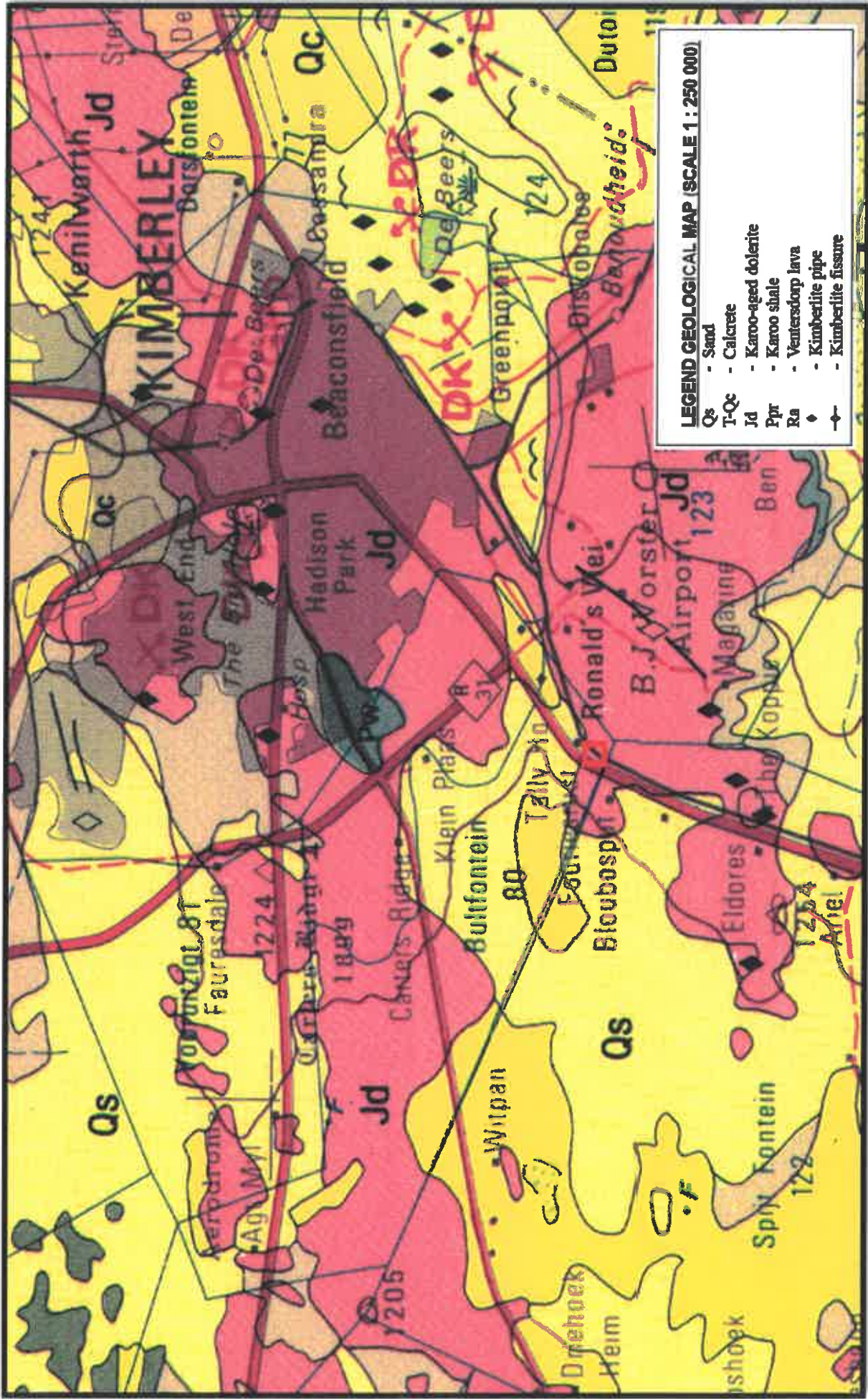


Figure 3: The distribution of geological features in the study area.

2) 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

3) **Topography:**

The area is generally flat, characterised by plains with open low hills or ridges. Altitudes are around 1 220 m above sea level. The terrain is indicated by a very gentle slope of less than 1 % running south-east.

4) **Soils:**

Eroded vehicle tracks on the eastern side of Eureka, towards Ronald's Vlei show that the superficial 10 – 20cm deep hutton Sands there are underlain by calcrete. In contrast, a borrow pit and other exposures near the western limit of this farm indicate that hutton sands in the area are up to 2.5m deep and directly cover dolerite bedrock.

The topsoil consists mainly of a 100 mm to 300 mm uniform layer of typical Kimberley red soil. The sand soil will erode easily if not properly contoured. Proper contours will be kept in place to reduce the erosion of the topsoil where the gradient is steep.

5. **Land Capability and Land Use:**

Land use before mining

The historical agricultural use of the land is for sheep, cattle or game farming.

Evidence of disturbance

The vegetation of the quarry section on the farm shows various degrees of retrogression from the normal Kalahari Thornveld. The absence of the *Acacia eriolabia* (camel thorn) and *Themeda triandra* (red grass) and the presence of many weeds and karoo species are indicative that the vegetation was subjected to overgrazing and/or trampling. There is no evidence of severe soil erosion.

Existing structures

Eroded vehicle tracks on the eastern side of Eureka, towards Ronald's Vlei.

The main railway line between Kimberley and De Aar is situated next to the application area and forms the western boundary of the farm. The railway line runs parallel to the national N12 road leading from Kimberley to Hopetown.

6. Surface Water:

There are no rivers or watercourses within 500 meters of the application area.

The surface water run-off direction is towards the lower lying area.

The boundaries of the study catchment C51L are occupied by some rural residential related activities, small-scale farming activities, as well as game farming area.

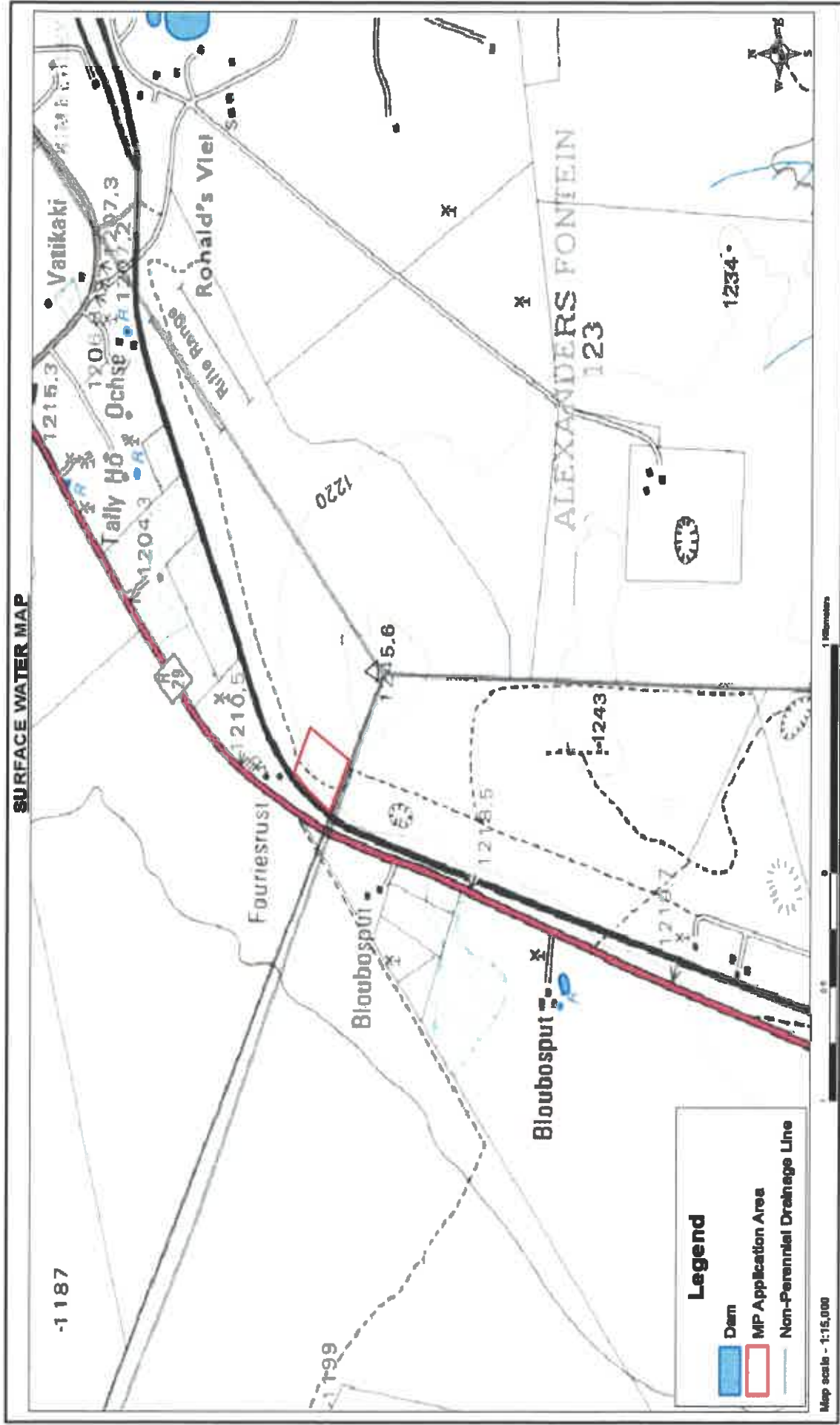


Figure 4: Surface Water Map

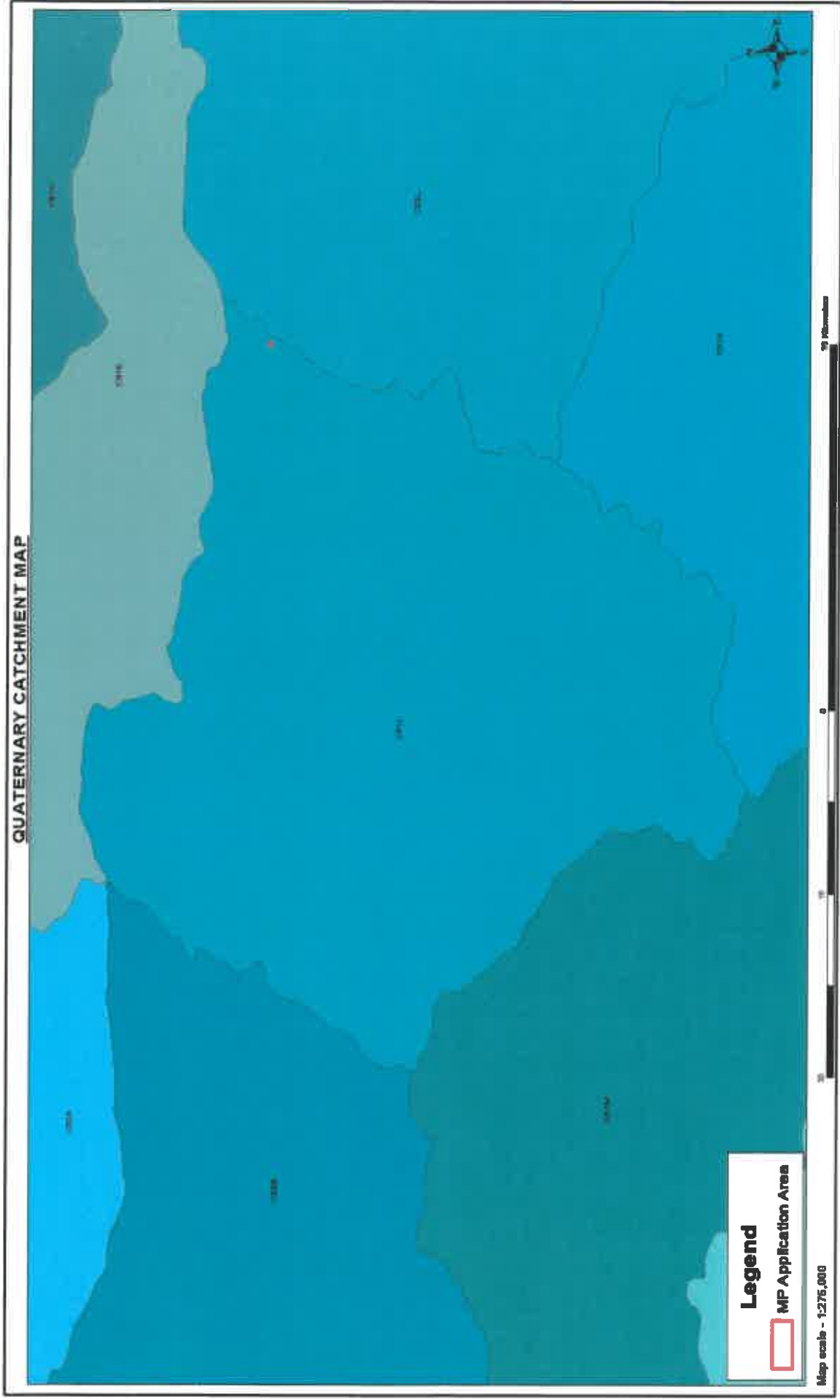


Figure 5: Quaternary Catchment Map

7. **Ground Water:**

Mean depth of the water table varies with the annual rainfall. The mean water depth of the water table in summer is approximately 300 m. The mean water depth of the water table in winter is approximately 100 m. The excavations planned for 1 – 2m below surface will never intersect ground water.

8. **Air Quality and Noise:**

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 mining activity.

The current source of air pollution in the area stems from mining and from vehicles travelling on the gravel roads of the area. No farming activities related to dust generation, such as ploughing, are known to occur in the area.

The potential source of air pollution on Eureka will be nuisance dust generated by the earth moving equipment as well as from the movement of vehicles on the site roads. Gas emissions from the vehicles will be negligible and within legal limits. Generated dust will be visible from the secondary gravel road and to local farm residents. Any potential fall-out dust will impact those who reside on the farm.

Noise on site will be generated by the earth moving equipment as well as vehicles. Although these activities do generate noise, the overall impact can be described as negligible. The most susceptible receptors of noise will be the local farm residents.

9. **Flora:**

The natural vegetation around the quarry is an open savannah with *Acacia tortilis* (umbrella thorn) the sole dominant tree species. A range of different aged individuals occur which is indicative of the increase in numbers and density of the specie. The grassland component is rich in species. The dominant grasses are *Anthephora pubescens* (wool grass) and *Aristida congesta* (spreading three-awn) in the recent disturbed areas.

The *Acacia tortilis* is the sole dominant tree species with bush clumps of *Ziziphus mucronata* (buffalo thorn), *Rhus lancea* (karee) and *Tarchonanthus camphoratus* (camphor bush) being present in grassland in the eastern area. The grassland component is rich in species, both grasses and forbs. The dominant grasses are

Antheophora pubescens and *Aristida congesta* in the recently disturbed areas.

There are no endangered species of the Red Data List present on the farm. The mesem, *Ruschia indurata* of the dolomite sheets is a succulent and not regarded as an endangered species but will be protected.

The most common invaders in the mining area are *Argemone Mexicana* (klipvygie), *Salsola kali* (tumbleweed), and *Chenopodium ambrosioides* (sandworm plant). No exotic plants are present on the mining premises.

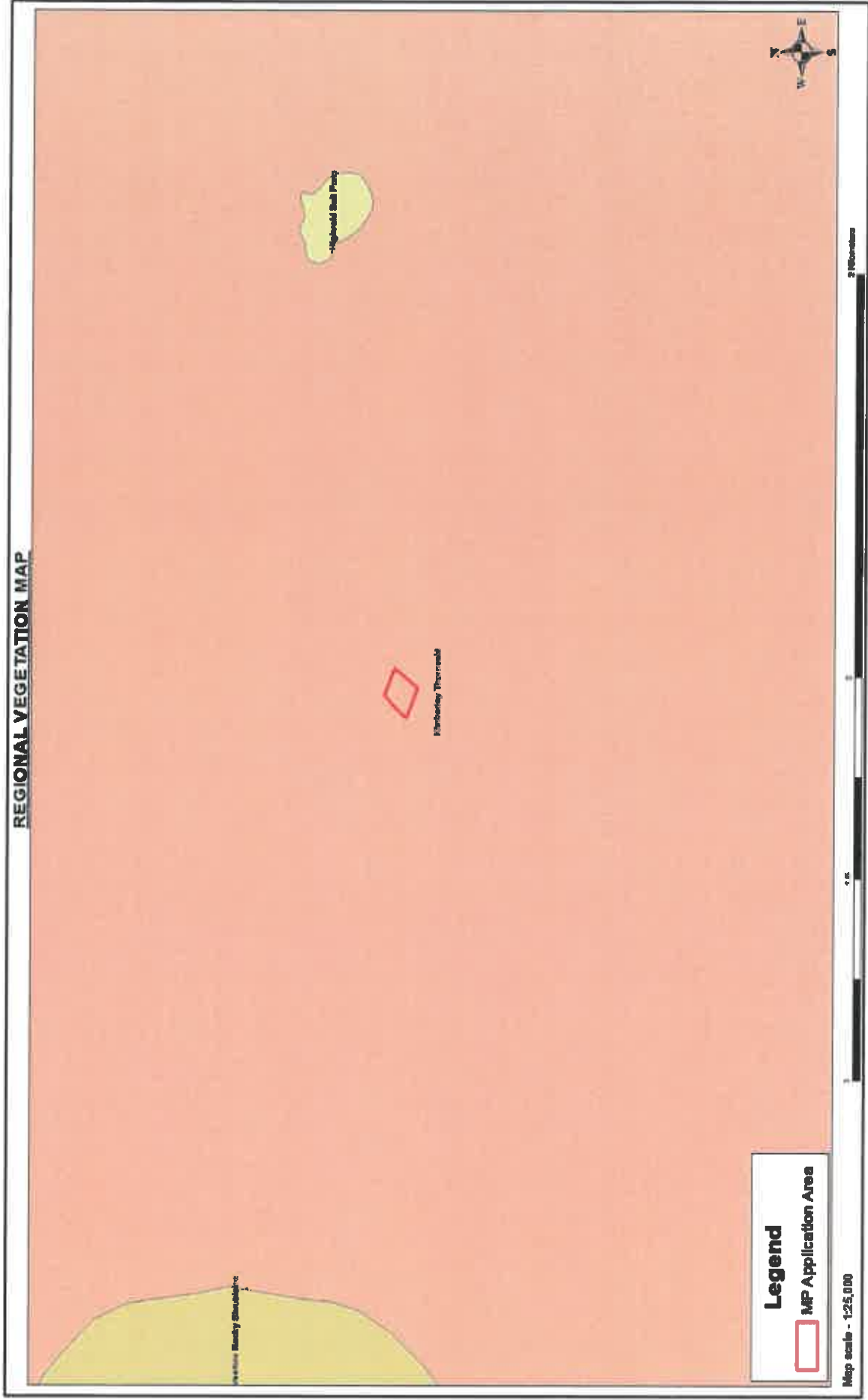


Figure 6: The distribution of fine scale vegetation units in the study area

(10) **Fauna:**

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 means of 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.

(a) **Mammals**

Numerous habitats are found in the study area and therefore the proposed mining site is likely to host a diverse mammal community. As many as 54 terrestrial mammals and seven bat species have been recorded in the region.

Table 4: A list of mammal species found in the region, which are of conservation concern

Scientific Name	Common Name	IUCN	SA RDB	NCNCA
<i>Eidolon helvum</i>	African Straw-coloured Fruit-Bat	NT		
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat		NT	
<i>Rhinolophus dentl</i>	Dent's Horseshoe Bat		NT	
<i>Orycteropus afer</i>	Aardvark			S1
<i>Parotomys littledalei</i>	Littledale's Whistling Bat		NT	
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil		DD	
<i>Atherlerix frontalis</i>	South African Hedgehog		NT	S1
<i>Proteles cristata</i>	Aardwolf			S1
<i>Felis silvestris</i>	Wild Cat	VU		S1
<i>Vulpes chama</i>	Cape Fox			S1
<i>Hyaena prunnea</i>	Brown Hyaena	N1	N1	S1
<i>Otocyon megalotis</i>	Bat-eared Fox			S1
<i>Ictonyx striatus</i>	Striped Polecat			S1
<i>Mellivora capensis</i>	Honey Badger		NT	S1
<i>Manis temminckii</i>	Ground Pangolin	VU	VU	S1

All of the listed bat species have a high potential to occur on site, due to their wide habitat tolerance or affinity for savanna habitats. The Honey Badger and Bushveld Gerbil both have a high potential to occur on site, given the Honey Badger's wide habitat tolerance and the Bushveld Gerbil's association with sandy soils. The South African Hedgehog, Black-footed Cat and Ground Pangolin may occur in the area on account of their performances for arid areas, but they are all rather skittish and will most likely occur at low densities.

The Brown Hyena will most likely not occur in the study area due to the numerous anthropogenic activities that have occurred on the farm over the past years. This fencing network in the area has most likely also restricted their distribution here.

Virtually all mammals of the study area are protected, either according to Schedule 1 or 2 of NCNCA. Those that are specifically protected include Honey Badger, Striped Polecat, Bat-eared Fox, Brown Hyena, Cape Fox, Black-footed Cat, Wild Cat, Aardwolf, South African Hedgehog, Ground Pangolin and Aardvark. Problem animals include Black-backed Jackal, Chacma Baboon, Vervet Monkey and Caracal.

Listed mammals that are most likely to be impacted resulting from the mining activities include the smaller mammals. This could be through accidental disturbances, accidental road kills, as well as intentional killings when animals are encountered that are believed to be dangerous. Although some areas will be cleared during mining of red soil no significant habitat loss is expected from the proposed activities.

(b) **Reptiles**

The proposed mining site lies within the distribution range of at least 36 reptile species, suggesting that the site has relatively low reptile species richness. No listed species are known to occur in the area, but most reptiles of the study area are protected either according to Schedule 1 or 2 of NCNCA. Specifically protected species include Flap-necked Chameleon and the Karoo Girdled Lizard.

Rocky outcrops and hills are considered important habitat for reptiles due to the large number of microhabitats they create. Road kills and intentional killings of snakes and reptiles perceived to be dangerous are most likely to be the most significant impact.

(c) **Amphibians**

Only 12 amphibian species have been recorded in the region, indicating that the site does not potentially have a diverse frog community. This is however normal for an arid area. No natural permanent water was observed in site that would represent suitable breeding habitats for most of these species. As a result, only those species which are relatively independent of water are likely to occur regularly in the area.

The Giant Bull Frog is listed as Near Threatened and is protected according to Schedule 1 of the NCNCA. They prefer seasonal shallow grassy pans, vleis and other rain-filled depressions in open

flat areas of grassland or savanna, but mainly remain buried up to 1m underground until conditions become favourable. The site lies within the known distribution of this species and even though it has not been recorded from any of the quarter degree squares around the site, it could potentially occur on site. All other amphibians of the study area are protected according to Schedule 2 of NCNCA. Impacts on amphibians are likely to be very low and restricted largely to habitat loss from excavations.

(d) **Avifauna**

The site does fall within or near, i.e. within 150km, of any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 259 species have been recorded from the area. This suggests that the area has been reasonably well sampled and that the species list is likely to be fairly comprehensive.

As many as 25 listed bird species are known from the study area, which are classified either as Vulnerable (VU), Near Threatened (NT), Endangered (EN) or Critically Endangered (CR) (Table 5). All birds are protected either according to Schedule 1, 2 or 3 of NCNCA. Those that are specifically protected (Schedule 1) are also listed in Table 5.

Table 5: Bird species found in the study area that are of conservation concern

Scientific Name	Common Name	IUCN	SA Bird Atlas	NCNCA
<i>Accipiter badius</i>	Shikra			S1
<i>Anthropoides paradiseus</i>	Blue Crane	VU	NT	
<i>Anthus crenatus</i>	Rock Pipit		NT	
<i>Aquila rapax</i>	Tawny Eagle		EN	
<i>Aquila werreaultii</i>	Black Eagle		VU	
<i>Ardeotis kori</i>	Kori Bustard	NT	NT	
<i>Bubo africanus</i>	Spotted Eagle Owl			S1
<i>Bubo lacteus</i>	Giant Eagle Owl			S1
<i>Buteo rufofuscus</i>	Jackal Buzzard			S1
<i>Buteo vulpinus</i>	Steppe Buzzard			S1
<i>Caprimulgus europaeus</i>	Eurasian Nightjar			S1
<i>Caprimulgus rufigena</i>	Rufouscheeked Nightjar			S1
<i>Caprimulgus tristigma</i>	Freckled Nightjar			S1
<i>Charadrius pallidus</i>	Chestnutbanded Plover	NT	NT	
<i>Ciconia abdimii</i>	Abdim's Stork		NT	
<i>Ciconia nigra</i>	Black Stork		VU	S1
<i>Circaetus pectoralis</i>	Blackbreasted Snake Eagle			S1
<i>Circus maurus</i>	Black Harrier	VU	NT	S1
<i>Circus pygargus</i>	Montagu's Harrier			S1

<i>Circus ranivorus</i>	African Marsh Harrier		EN	S1
<i>Coracias garrulous</i>	Eurasian Roller	NT	NT	
<i>Cursorius rufus</i>	Burchell's Courser		VU	
<i>Elanus caeruleus</i>	Black-shouldered Kite			S1
<i>Falco biarmicus</i>	Lanner Falcon		VU	S1
<i>Falco chicquera</i>	Red-necked Falcon	NT		S1
<i>Falco naumanni</i>	Lesser Kestrel			S1
<i>Falco peregrinus</i>	Peregrine Falcon			S1
<i>Falco rupicolis</i>	Rock Kestrel			S1
<i>Falco rupicoloides</i>	Greater Kestrel			S1
<i>Gallinule chloropus</i>	Common Moorhen			S1
<i>Glareola nordmanni</i>	Blackwinged Pratincole	NT	NT	S1
<i>Glaucidium perlatum</i>	Pearlspotted Owl			S1
<i>Gyps africanus</i>	White-backed Vulture	CR	CR	S1
<i>Gyps coprotheres</i>	Cape Vulture	EN	EN	S1
<i>Haliaeetus vocifer</i>	African Fish Eagle			S1
<i>Leptoptilos crumeniferus</i>	Marabous Stork		NT	S1
<i>Mellerax canorus</i>	Pale Chanting Goshawk			S1
<i>Mellerax gabar</i>	Gabar Goshawk			S1
<i>Milvus migrans</i>	Black Kite			S1
<i>Neotis ludwigii</i>	Ludwig's Bustard	EN	EN	S1
<i>Oxyura maccoa</i>	Maccoa Duck	NT	NT	
<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	NT	S1
<i>Phoenicopterus ruber</i>	Greater Flamingo		NT	S1
<i>Polemaetus bellicosus</i>	Martial Eagle	VU	EN	S1
<i>Pollhierax semitorquatus</i>	Pygmy Falcon			S1
<i>Polyboroides typus</i>	Gymnogene			S1
<i>Ptilopsis granti</i>	Southern White-faced Owl			S1
<i>Sagittarius serpentarius</i>	Secretarybird	VU	VU	S1
<i>Torgos trachellotus</i>	Lappet-faced Vulture	EN	EN	S1
<i>Tyto alba</i>	Barn Owl			S1

A number of the listed species are expected to occur on site either as residents or by occasionally passing over the area. In general, bird species of the study area are likely to experience very limited disturbances in the form of noise and movement and small-scale local habitat loss as a result of the proposed mining activities. This will especially impact those birds that rely on the affected habitats for breeding, nesting and foraging. The disturbances will be confined to the excavations and habitat loss is associated with the excavations. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary.

Apart from general disturbances and limited habitat loss, other potential impacts would come from the additional or intentional killing of birds. Species that are likely to get killed intentionally include vultures and owls, which often fall victim to religious beliefs or the medicinal trade. Monitoring and environmental inductions during the operation would be vital in order to ensure no or low impact.

(11) **Critical biodiversity areas and broadscale processes:**

The Mining area of Henly Booysen is close to some biodiversity areas like:

Kamfersdam is an endorheic pan that has been transformed into a permanent wetland over the past decade due to an increase in sewage effluent inflow. Hence, it has become an important habitat for birds, especially the Greater- and Lesser Flamingos. The dam supports the largest permanent population of Lesser Flamingos in southern Africa. The most significant threats to Kamfersdam are poor water quality, flooding and expansion of urban development, while threats to the bird population include illegal hunting of water birds and the collisions and mortality of flamingos and other water birds caused by power lines and the electrical transmission lines along the railway.

Dronfield supports large numbers of breeding White-backed Vulture, which comprises 41 % of the breeding pairs in the Kimberley region. These birds forage over wide areas and a pair was encountered soaring over the study area during the site visit. The use of poisons in farming areas to combat mammalian predators still poses a threat to scavenging raptors, and hundreds of vultures can be killed in a single poisoning incident. Collisions with transmission power lines and electrocutions on reticulation and distribution power lines also pose an ongoing threat to vultures and other trigger species.

Benfontein is a Nature Reserve owned by De Beers Consolidated Mines since 1891 and there has been significant investment by research groups over the years. The farm supports small numbers of breeding White-backed Vulture, Blue Crane and Blue Korhaan. The farm also holds several biome-restricted assemblage species and congregatory species, including Lesser Flamingo. More than 1 700 water birds are present during years of high rainfall on the ephemeral Benfontein Pan, and 65 water bird species have been recorded on the pan. There are presently few threats to this IBA as it is being well conserved. The invasive mesquite *Prosopis glandulosa*, currently present in the north-eastern section and spreading along the N8 on the eastern boundary, could become a

significant threat if not controlled. Collisions with the power line transecting the eastern side of Benfontein are a threat to the White-backed Vultures and large terrestrial birds such as Blue Crane and Ludwig's Bustard. Anglo American has recently bought De Beers and this change of ownership may lead to a change in land use or the sale of the property.

A total number of 299 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. Twenty-five listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened or Endangered. Although none of these species were observed to reside on site, they are expected to potentially occur on site either by occasionally passing over the area or by frequently foraging in the various habitats.

In general, bird species of the study area are likely to experience the most disturbances among all fauna as a result of the Booyesen mining activities.

Apart from general disturbances and habitat loss, other potential impacts would come from the accidental or intentional killing of birds. Many of the raptors, including vultures and owls, are susceptible to intentional killing due to cultural beliefs. Monitoring during the mining operation would be vital in order to ensure no or low impact.

(12) **Site Sensitivity:**

The proposed mine falls within close proximity to an urban development zone and has also not been identified as important for long-term maintenance of broad-scale ecological processes within the Sol Plaatje Municipality (Kotze et al. 2009). The mining operation itself is not expected to cause severe habitat transformation and due to the high degree of transformation through previous mining activities on site it is not expected to contribute to severe cumulative habitat loss or the disruption of the broad-scale landscape connectivity in the region. However, it is advisable that the mining activities are restricted to the earmarked application area.

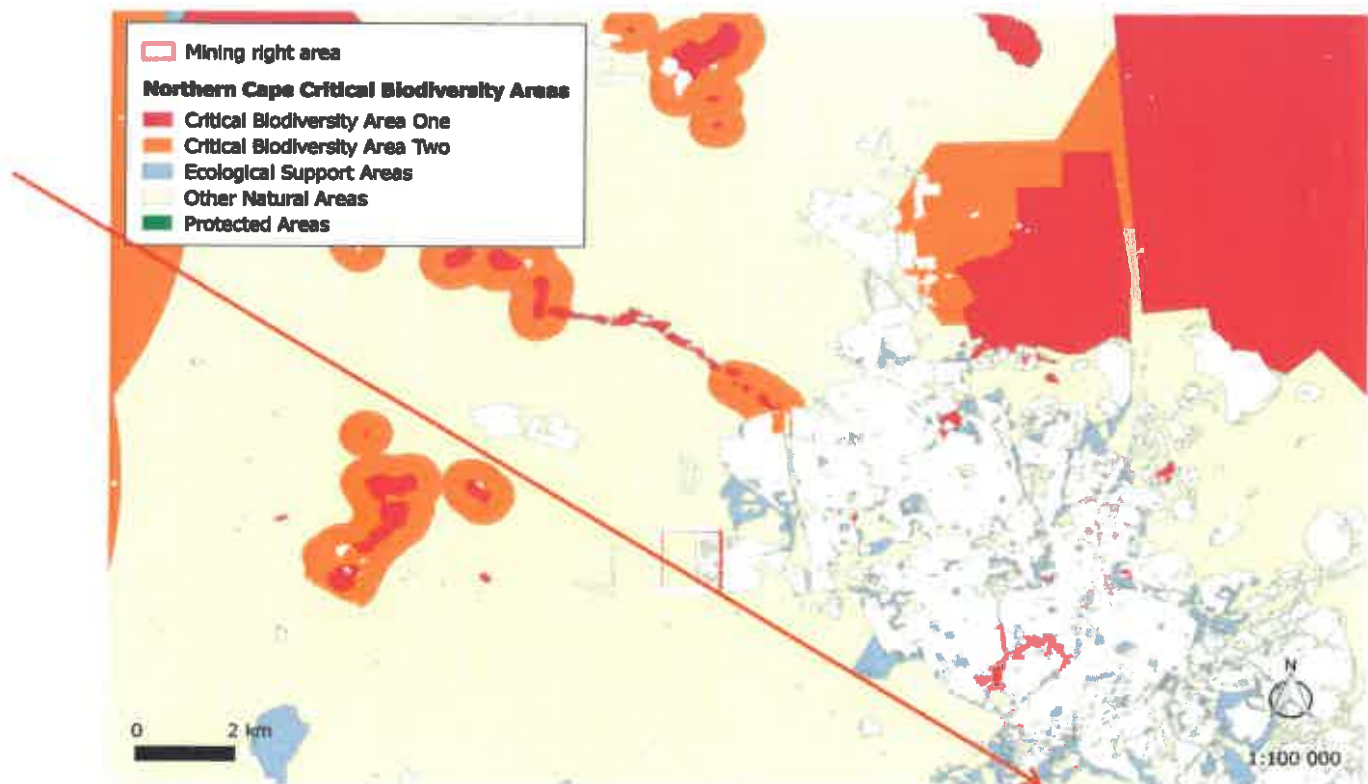


Figure 7: A sensitivity map for the proposed mining area.

(13) Socio-Economic Structure of the Region:

(a) Population Density, Growth and Location:-

According to the 2011 Census, the population of Kimberley was 96,977, while the townships Galeshewe and Roodepan had populations of 107,920 and 20,263 respectively. This gives the urban area a total population of 225,160. Of this population, 63.1% identified themselves as "Black African", 26.8% as "Coloured", 8.0% as "White" and 1.2% as "Indian or Asian". 43.2% of the population spoke Afrikaans as their first language, 35.8% spoke Setswana, 8.7% spoke English, 6.0% spoke IsiXhosa and 2.7% spoke Sesotho.

Kimberley is the capital of the Northern Cape Province. It is located approximately 110km east of the confluence of the Vaal and Orange Rivers. The city has considerable historical significance due to its diamond mining past.

The Sol Plaatjie Local Municipality comprises of a large urban node in the form of Kimberley, and villages and farms. Kimberley is the administrative centre of the municipality. The economic activities consist of retailers, industries as well as mining and farming.

The SPLM accommodates approximately 247 000 people and is also a major contributor to the economy of the Province accounting for 28.9% and 82.1% of provincial and District GDP in 2009 respectively, Sol Plaatjie LM certainly is encumbered with ensuring that the Province as a whole reaches its accelerated growth objectives.

Table 6: Sol Plaatjie Municipality: Population by Population Group

Persons	2001	1996	Change over 5 years		Annual ave % change	% Composition 2001
			Number	percent		
African	109,714	105,838	3,876	4%	0.7%	54%
Coloured	63,918	63,655	263	0%	0.1%	32%
Indian	1,812	1,809	-197	-11%	-2.3%	1%
White	26,220	29,587	-3,367	-11%	-2.4%	13%
Total Population	201,484	204,283	-2,799	-1%	-0.3%	100%

Gender	People	Percentage
Female	49 550	51.09%
Male	47 427	48.91%

Population Group	People	Percentage
Black African	40 218	41.47%
Coloured	35 590	36.70%
White	17 841	18.40%
Indian or Asian	2 226	2.30%
Other	1 102	1.14%

First Language	People	Percentage
Afrikaans	52 161	55.48%
Setswana	17 621	18.74%
English	14 626	15.56%
isiXhosa	4 328	4.60%
Sesotho	2 174	2.31%
isiZulu	901	0.96%
Other	836	0.89%
isiNdebele	418	0.44%
Sign Language	301	0.32%
Sepedi	275	0.29%
Tshivenda	175	0.19%

Xitsonga	153	0.16%
SISwati	57	0.06%
<i>Not Applicable</i>	2 952	

(b) Major Economic Activities and Sources of Employment:-

The population of Sol Plaatjie shows a declining trend – in common with the Northern Cape Province as a whole. One third of the employed citizens in Sol Plaatjie work for the public sector. The number of economically active people barely grew between 1996 and 2001. However, the number of people with employment decreased, with the result that the rate of unemployment increased markedly, from 34% to 42%.

Persons	2001	1996	Change over years			
			2001 Percent	1996 Percent	Number	Percent
Employed	46 412	51 643	58.5%	65.7%	-5,231	-10%
Unemployed	32 928	26 979	41.5%	34.3%	5,949	22%
Total Labour Force	79,340	78,622	100.0%	100.0%	718	1%
Not Economically Active	54,218	49,889			4,329	9%
Population 15 – 65	133,558	128,511			5,047	4%
Total Population	201,484	204,263			-2,799	-1%

In the past, the local economy of Sol Plaatjie was heavily dependent on the De Beers Diamond Mines in and near SPM. In addition, the military maintained large bases of men and equipment in and around the region. However, since the major mines, have downscaled and closed over the last 15 years and the military establishments have shrunk since 1994, the local economy has changed without diversifying. The public sector is the single largest source of employment, as the city is home to the regional and head offices of three spheres of government. The figure below illustrates that in 2001 the majority of the population were employed in the service sector.

Diagram 1: Employment pattern In Sol Plaatjie, 2001 Census Data



Other major employment areas are retail distribution and services. Tourism is a useful contributor to the economy, but it is not large enough to be defined as a driver of the economy in its own right. Employment in the manufacturing sector has experienced slow decline between 2000 and 2003.

Since the manufacturing sector is slowly losing the limited critical mass that it had, it no longer provides a viable economic sector for SPM on which to focus over the longer term within the ambit of a city development strategy. With regard to other economic sectors, the following picture emerges:

- Mining is in closure mode within the city;
- Construction depends on government decisions;
- Retail is a driver of the local economy as the trading centre for the region;
- Tourism is a supporter of economic growth, but will rely on improved human capital;
- Transport depends on major state infrastructural investment in road and rail upgrading.

Table 7: Positive and negative forces in the economy

	Positive	Negative
Main Forces	Drivers of the economy Government (Provincial, District & Local) Retail and service economy for the city and the region	Underminers of the economy Decline of the mining and manufacturing sectors Growing strength of Mangaung as the principal urban centre in the region
Important Supplements	Boosters The Diamond Hub Project The Urban Renewal Projects	Obstacles / Barriers Deteriorating state of the N12
	Complementers Tourism and tourism development Blue Train Appropriate Improvers of the retail and recreation environment	Caps Capacity of the SPM as an institution to drive the strategic agenda Poor state of maintenance on municipal services Infrastructure supporting

		economic activity Loss of municipal tax revenue through decline of CBD
	Supporters De Beers "Big Hole" redevelopment – conference centre, hotel, museum Education institutions	Diversions Decentralised shopping malls
	Sustainers The N23 in its present poor state	
	Defenders Social grants	
Alternatives	Rescuers The new prison and mental facility Regional health facilities The N12 upgraded The military Relocation of a national department to Sol Plaatje	

(c) Estimated Unemployment:-

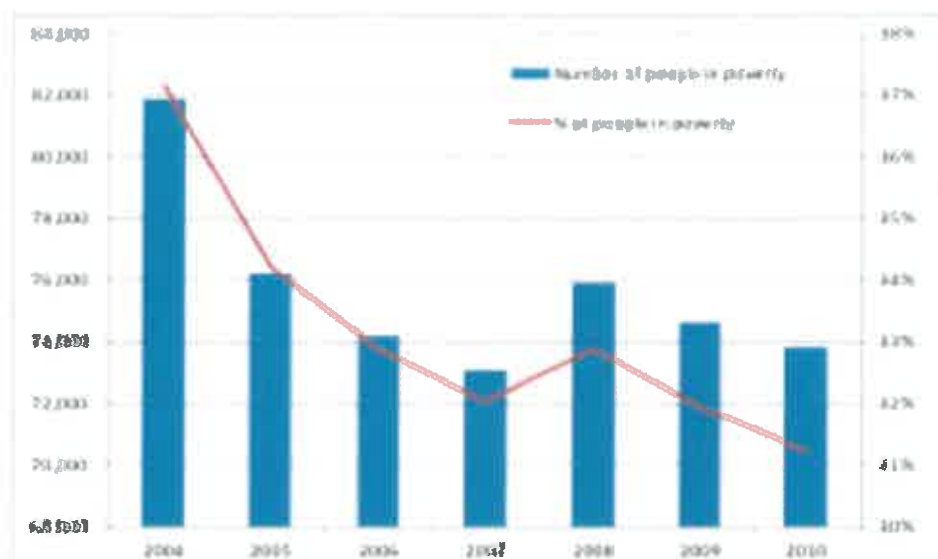
The education level of persons in the area where only 10% have post-matric and 90% matric or less with an unemployment rate of 33% which is mainly in the category of persons with matric or less, a need exist for innovative ways to diversify the economy. The main job creating sectors are the primary and secondary sectors which employ the most unskilled workers.

Table 8: Labour Market and Education Statistics 2011 compared to 2001

Labour Market				Education (aged 20+)					
Unemployment Rate (official)		Youth Unemployment Rate (official) 15 – 34 years		No Schooling		Matric		Higher Education	
2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
41,3 %	31,9 %	51,5 %	41,7 %	11,3 %	7,1 %	21,9 %	29,2 %	8,7 %	10,4 %

Linked to the unemployment rate the chart below indicates the people living in poverty in the Sol Plaatje Municipality.

Chart 1: Number and percentage of people living in poverty, Sol Plaatje Local Municipality 2004 – 2010



According to the chart above the number of people living in poverty decreased dramatically to 31,2%. This is well below the national average of 39,9% as well as the provincial and district averages of 43,4% and 39,1% respectively. The NDP's target is to reduce the number of people living in poverty to 39% by 2030.

(d) Housing Demand and Availability:-

Table 9: Access to Household Services (higher level) 2011 compared to 2001

Level of Service	2001 %	2011 %
Piped water inside dwelling	51,2	61,9
Flush toilet connected to sewer	83,4	82,8
Electricity for lighting	82,4	84,9
Weekly refuse removal	90,8	84,3

SPM was able to provide more households with a higher standard of service in terms of water and electricity during the period 2001 to 2011 which was however not the case with sanitation and refuse removal. In the case of sanitation the main reason is that until 2009/10 SPM's bulk sewer treatment works ran out of capacity which led to a moratorium on development as new development – also housing development – could not be connected to the sewer network. The capacity problems have since been resolved and the moratorium has been lifted and enough capacity has been created for the next 20 years. Refuse removal also lagged behind mainly due to the increase of informal settlements – which is not accessible to deliver a waste removal service. This is still the case today.

The Infrastructure diamond below depicts the four household infrastructure measures on a single diamond shaped chart. The larger the diamond, the better serviced the area is in terms of refuse removal, electricity, water and sanitation access. The dotted blue line shows the national average as a means of comparison, the light dotted blue line is the provincial comparison, whilst the green line shows the SPM's measure. The dotted blue line falls inside the green line indicating that SPM is performing better than the national and provincial average.

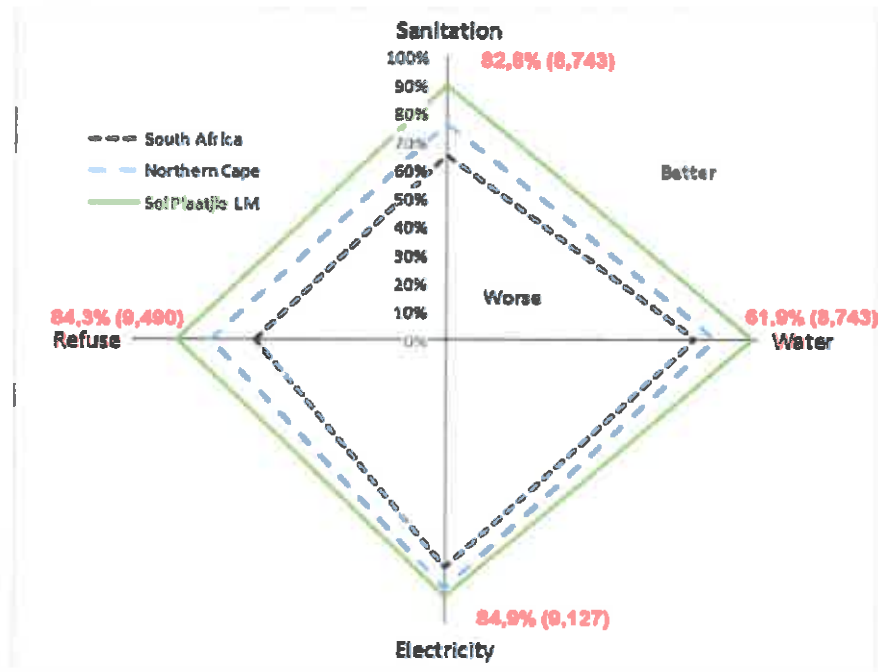


Figure 8: SPM Infrastructure Diamond: Basic Services: 2011

Although SPM does well in providing services to its communities the tables below indicate the backlogs and needs that still exist in terms of service delivery.

The table below indicate the number of informal settlements in SPM as well as the stage of development in each informal settlement.

Table 10: No. and Status of Informal Settlements

Description	No. of Areas	H/H
Planning not commenced	9	5 172
Planning in process	11	2 167
Planning completed – await registration	5	1 526
Install services	2	996
Housing	1	3 500
TOTAL	28	13 361

Table 11 below indicates the present backlogs/need for basic household services according to Census 2011, the provision of services since the 2012/2013 financial year as well as the planned provision for the financial year 2014/2015. It also include the growth of informal households since the 2011 Census and the survey done through the NUSP process.

Table 11: Basic Household Services Backlog and Need 2011

Service	Backlog Census 2011	Provision up to 30 Jun 2014	2014/2015 Targets	TOTAL	Balance	PLUS Growth 2011 to 2013
New Houses (subsidised)	7 846	1 293	375	1 668	6 178	11 693
New Erven Planned and Surveyed	7 846	1 163	1 272	2 435	5 411	10 927
Houses connected to water	8 743	2 521	892	3 413	5 330	10 846
Houses connected to sanitation	9 343	3 552	892	4 444	4 899	10 415
Houses connected to electricity	9 127	2 335	214	2 549	6 578	12 094
Houses provided with waste removal	9 490	2 000	600	2 600	6 890	12 406
Roads Rehabilitation/ Paving	297km	25,7km	2,5km	31,7km	265,3km	-

(e) Social Infrastructure:-

The city of Kimberley have formal instructure such as schools, university, hospitals, sport- and recreation facilities and shops.

(f) Water Supply:-

Water is available to almost 50% of the population in the Northern Cape in the form of water piped to their dwelling. The next most used source of water supply is piped water on-site or in yards, which is available to around 33% of the population.

Surface water from the Riet-, Vaal- and Orange River is the major source of water in the region, although some smaller communities are totally dependent on groundwater for supply.

(b) **Description of the current land uses**

Please see Baseline Description above.

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

Please see Baseline Description above.

**(d) Environmental and current land use map
(Show all environmental, and current land use features)**

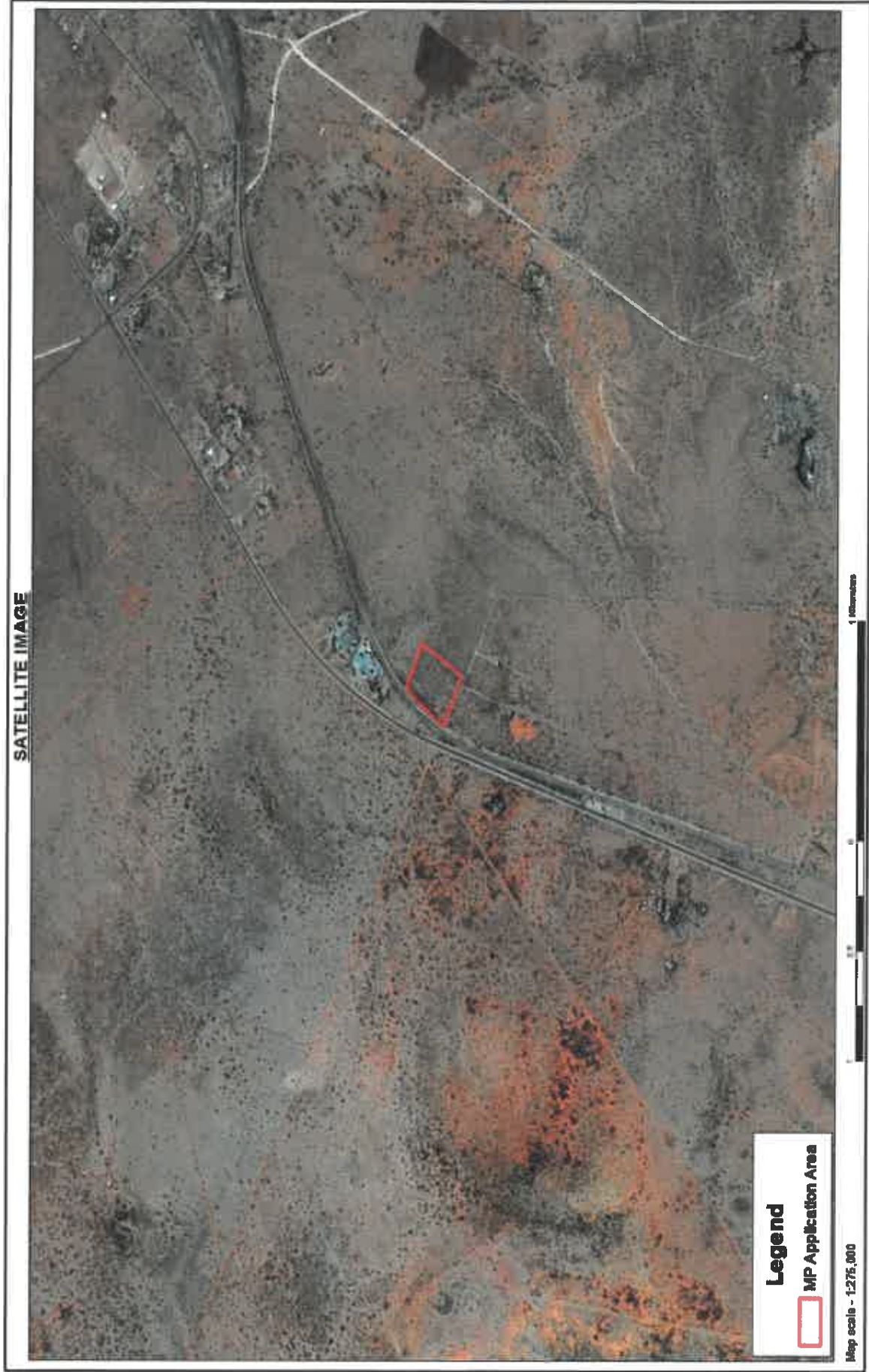


Figure 9: Environmental and current land use map

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 Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and excavations.	Medium	Certain	Construction and Operational	Low Local	<ul style="list-style-type: none"> Rehabilitation of and backfilling when possible continuously, if possible and does not influence mining and safety requirements. Employ effective rehabilitation strategies to restore surface topography of excavations. All temporary infrastructures should be demolished during closure.
Soils	Soil Erosion Construction of infrastructure; topsoil removal; potential runoff.	Medium	Probable	Construction and Operational	Low Local	<ul style="list-style-type: none"> At no point may plant cover be removed within the no-development zones. Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.

						<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 during construction 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. • Stockpiles susceptible to wind erosion are to be covered during windy periods. • 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.
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	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	<p>Loss of soil fertility During the removal of topsoil; stockpiling.</p>	<p>Medium-High</p>	<p>Certain</p>	<p>Construction Operational Decommissioning</p>	<p>Low Local</p>	<p>Management / mitigation</p>
	Nature of Impact	Significance	Probability	Duration	Consequence	Management / mitigation

	Soil pollution	Medium	Probable	Construction and Operational	Extent
	Spillage of hazardous material; runoff.				Low Local
					<ul style="list-style-type: none"> • 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	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Low	Probable	Short term	Minimal Local
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Very low	Probable	Short term	Minimal Local
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent
	Hydrocarbon Spills Hydrocarbon spills from construction	Low	Probable	Construction Operational Decommissioning	Low Local
					Employ appropriate rehabilitation strategies to restore land capability. Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability. Management / mitigation Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
<p>Surface Water</p>	<p>vehicles and fuel storage areas may contaminate the groundwater resource locally</p> <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. Transport of construction materials to and from site. Significant levels of dust may emanate from the use of heavy construction vehicles which in turn will impact on runoff water 	<p>Medium to Low</p>	<p>Possible</p>	<p>Construction</p>	<p>Low Local</p>	<p>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.</p> <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>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 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:</p> <ul style="list-style-type: none"> Only environmental friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground

	<ul style="list-style-type: none"> Materials used during construction may impact negatively on the runoff water quality. 	High	Possible	Operational	Low to Moderate Local	<p>water resources.</p> <ul style="list-style-type: none"> Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment. 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 reduce soil erosion and improve natural re-vegetation.
<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. 						
<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 		Medium to Low	Possible	Closure	Low Local	

	transportation. • Significant dust levels will emanate from the use of heavy construction vehicles.					
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	<p>Loss of and disturbance to indigenous vegetation</p> <p>Construction of roads, plant site, as well as other necessary infrastructure; placement of stockpiles; and the clearing of vegetation for mining, materials storage and topsoil stockpiles; vehicular movement.</p>	Low	Definite	Construction and operational	Low to Medium Local	<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.
	<p>Loss of flora with conservation concern</p> <p>Removal of listed or protected plant species; during Construction of roads, plant site, as well as other necessary infrastructure; the</p>	High	Certain	Construction and Operational	Low to Medium Local	<ul style="list-style-type: none"> • Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining. • It is recommended that these plants are identified and marked prior to mining. • These plants should, where possible, be incorporated into the design layout and left in

	placement of stockpiles; and clearing of vegetation for mining.				<ul style="list-style-type: none"> • However, if threatened of destruction by mining, 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; mining activities	Medium-High	Certain	Construction and Operational	Low Regional	<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 mining activities.	High	Probable	Construction and Operational	Low Local	<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

Fauna	Loss, damage and fragmentation of natural habitats Clearance of vegetation; mining activities	High	Probable	Construction and Operational	Low-Medium Local	<p>to be implemented.</p> <ul style="list-style-type: none"> Mining 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 mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorised to do so. 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 mining footprint. 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 ensure that all contractors and workers undergo Environmental
	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from mining activities.	Medium	Probable	Construction and Operational	Low Local	

<p>Air Quality</p>	<p>Sources of atmospheric emission associated with the mining operation are</p>	<p>Low</p>	<p>Certain</p>	<p>Decommissioning</p>	<p>Low Local</p>	<p>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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SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
	likely to include fugitive dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of dust road.					acceptable levels.
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Topsoil stripping should be limited to daytime only.
	Construction of Roads	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Building activities Noise increase at the boundary of the mine footprint.	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Hauling of building material to and from the specific areas.	Medium	Possible	Pre- Construction and Construction	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Hauling of material should be

						limited to daytime only. Noise survey to be carried out to monitor the noise levels during these activities.
Construction of the soil stock pile and material stock pile. Noise increase at the boundary of the mine footprint.	Medium	Possible	Pre- Construction and Construction	Low Local		Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Clearing of new open cast mining areas, stripping and stockpiling of topsoil. Noise increase at the boundary of the mine footprint.	Medium	Possible	Operational	Low Local		Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Topsoil stripping should be limited to daytime only.
Diesel emergency generators Noise increase at the boundary of the mine footprint.	Medium	Possible	Operational to closure	Low Local		Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Additional traffic to and from the mine	Medium	Possible	Operational to closure	Low Local		Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to

Maintenance activities at the site.	Medium	Possible	Operational closure	Low Local	monitor the noise levels during these activities. Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Noise survey to be carried out to monitor the noise levels during these activities.
Back fill of mine footprint area	Medium	Possible	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Backfill of mine footprint area activities should be limited to daytime only.
Planting of grass and the rehabilitated areas	Medium	Possible	Decommissioning	Low Local	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 infra-structure	Medium	Possible	Decommissioning	Low Local	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

Visual impacts	Potential visual impact	Low Site	Certain	Construction, Operation and Decommissioning	Low Local Site	monitor the noise levels during these activities. The design of the proposed mining development will determine the visual impact. As the visual impact would be low, Correct design will ensure that the development will fit into the surrounding area and will become a feature of the area.
	Visual Impact on the surrounding land users/ residents	Low site	Highly Likely	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed mining development will determine the visual impact.
	Potential visual impact of the proposed development on the operational phase of the surrounding land users in close proximity.	Low	Highly likely	Operational	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact. <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	Low	Low likelihood	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.

	existing road networks. The Deterioration of sites of cultural and heritage importance.	Low	Certain	Construction, Operational	Low	Any heritage and cultural resources must be protected and preserved by the delineation of a no go zone if any have been identified. No such sites were identified but should any resources be discovered, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Should any Burial remains be uncovered it should not be disturbed or removed until inspected by an archaeologist or for fossil finds by a palaeontologist.
Environmental Factor Socio-Economic	Nature of Impact Population Impacts Employment and Opportunities skills Inequities	Significance Medium Positive	Probability Probable	Duration Start-up and Construction	Consequence Extent Medium Positive Local	Management <ul style="list-style-type: none"> • Training of potential future employees, contract workers and/or community members should focus on mining 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

						<ul style="list-style-type: none"> the preferred training and skills development method. Training courses should be accredited and certificates obtained should be acceptable by other related industries. Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population where possible to avoid possible conflict arising between locals and the outside workforce, but also to limit the need for accommodation facilities. Maximise the use of local labour where possible by developing a strategy to involve local labour in the construction process. The appointment of locals and the inflow of temporary workers should still be managed with due cognisance of the sensitivities at hand and the process of introducing foreigners should be pro-actively managed. Effective management of the mining activities to avoid any environmental pollution
Inflow of Temporary workers	Low Negative	Highly Probable	Start up and Construction	Low Negative Local		
Influx of Jobseekers	Low Negative	Highly probable	Start-up and Construction	Low Negative Local		
Conflicts between Local Residents and Newcomers Impact on Social Networks	Low Negative	Probable	Start-up and Construction	Low Negative Local		
Individual and Family Level Impacts Impact on nearby	Low Negative	Low probability	Start-up and Construction	Low Negative Local		

	residential properties.					<p>focusing on water, waste and sanitation infrastructure and services, and limiting any increase in noise levels.</p> <ul style="list-style-type: none"> Dust pollution should be kept to a minimum The active mining area should be fenced to avoid unauthorised entry by animals onto the mining area
Impact on daily living and movement patterns	Low Negative	Probable	Start-up Construction	and Construction	Low Negative Local	<ul style="list-style-type: none"> Dust suppression methods should be strictly implemented if and where required All construction 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 The construction of additional access roads should be limited. Speeding of construction vehicles must be strictly monitored.
Safety and Security Risks	Low Negative	Highly Probable	Construction	Construction	Low Negative Local	<ul style="list-style-type: none"> A Fire/Emergency Management Plan should be developed and implemented at the outset of the construction phase.

					<ul style="list-style-type: none"> • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site and construction workers should be appropriately trained for fire fighting • The construction sites should be clearly marked and “danger” and “no entry” signs should be erected. • Speed limits on the local roads surrounding the construction sites should be enforced. • Speeding of construction vehicles must be strictly monitored • Local procurement and job creation should receive preference.
Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> • Maximise the employment of locals where possible • First aid supplies should be available at the mine site • Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the construction site
Community Infrastructure Needs	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> • Maximise the employment of locals where possible

Impact on Infrastructure and Services	Heritage Features	Low Negative	Highly probable	Construction	Low Negative Local	<ul style="list-style-type: none"> Any heritage and cultural resources must be protected and preserved by the delineation of a no go zone if any have been identified. No such sites were identified but should any resources be discovered, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Should any Burial remains be uncovered it should not be disturbed or removed until inspected by an archaeologist or for fossil finds by a palaeontologist.
Intrusion Impacts Visual Impact and Sense of Place	Noise Impact	Low Negative	Probable	Construction	Low Negative Local	<ul style="list-style-type: none"> The construction site should be kept litter free
Population Impacts Employment Opportunities and		Medium Positive	Probable	Operational	High Positive Regional	<ul style="list-style-type: none"> Construction vehicles should be in a good working order Construction activities should be kept to normal working hours e.g. 7 am until 5 pm during weekdays Job creation and training remains critical as there is still a high unemployment rate

skills inequities					<p>within the local communities. Training should thus be focused on mining related skills.</p> <ul style="list-style-type: none"> • Should retrenchments be necessary, adequate measures should be put in place to assist the affected employees to find alternative forms of employment. • Possible steps to be taken with regards to retrenchments should be clearly communicated to all employees.
Conflicts between local residents and newcomers	Low Negative	Probable	Operational	Low Negative Local	<ul style="list-style-type: none"> • Maximise the employment of locals as far as possible
Impact on social networks					
Individual and Family level impacts	Low Negative	Highly Probable	Operational	Low Negative Local	<ul style="list-style-type: none"> • Maximise the employment of local labour to limit the negative impacts on the infrastructure and services within the area • Speed limits on the local roads surrounding the mining site should be enforced. • Speeding of mine related vehicles must be strictly monitored • Monitoring of possible
Impacts on daily living and movement patterns and family activities					

						impacts on water quality and quantity, as well as the possible impacts of dust pollution should be undertaken.
Health and safety risks	Low Negative	Highly Probable	Operational	Low Negative Local		<ul style="list-style-type: none"> The general health of employees should be monitored on an on-going basis EMP Guidelines should be strictly adhered to and international best practice should be sought
Intrusion Impacts Visual Impact and Sense of Place	Low Negative	Highly Probable	Operational	Low Negative Local		<ul style="list-style-type: none"> Recommendations and mitigation measures as part of the EMP should be strictly implemented. Mining areas should be rehabilitated as soon as the Mining allows
Noise Impact	Low Negative	Probable	Operational	Low Negative Local		<ul style="list-style-type: none"> Noise generating activities should be kept to normal working hours (e.g. 7 am until 5 pm) where possible
Socio-Economic Possible social impacts to be experienced during decommissioning (closure of the mine) could include the following:	Low Negative	Highly probable	Decommissioning	Low Negative Local		<ul style="list-style-type: none"> Downscaling of production should be undertaken over a period of time. Downscaling and retrenchment of contractor and permanent staff should be done over a period of time. Rehabilitation of all mining and mining related areas

Interested and Affected Parties	<p>Job losses due to mine closure; Decline in the sustainability of the local economy as a result of the loss of employment, household income and capital investments; Reduced economic activities within the area with subsequent negative impacts on smaller businesses; Possible negative impact on the crime levels due to increased unemployment rate; Remnants of possible environmental impacts; and Remaining visual impact as a result of mining.</p>	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	<p>should be undertaken.</p> <ul style="list-style-type: none"> A closure plan must be developed and a closure quantum must be included in the Environmental Management Programme Report
						Ensure continuous and transparent communication with IAP's

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**
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**

The criteria used to assess the significance of the impacts are shown in the table 12 below/overleaf. The limits were defined in relation to mining 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 12: 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 13: 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

Table 14: 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 Sol Plaatje Kimberley area
4	Regional/District Regional	Direct and Indirect impacts affecting environmental elements within District (Frances Baard District)
5	Provincial	Direct and Indirect impacts affecting environmental elements in the Northern Cape Province

Table 15: 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 16: 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.

The impact is of great importance. Failure to mitigate, with the objective to reduce the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

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 mining 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. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and removing of dumps, 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 aggregate mining and material but 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.

Mining activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and mining 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 mining 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 will not impact on heritage resources. Any heritage and cultural resources must be protected and preserved by the delineation of a no go zone if any have been identified. No such sites were identified but should any resources be discovered, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Should any Burial remains be uncovered it should not be disturbed or removed until inspected by an archaeologist or for fossil finds by a palaeontologist. 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

Impact	Mitigation	Risk
Air quality	<ul style="list-style-type: none"> • Speed limits; • Spraying of surfaces with water; • Avoidance of unnecessary removal of vegetation; • Re-vegetation; • Monitoring; • Rehabilitation of disturbed areas; and • Controlled excavation operations, preferably on wind-free days. 	Medium
Fauna	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of cleared areas. • Encourage the growth of natural plant species. • Ensure measures for the adherence to the 	Medium

	<p>speed limit.</p> <ul style="list-style-type: none">• Mining 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 mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mining site that are not part of the demarcated development area should be considered as a no go zone for employees and machinery or even visitors.• 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.• In the case of any mortalities resulting from birds flying into power lines, these should be recorded including the date of the observation and the species affected and any other relevant information.• 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 pristine habitats and minimise the overall mining footprint.• The extent Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining;	
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	<ul style="list-style-type: none"> • Snares & traps removed and destroyed; and • Maintenance of firebreaks. 	
Flora	<ul style="list-style-type: none"> • Minimise the footprint of transformation. • Encourage proper rehabilitation of cleared areas. • Encourage the growth of natural plant species. • Ensure measures for the adherence to the speed limit. • Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; • It is recommended that these plants are identified and marked prior to mining. • These plants should where possible, be incorporated into the design layout and left in situ. • However if threatened of destruction by mining these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation. • 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 mining areas • Encourage the growth of natural plant species (diverse selection of natural plant species). • Mechanical methods (hand-pulling) of control to be implemented extensively. • Annual follow-up operations to be implemented. • Ensure measures for the adherence to speed limit. • Maintenance of firebreaks; • No trees felled for firewood; 	Medium
Ground water	<ul style="list-style-type: none"> • Refuelling must take place in well demarcated areas and over suitable drip trays to prevent ground water pollution. • Spill kits to clean up accidental spills from the 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. 	Low

	<ul style="list-style-type: none"> • Vehicles should be regularly serviced and maintained. • Monitoring of groundwater abstraction and quality; and • Clean & Dirty water system must be well maintained. 	
Noise	<ul style="list-style-type: none"> • Hearing protection; • Non-metallic washers to join infrastructure; • Working hours; • Controlled excavation operations; • Silencers on equipment and vehicles; • Acoustic enclosure for generators; and • Distance from residence of surface owner. 	Medium
Soil	<ul style="list-style-type: none"> • At no point may plant cover be removed within the no-development zones; • 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 minimized in terms of the surface area and duration, wherever possible; • The mining operation must co-ordinate different activities in order to optimise the utilisation of the yellow fleet and thereby prevent repeated and unnecessary excavations. • Construction that requires the clearing of large areas of vegetation for excavations should ideally occur during the dry season only. • The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers. • The soil that is excavated during construction 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. • Excavated and 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. • Stockpiles susceptible to wind erosion are to be covered during windy periods. • 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. • Rehabilitation of the erosion channels and 	Medium

	<p>gullies.</p> <ul style="list-style-type: none"> • Linear infrastructure such as roads 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. 	
Surface water	<ul style="list-style-type: none"> • Refuelling must take place in well demarcated areas and over suitable drip trays to prevent surface water pollution. • Spill kits to clean up accidental spills from 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. • Storm water control; • Clean & dirty water plan. 	Low
Topography	<ul style="list-style-type: none"> • Backfill all excavations continuously • Employ effective rehabilitation strategies to restore surface topography of excavations; • All temporary infrastructures should be demolished during closure. 	Medium
Visual	<ul style="list-style-type: none"> • Continuous backfilling of excavations; • Replacing layer of topsoil over backfilled areas; • Sloping of rehabilitated and disturbed areas; 	Low

- | | | |
|--|---|--|
| | <ul style="list-style-type: none"> • Removal of all infrastructures upon mine closure. | |
|--|---|--|

ix) Motivation where no alternative sites were considered

No viable alternative sites were identified for the following reasons:

- The applicant is also the farm owner and knows the viability of the specific area.
- The location of deep red soils indicate that the mining within the boundaries of the abovementioned property can be a viable project.

x) Statement motivating the alternative development location within the overall site

Not applicable. There is no alternative development location for the site.

l) 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

Not applicable. There is not 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).

j) 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)

In this section, the potential impacts and associated risk factors that may be generated by the proposed mining operation on Eureka are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the mining activities are listed.

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which Impact is anticipated	SIGNIFICANCE If not mitigated	MITIGATION TYPE	SIGNIFICANCE If mitigate
Roads	Air quality	Nuisance dust will be created by the mining fleet.	Construction	High	Dust control Water spraying. Well maintained equipment	Medium
	Fauna	Where new haulage roads will be created the natural habitat of the	Construction	High	Speed limits Environmental Awareness	High

		animals will be disturbed and/or destroyed.				
	Flora	Where new haulage roads will be created the vegetation will be disturbed and/or destroyed.	Construction	High	Stripping of topsoil and concurrent rehabilitation excavations	High
	Ground water	No impact to groundwater is expected from the roads that will be used by the planned mining operation.	Construction	No significance	Pollution control and good housekeeping practice	No significance
	Noise	Noise from the mining equipment on the roads will be created.	Construction	Medium	Noise control Well maintained equipment	Low
	Soil	No impact to soil is expected from the roads that will be used by the planned mining operation.	Construction	No Significance	Stripping of topsoil and concurrent rehabilitation	No Significance
	Surface water	No impact to surface water is expected from the roads that will be used by the planned mining operation.	Construction	No significance	Pollution control and on-going housekeeping	No Significance
	Topography	No impact to topography is expected from the roads that will be used by the planned mining operation.	Construction	No Significance	Concurrent rehabilitation	No Significance
	Visual	The mining roads will be visible to some extent from the immediate surroundings.	Construction	No Significance	Concurrent Rehabilitation	No Significance
Excavation	Air quality	Nuisance dust will be created by the excavations.	Operational	High	Dust control Well maintained equipment	Medium
	Fauna	Where new excavations will be created the	Operational	High	Speed limits Environmental Awareness	High

		natural habitat of the animals will be disturbed and/or destroyed.				
Flora		Where new excavations will be created the vegetation will be disturbed and/or destroyed.	Operational	High	Stripping of topsoil and concurrent rehabilitation	High
Ground water		No Impact to groundwater is expected from the creation of the excavations. It is not expected that ground water will be intercepted.	Operational	No Significance	Pollution control and good housekeeping practice	No Significance
Noise		Noise impact from the yellow gear will be created.	Operational	High	Noise control Well maintained equipment	Medium
Soil		The disturbance of the soil structure during mining activities.	Operational	High	Stripping of topsoil and concurrent rehabilitation	High
Surface water		No impact to surface water is expected during excavation activities.	Operational	No Significance	Pollution control and on-going housekeeping	No Significance
Topography		Breaking of the Sky-line by the equipment and mining activities.	Operational	Medium	Concurrent rehabilitation	Low
Visual		The mining will be visible to some extent from the immediate surroundings.	Operational	No Significance	Concurrent Rehabilitation	No Significance

Vegetation and floristics

Loss of natural and unique habitats

The vegetation in the path of excavations will be damaged or completely and removed. Vegetation clearing during these activities will lead to loss of intact habitat within the mining area and habitat disturbances. Such disturbances destroy primary vegetation and can allow secondary pioneers species or invasive plants to enter and recolonize

disturbed area. As primary vegetation is more functional in an ecosystem, this could irreversibly transform the vegetation characteristics in the area.

Loss of Red data and/or protected floral species

It is possible that there can be some protected species present at the site.

It is possible that some of the protected species would be impacted by the operation. The most profound impacts will most likely be on Larger trees or individuals that occur in the excavation areas. Apart from its conservation concern, a tree is a valuable sources of shade, especially in arid areas, where mammals seek protection and shade from its canopy.

Other fauna also utilise trees for nesting. Furthermore, the shade that the tree provides serves as a significant microhabitat for invertebrates, suggesting its importance in continuing biodiversity patterns in the region. Further ecological functions provided by the tree include nutrient cycling, diminishing nutrient leaching, mitigating soil degradation, preventing soil erosion, sequestering carbon and replenishing organic matter.

Introduction or spread of alien species

The disturbance created during the operation could encourage the invasion of the disturbed areas by alien species. This includes *Opuntia* spp, *Prosopis glandulosa* and *Eucalyptus* sp. Some of these species, especially the *Opuntia* spp. will rapidly increase in abundance and expand into the disturbed areas if given the opportunity.

Encouraging bush encroachment

The disturbance created during the mining operation could potentially encourage bush encroachment. This is especially likely during the clearing of diverse habitats where opportunity is provided for highly competitive encroaching species like *Senegalia mellifera* to establish.

Fauna

Habitat fragmentation

The mining operation is not expected to cause major habitat transformation or habitat loss. Terrestrial habitats such as rock crevices, burrows, nests and vegetation on which small mammals, insects, amphibians, reptiles and birds are heavily reliant could however be disturbed during the clearing activities associated with the mining operation, causing temporary displacement of these animals.

During the creating of mine roads vegetation will be cleared, which will create unnatural open spaces within the landscape. This might restrict the movement of smaller species and limit their access to foraging sites, but it is not expected to have major impacts on the nutrient cycle or ecological functioning.

Intentional/accidental killing of fauna

Smaller fauna might be killed along with their habitat during the clearing of land. Some

species, particularly snakes and lizards are often intentionally killed as they are thought to be dangerous, while vultures and owls are killed for cultural and religious beliefs or for medicinal purposes. Furthermore, vehicular traffic is often a significant cause of accidental road kill.

Anthropogenic disturbances

Disturbance, like excavation activities and vehicular movement, result in disturbances to the naturally occurring faunal species. Possible associated disturbances include increased levels of noise, pollution, vibrations, illumination and human presence. Sensitive and shy fauna would move away from the area during the operation as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the activities and might be killed.

Topography, soil erosion and associated degradation of ecosystems

The plains of the site are fairly flat; the minimal amount of disturbances and vegetation clearing created during mining activities are not expected to leave the site vulnerable to soil erosion. Furthermore, no change to surface topography is expected and therefore local runoff erosion is not considered a likely impact during the operation.

Broadscale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the large extent of mining activities in the region, the Frances Baard District and in the Griqualand West Centre of Endemism, the cumulative impacts in the vicinity of the study area are considered to be high, but the proposed mining activities on Eureka are not likely to contribute significantly to these cumulative impacts.

k) Summary of specialist reports

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
PHASE 1 HERITAGE IMPACT ASSESSMENT REPORT ON THE FARM EUREKA 200 NEAR KIMBERLEY, FRANCES BAARD DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE by	The inspected property showed a sparse lithic scatter below the superficial red sands, but no sites of archaeological significance, and my conclusion is therefore that the subdivision of Eureka, except for the southern hillside, will have no impact on the heritage resources of the Northern Cape.	X	

Peter B Beaumont 7 March 2007			

I) Environmental impact statement

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

The nature of impacts can vary widely depending on the type of physical environment, the size of 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.

The most profound impacts are expected to be related to the possible accidental/intentional killing of fauna, proliferation of alien invasive species and contribution to the cumulative effects of other mining activities in the region. These impacts are however not considered to significant and can be well mitigated.

Species of conservation concern that are found in these earmarked habitats could potentially be damaged or removed.

A permit application 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.

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 benefits.

To conclude, the proposed mining activities will not have a major impact on the ecological integrity of Eureka, with associated impacts mainly considered to be low. Authorisation should nevertheless be granted on condition that the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.

(ii) Final Site Map;

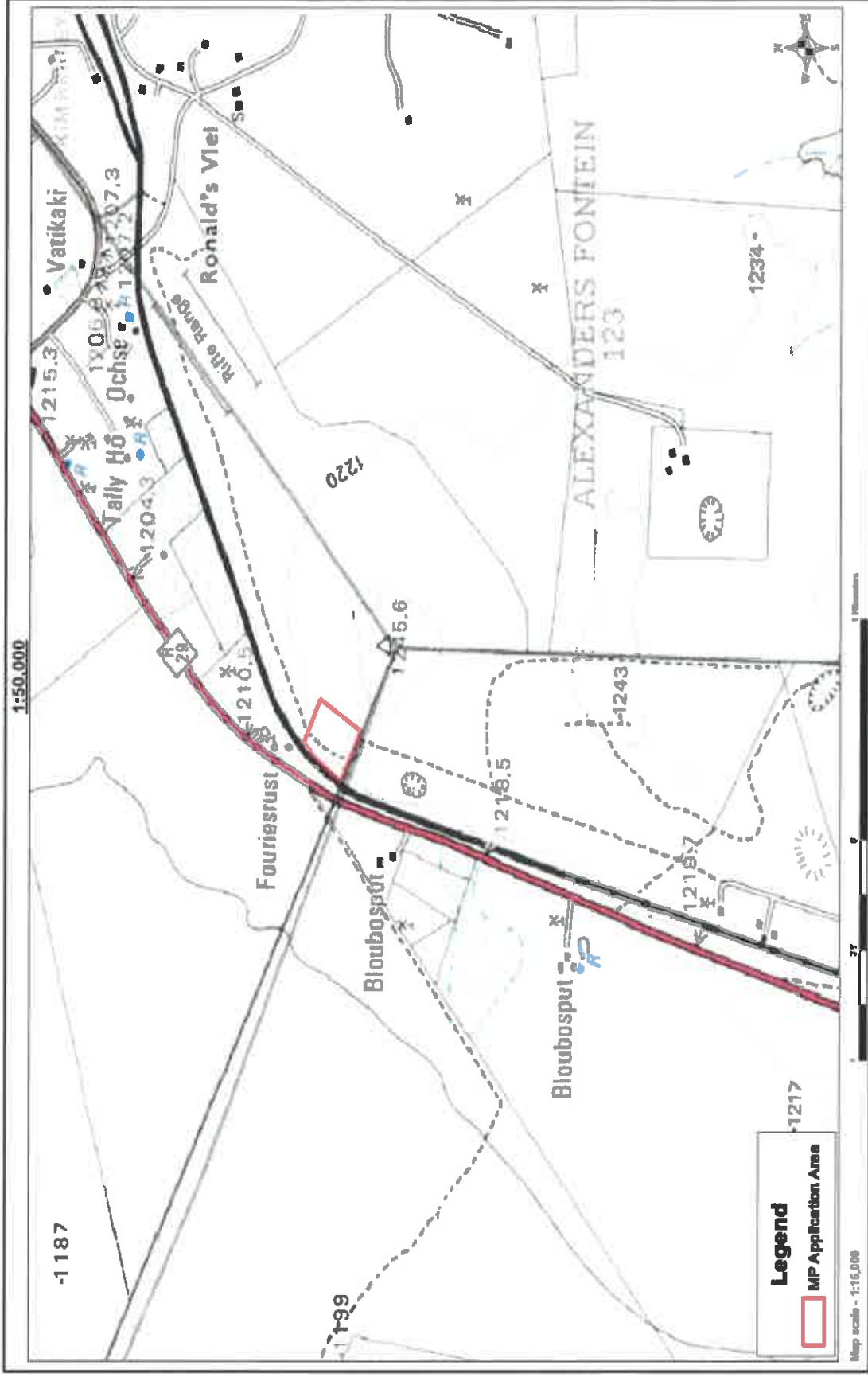


Figure 10: Final Site Map

(III) Summary of the positive and negative implications and risks of the proposed activity and Identified alternatives;

The proposed mining operation will be done in such a way that farming will still be possible on the rest of the farm. If mining is done the loss of land use will be temporary as the site will be rehabilitated in such a way that it allows the establishment of a grass cover again. The rest of the farm will still be able to be used for grazing purposes.

This mining operation will provide 7 temporary jobs. This will also add to the increased economic activity and area surrounding the farm.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMP are adhered to e.g. rehabilitation.

No concerns in terms of the mining itself have been raised.

The specific occurrence of Red soil in the area dictates the selection of the specific mining site.

m) Proposed Impact management objectives and the impact management outcomes for Inclusion in the EMPr

The main closure objective of Henley Booysen's planned mining operation is to restore the site to its current land capability in a sustainable matter.

- To prevent the sterilization of any sand 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.
- The mine also has the objective 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 of the mine.
- To limit and manage the visual impact of the mine.
- To safeguard the safety and health of humans and animals on the mine.
- The last closure objective is that the mine is closed efficiently, cost effectively and in accordance with government policy.

Rehabilitation Plan

Infrastructure areas

On completion of the mining operation, the various surfaces, including the access road, the excavations will finally be rehabilitated as follows:

All material on the surface will be removed to the original level where possible. This material will then be backfilled into the excavations. 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, and other items used during the operational period will be removed from the site.

Final rehabilitation of Excavations

After rehabilitation has been completed, all roads will be ripped or ploughed, fertilized and seeded, 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 will be submitted annually to the Department of Mineral Resources – Kimberley, as described in regulation 55.

Maintenance (Aftercare)

Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.

The aim of the Basic Assessment Report 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 will be to create an acceptable post-mine environment and land-use. Therefore all agreed commitments will be implemented by Mine Management.

After-effects following closure

- *Acid mine drainage*
No potential for bad quality leachate or acid mine drainage development exist after mine closure.
- *Long term impact on ground water*
No after effect on the ground water yield or quality is expected.
- *Long-term stability of rehabilitated land*
One of the main aims of any rehabilitated ground will be to obtain a self-sustaining and stable end result. As the open pits will be mined onto dolomite bedrock these areas will have long term stability.

n) Aspects for Inclusion as conditions of Authorisation

There are no aspects which have not formed part of the EMPR that must be made conditions of the Environmental Authorisation.

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

This report was compiled by incorporating information provided by the applicant and the some specialists and no warranty or guarantee, whether expressed or implied, is made by the EAP with respect to the completeness, accuracy or truth of any aspect of this document with reference to the instructions, information and data supplied by the aforementioned parties.

The impact assessment was conducted based on the EAPs knowledge and experience. The probability, intensity/severity and significance pertaining to the criteria used to assess the significance of the impacts were based on rule-of-thumb and experience.

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 mining operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority and the applicant should take all the necessary steps to ensure that the mining operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation.

None other than the implementation of the EMPR.

q) Period for which the Environmental Authorisation is required

It is required for 5 years.

r) Undertaking

We hereby undertake to meet the requirements as provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

The progressive rehabilitation cost that will be paid into the fund to make provision for premature closure and end of life closure is estimated at **R59 411**.

i) Explain how the aforesaid amount was derived

The quantum of the financial provision contemplated in Regulation 54 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be revised and adjusted accordingly annually, based on a survey assessment of the environmental liability of Henley Booysen. Surveys of excavations are conducted by a registered surveyor and results are forwarded to the Environmental Manager who calculates the outstanding rehabilitation as per the agreed rate in the DMR Guideline. A bank guarantee is prepared for the amount and submitted to the DMR.

Financial provision for the rehabilitation or management of negative environmental impacts caused by the mining operation [as required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)] will be made in the form of a financial guarantee from a South African registered bank. This document will guarantee the financial provision relating to the Environmental Management Programme in a format as approved by the Director-General.

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

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

t) Specific 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

The applicant is also the owner of the farm it can therefore be said that the mining operation was thoroughly discussed with the landowners.

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

The inspected property showed a sparse lithic scatter below the superficial red sands, but no sites of archaeological significance, and my conclusion is therefore that the subdivision of Eureka, except for the southern hillside, will have no impact on the heritage resources of the Northern Cape (Taken out of the report done by Peter Beaumont, 2007).

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

There are no alternatives, as the application area applied for is the area where the applicant has proven Red Soil and has found potential for a Red Soil mining 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 requirements for the provision of the details and expertise of the EAP are already included in PART A, section 1(a).

Confirmed (Mark with an X)	X
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- 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 requirements to describe the aspects of the activity that are covered by the draft environmental management programme are already included in PART A, section 1(h).

Confirmed (Mark with an X)	X
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c) Composite Map

The final site map below indicates the mining permit application area in which all mining will take place. Existing roads are also depicted. The associated infrastructure relating to the mining site will be placed in the area marked as the "mine infrastructure footprint".

The only buffers that must be implemented is the 100m away from any fixed infrastructure like the tar road and the farm house and out buildings 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 mine must take reasonable measures to ensure that:

No mining operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways or any other

structure whatsoever including such structure beyond the mining 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.

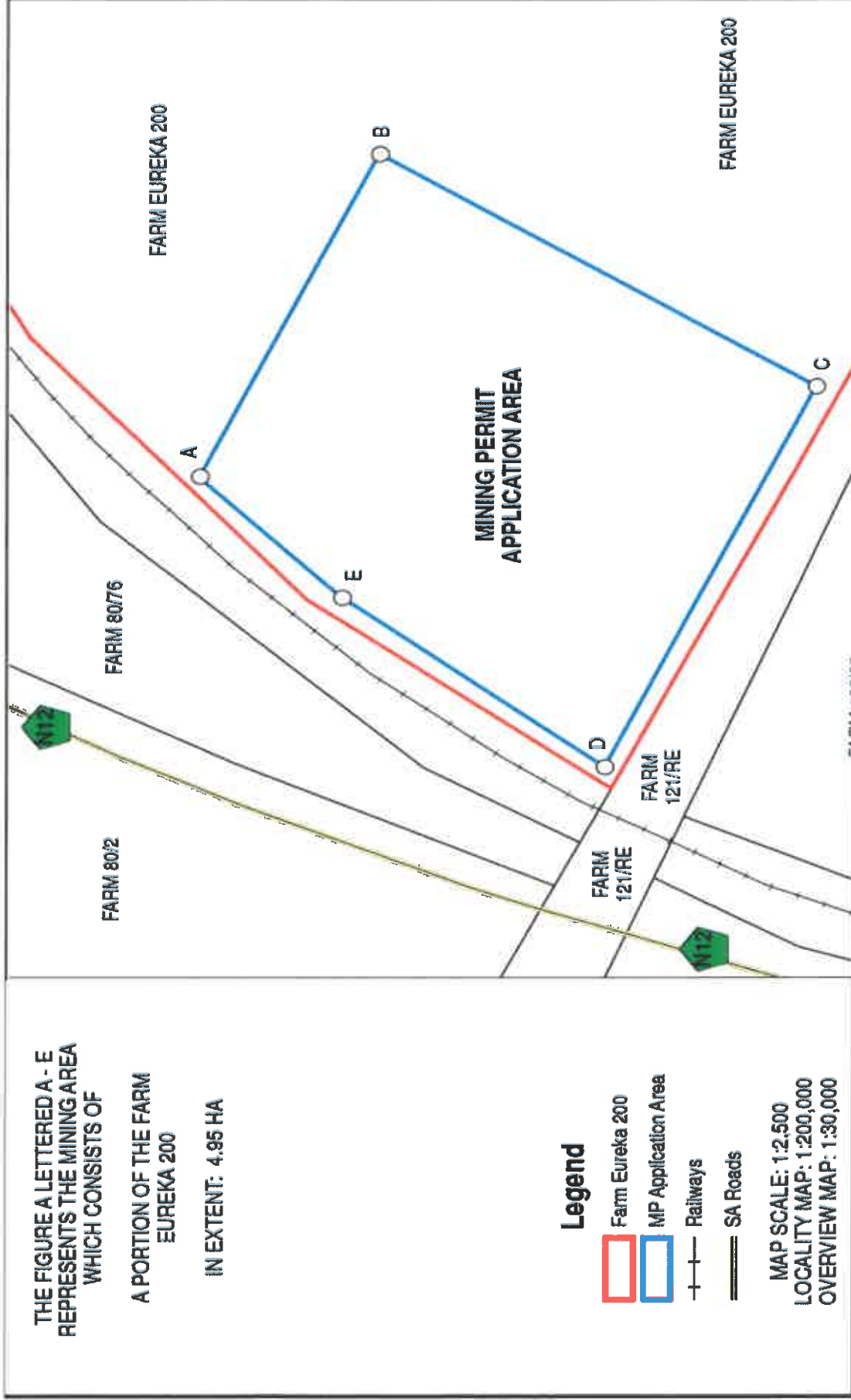


Figure 11: Composite map

d) Description of impact management objectives including management statements

l) Determination of closure objectives

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 and infrastructure and the subsequent rehabilitation of the areas they occupied include:

- To ensure the 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.

Maintenance

The necessary agreements and arrangement will be made by Henley Booyesen 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 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, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, Henley Booyesen will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of the EMPR;
- Conduct performance assessments of this EMPR as required by the MPRDA and associated Regulations; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments

will occur every year. 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 to a state that facilitates compliance with applicable environmental quality objectives.
- Limit the impact on staff whose positions become redundant at the time of mine closure.
- 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:

- Henley Booyesen will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of planning.
- Strategies for sustainable development of surrounding towns 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.
- Henley Booyesen 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) Volumes and rate of water use required for the operation

No water except for a little bit of domestic water will be required for the 7 workers on site. This water will be bought in Kimberley as bottled water and transported to site for use every day.

iii) Has a water use licence been applied for?

No as no other water uses is anticipated.

iv) Impact to be mitigated in their respective phases

Table 17: Impact to be mitigated in their respective phases

Activity and Phase	Potential Impact	Size and Scale	Mitigation or control measure related to compliance with standards
ENVIRONMENTAL IMPACTS			
Construction Activities	Geology Sterilisation of mineral resources	Local	- Proper planning of excavations.
Control measures are to be applied during the implementation of respective activities	Topography Changes to surface topography due to placement of excavations.	Local	- Prominent natural features will not be disturbed such as heritage sites and grave sites; - All temporary infrastructure will be demolished during closure; - Waste will be disposed of at Municipal waste disposal site; - All disturbed areas will be rehabilitated.
	Soils Loss of soils resources due to erosion Soil contamination due to hydrocarbon spillages	Local	- All temporary infrastructures will be demolished during closure; - Waste will be disposed of at a Municipal waste disposal site; - Agreement to use this site will be sought from the municipality; - All disturbed areas (excavations) will be backfilled and rehabilitated; - Topsoil will be stripped according to the soil type and the available soil depth in the areas to be disturbed (up to 150mm) as per soil analysis of the area; - Soil will be stockpiled in windrows not higher than 2m with as little compaction as possible; - Stockpiling will be done as close as possible to areas where the soils will be replaced and single handling practised; - Soil stockpiles will be kept in a weed-free condition; - Stockpiled soil will be used in ongoing rehabilitation of disturbed areas; - Rehabilitation will include:- ✓ removing of all debris, ✓ replacement of soil with as little compaction as possible, ✓ reshaping, ploughing or ripping to break compaction; and ✓ introduction of organic matter as necessary. - Soil contamination will be prevented through:- ✓ bunding of all above-ground storage facilities, ✓ construction on impervious floors for hazardous substances such as diesel, oil and chemicals; and ✓ regular inspections of equipment and vehicles for leaks - Spillages of oil, grease and hydraulic fuels will be reported. The spillages will be cleaned up by removing the soil and disposing such soil in a waste receptacle called soil farm. A dedicated engineer will be appointed

			<p>to oversee the soil farm.</p> <ul style="list-style-type: none"> - Contaminated soil will be removed taken to this soil farm, where it will be treated with decontaminant. The treated soil samples will be taken to the laboratory to determine if this soil is suitable for taking back to rehabilitation areas. - Contractors, staff and drivers will be trained on how to deal with spillage of hydrocarbons and other potential contaminants. - All domestic and industrial waste generated on site will be contained in skips and appropriate receptacles, collected and if required sorted by the approved contractor, and removed to approved waste disposal site. - 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. - All surface water management infrastructure constructed from soil (berms, canals and bunds) will be inspected at least monthly, with more frequent inspections during periods of high rainfall and after major rainfall events. - The disturbed areas will be rehabilitated to grazing potential and appropriate erosion control measures will be implemented. Available soils will be used for top soiling. - Any excavation of topsoil's will be done such that the cleared area is also ripped and allow to re-vegetate.
	Land capability Loss of land capability	Local	<ul style="list-style-type: none"> - All construction activities to be restricted within the demarcated areas. - Check, service and maintain vehicles and equipment to minimise the risk of hydrocarbon and chemical leakages and spillages.
	Land use Fragmentation of farm land	Local	<ul style="list-style-type: none"> - Restrict construction activities to demarcated areas and consider all other areas as no-go areas to minimise loss of grazing land. - Do not disturb grave sites. - Ensure that land which is not used during construction is made available for grazing and recreational activities.
	Fauna and Flora Loss of habitat	Local	<ul style="list-style-type: none"> - Service and maintain construction vehicles in order to reduce noise emissions. - Advise persons entering the site not to disturb or harm animals. - Implement a biodiversity action plan that is available as part of the Biodiversity Specialist Report. - Avoid sensitive areas, such as pans and streams banks- no infrastructure within 100m of any road or water course.
	Pans and wetlands Loss or disturbance of habitat through encroachment of mining related activities	Local	<ul style="list-style-type: none"> - Educate employees, contractors and visitors on biodiversity and land management principles. - Planning & Surveying Department to be provided with relevant buffer areas to incorporate in future planning. - Applicable Water Use Licenses should be applied for disturbance of any pans.
	Alien Species Contamination by chemical control agents (users need to be registered and certified for use of dangerous products) Large areas denuded of vegetation (small-scale rehabilitation of denuded areas to be implemented)	Local and regional	<ul style="list-style-type: none"> - Mechanical and chemical methods will be implemented initially to bring about a quick reduction in these species that pose the greatest invasive threat to the area. - Mechanical (tree-felling) and chemical (stump treatment) methods to be implemented. Market for harvested wood to be investigated. - Mechanical methods (hand-pulling) of control to be implemented extensively in the early stages of establishment of the mine. - Annual follow-up operations to be implemented. - Control measures to be implemented on an opportunistic basis. - Landscaping and gardening to be based on the use of indigenous plants only. Alien plants are to be removed whenever possible.

	Biodiversity Loss of biodiversity	Local, regional and national	<ul style="list-style-type: none"> - Conduct rehabilitation. - Provide training in the identification of protected species. - Re-establish using mix of indigenous locally occurring species. - Re-establish tree species on the field away from the mining areas. - Set up fixed point monitoring sites to check progress of rehabilitation. - Fence off newly rehabilitated areas and protect from grazing until well established.
	Ground water Contamination of ground water	Regional	<ul style="list-style-type: none"> - Implement waste management plan for handling hazardous waste. - Conduct ground water monitoring as per the monitoring plan.
	Air quality Deterioration of air quality	Regional	<ul style="list-style-type: none"> - Rehabilitate and maintain disturbed surfaces that are not going to be utilised after construction. - Promote use of PPE such as dust masks.
	Noise Increase in ambient noise level	Regional	<ul style="list-style-type: none"> - Service construction vehicles and equipment on a regular basis to ensure noise suppression mechanisms are functioning. - Construct enclosures/bunds and berms for generators and other noise generating equipment. - Equip vehicles with noise silencers. - Switch equipment off when not in use. - Demarcate and clearly mark noise zones. - Adhere to occupational health and safety noise limits. - Maintain occupational noise monitoring to determine noise levels from equipment as increased noise may indicate other issues. A noise monitoring programme and grievance procedure must be implemented.
	Visual Visual intrusion	Regional	<ul style="list-style-type: none"> - Carry adjustments to the siting and design of the project, the careful selection of finishes and colours, the use of earthworks (such as berms) and planting to provide visual screening, as well as dust control where required. Penalties for non-compliance and should be considered. - Turn lights off using a timer or occupancy sensor or manually when not needed. - Both on-site and off-site landscape rehabilitation of areas affected by the project should be considered. This may include re-instating landforms and natural vegetation, provision of landscaped open space, or other agreed upon facilities.
	Sensitive areas Destruction of sensitive areas	Local	<ul style="list-style-type: none"> - Avoid all identified wetlands and ensure that no activities take place within wetland areas. - Conduct monitoring programme for water, soil and biodiversity. - Introduce a hydrocarbon management system to ensure that hydrocarbon pollution is minimised. - Commence with construction during the low flow or during low rainfall in the wet season. - Ensure that infrastructure is constructed outside the 100 year flood line and or within 100m from streams and pans in order to minimise impacts on water courses. - Comply with Regulation 704 of the National Water Act of 1998 for all designs of mine residue disposal infrastructure. - Minimise the removal of vegetation during stripping.
	Traffic and safety	Local	<ul style="list-style-type: none"> - Allocate and adhere to speed limits. - To reduce negative impacts of increased traffic on and around the site. - Restrict traffic to demarcated areas. - Public to be given right of way on public roads and contractors shall make use of approved methods to control the movement of vehicles so as not to constitute a road hazard. - Erect safety signs in the local languages to warn people of the danger on roads. - Keep in constant liaison with the local Department of

			<p>Roads who will need to be aware of any proposed road plans and who may be able to assist in terms of making recommendations and road maintenance.</p> <ul style="list-style-type: none"> - Ensure that all site access points are clearly visible from the main road. - Ensure that all drivers employed are certified with appropriate training levels for the required vehicle. - Ensure that all vehicles entering and leaving the site use demarcated routes.
	Surface water Contamination of surface water resources	Regional	<ul style="list-style-type: none"> - Clean surface water or runoff will be prevented from entering dirty areas by diverting it around these areas; - The discharge positions might also require additional reinforcement in the form of a suitably designed gabion or similar structure to prevent erosion at the discharge positions.
	Fauna and flora Loss of natural vegetation and species of conservation value	Local, regional and national	<ul style="list-style-type: none"> - Ensure that vegetation is not unnecessarily removed. - Remove with care and relocate Red Data List Species to avoid destruction. - Manage and control plant species declared as invasive and declared weeds.
Operational activities	Air quality Deterioration in air quality	Local	<ul style="list-style-type: none"> - Minimise the removal of vegetation in order to reduce the possibility of dust pollution. - Vegetate topsoil stockpiles as soon as possible to reduce dust and particulate emissions. - Locate topsoil stockpiles in order to reduce its exposure to wind, thereby reducing the likelihood of particle entrainment. - Spray road surfaces with water and treat it with a dust binding agent to minimise emissions of fugitive dust. The type of dust-binding agent should determine the amount of watering.
Control measures are to be applied during the implementation of respective activities	Topography Change in surface topography	Local	Mine owner and environmental consultant should supervise vegetation and rehabilitation activities in accordance with post mining topographical plan.
	Land capability Loss of land capability	Local	<ul style="list-style-type: none"> - Plan all construction activities to prevent the incorrect stripping of topsoil which leads to the reduction in land capability. - Restrict all construction activities to demarcated areas.
	Soils Loss of soil fertility	Local	<ul style="list-style-type: none"> - Vegetate soil stockpiles and berms to minimise the risk of erosion. - Implement erosion control measures, such as contour banks in the area prone to erosion, including slopes and uneven ground; c) Vegetate preferential flow paths of storm water runoff. - Remove soils in dryer months, due to their increased susceptibility to compaction and erosion during rains. - Separate topsoil (A horizon) and sub-soils (B horizon) where possible and stockpile separately. - Construct berms around soil stockpiles in order to divert water away from the stockpile to prevent erosion. - Restrict stockpile height to less than 3m and shape to reduce soil compaction. - Minimise the removal of topsoil in order to reduce dust and particulate emissions.
	Surface water Deterioration in water quality	Regional	<ul style="list-style-type: none"> - Ensure that construction activities are at least 100m from wetlands and flood lines. - Stabilise soil stockpiles with vegetation in order to reduce exposure to erosion and minimise the effects of silt loading of surface water running over exposed soil.
	Surface water Deterioration of a water resource	Regional	<ul style="list-style-type: none"> - Dispose of domestic and hazardous waste originating from temporary and permanent offices and workshops at an authorised landfill facility to minimise the risk of surface water pollution. - Dispose of hazardous waste and effluent at an authorised landfill facility.
	Ground water Contamination of	Regional	<ul style="list-style-type: none"> - Check, service and maintain vehicles used during infrastructure construction to reduce the risk of

	ground water		<ul style="list-style-type: none"> hydrocarbon and chemical leakages and spillages. - Contain and remediate hydrocarbon or chemical leakages and spillages to prevent leaching into the ground water. - Develop an emergency spill response plan and train all construction contractors in the emergency spill response procedure.
	Fauna and flora Loss of natural vegetation and species of conservation nature	Local, regional and national	<ul style="list-style-type: none"> - Plan and construct strip areas carefully to minimise the impact on flora species. - Avoid the unnecessary removal of vegetation. - Set and enforce speed limits to prevent accidental injury or death to animals. - Restrict vehicles to road and demarcated areas to prevent damage to vegetation. - Prevent disposal of waste in non-designated areas and the reputable clearing and disposal of any such waste, as these can cause harm to animals, particularly poisonous waste and plastics.
	Noise Noise disturbance	Local	<ul style="list-style-type: none"> - Restrict operational activities to normal working hours. - Service vehicles and equipment on a regular basis to ensure noise suppression mechanisms are functioning. - Limit the speed of vehicles to 40km/h. - Train workers in safety and the use of personal protective equipment to prevent damage to their hearing.
SOCIO-ECONOMIC IMPACTS			
Construction, operational and decommissioning Control measures are to be applied during the implementation of respective activities	Socio-Economic negative impacts on employment and loitering of people in the area resulting in lack of security and safety	Local and regional	<ul style="list-style-type: none"> - Where possible local service providers and workers will be recruited during the construction phase. - Ad-hoc, informal recruitment at the gate or through other unapproved channels by setting up recruitment stands in built up areas will be prohibited. - A skills audit should also be undertaken to determine local skills available. - HIV/AIDS awareness programmes/ Voluntary Counselling & Testing Program will be introduced. - Relationships with local government through LED programmes should be developed. - Stakeholder database will be established to identify partners and develop collaborative networks. - Uncontrolled settlement of contractors outside of the site will be prevented. - The recruitment selection process to promote gender equality and the employment of women wherever possible..
	Interested and affected parties Lack of communication with stakeholders and loss of trust	Local and regional	<ul style="list-style-type: none"> - Implementation of EMP recommendations, involvement of communities in LED initiatives, ongoing communication to provide feedback and updates. - IAPs must be kept up to date on any changes to mining or of alternative routes. - 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.
	Heritage resources Destruction of heritage resources	Local	<ul style="list-style-type: none"> - In the event that any major features such as a burial or cache of ostrich eggshell flasks is uncovered during mining operation, an archaeologist should be called in to evaluate the finds. - In the event of an archaeological artefact being unearthed, an accredited archaeologist will inspect the site and make recommendations. - Promote archaeological awareness and investigate sustainable initiatives with communities to promote the local culture.
	Land use Loss of land use Proliferation of alien Invasive species	Local	<ul style="list-style-type: none"> - Incorporate an alien invasive eradication and control programme into the rehabilitation efforts. This programme should be formulated according to relevant legislation. - All temporary infrastructures will be demolished during closure.

	Employment Loss of jobs and employment	Local and regional	<ul style="list-style-type: none"> - Opportunities for additional resources and redeployment, integration of employees and communities into sustainable LED projects, equip suppliers through mentoring and training. - Increased employment opportunities during decommissioning for local contractors. - Where short term employment opportunities exist during decommissioning, local contractors and jobs seekers will receive preference. - The workforce should undergo multiple skills training during the operation of the mine so that they can be productively absorbed into the local economy after mine closure. - Where retrenchments are unavoidable, they will be managed humanely according to legislative requirements. - The workforce should be empowered to develop skills that will equip them to obtain employment in other sectors of the economy. - The LED plan should be implemented to assist local business development. - Local partners should be supported to diversify economy and decrease dependence on mining. - A strategy for saving jobs and management of downscaling and/or retrenchment should be implemented. - Assistance should be given for help with redeployment of retrenches in other operations or assistance with alternative livelihood strategies. - Identify and implement training needs and training programmes for decommissioning and closure. - Consultation with communities and local government on future uses for the infrastructure and facilities should be implemented.
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e) Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDDARED TO BE ACHIEVED
Please refer to the above table in section ix.					

f) Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDDARED TO BE ACHIEVED
Please refer to the above table in section ix.					

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 the Regulation.**

REGULATION 51(a):**DESCRIPTION OF THE ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR MINE CLOSURE****Closure**

The main closure objective of this mining operation is to rehabilitate the mined areas in such a way to ensure that the rehabilitated topographical landscape would blend in with the surrounding landscape, would not pose a safety hazard for human and animal, but at the same time allow a certain alternative land use. Establish a self-sustaining and stable vegetation cover in order to mitigate the visual impact, to control erosion and to create some habitat for animals. The rehabilitated environment also needs to be aesthetically acceptable according to the principle of BPEO.

Henley Booysen will ensure that the mining operation is:

- Neither a danger to public health and safety nor to animal health and safety.
- Not a source of any pollution.
- Stable (ecological and geophysical).
- Rehabilitated to the state that is suitable for the predetermined and agreed land use.
- Compatible with the surrounding biophysical environment.
- A sustainable environment.
- Aesthetically acceptable.
- Not an economic, social or environmental liability to the local community or the state now or in the future.

Henley Booysen will ensure that the physical and chemical stability of the rehabilitated mining site will be such that risk to the environment is not increased by naturally occurring forces to the extent that such increased risk cannot be contended with by the installed measures.

Henley Booysen will subscribe to the optimal exploitation and utilization of South Africa's mineral resources (Red Sand).

Henley Booysen will ensure that the mining site is closed efficiently and cost effectively.

Henley Booysen will ensure that the operation is not abandoned but closed in accordance with the relevant requirements.

Henley Booysen will ensure that the interest of all interested and affected parties will be considered.

Henley Booysen will ensure that the all-relevant legislation regarding mine closure will be adhered to, and all relevant application procedures followed.

The management of environmental impacts

With regard to the extension, the mitigation of all environment impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing facilities in a well-planned manner.
- To take care that no new land surface, habitats of vegetation and animals are destroyed, disturbed or alienated unnecessarily.
- To contain and prevent any pollution (physical and chemical) from the mining operation within structures, facilities provided therefore.
- To ensure an effective surface run-off control system in order to deal with the separation of clean and dirty water environment.
- The sustainable and responsible utilization (re-use) of all water resources and the prevention of pollution thereof.
- The sustainable rehabilitation of the mining site (excavations, topsoil stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.

Socio-Economic conditions

- Promote employment and advance the social and economic welfare of all South Africans.
- Contribute to the transformation of the mining industry.

Historical and Cultural aspects

There was a previous operation on the farm for a borrow. The application mining area has not been previously disturbed by previous mining activities.

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

The consultation process with interested and affected parties (neighbouring farmers and land owners) was completed. Regular contact sessions will be held with neighbouring farmers and land owners which will be affected by the mining operations. Records will be kept of the complaints and mitigation measures will be implemented. An advert in the DFA (Diamond Fields Advertiser) was also placed in order for other interested parties to come forward and register as interested parties in the project. This is an ongoing process.

- (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.**

Infrastructure Areas

On completion of the mining operation, the various surfaces, including the access road and the excavation site, should finally be rehabilitated as follows:

- All remaining material on the surface should be removed to the original topsoil level. This material should then be backfilled into the excavation area. Any compacted area should be ripped to a depth of 300 mm, where possible, the topsoil or growth medium returned and landscaped.
- All infrastructures and other items used during the operational period should be removed from the site.
- On completion of operations, all structures or objects on the site should 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 mining 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: It is not foreseen that any monitoring of ground or surface water should take place after mine closure, except is so requested by the DWS – Kimberley.

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 excavations. 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 seeded, 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.

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

Long Term Impact on Ground Water: No after effect on the ground water 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 cleaning of all waste material and replacement of topsoil where available should be ensured.

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

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:

Rehabilitation of excavation areas will be done concurrently as each excavation is completed. Access road rehabilitation is carried out when all mining are completed at the end of the mining activity. Rehabilitated sites will be monitored after backfilling and sloping has been completed to ensure vegetation growth re-occurs.

- Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.

Maintenance

The necessary agreements and arrangement will be made by Henley Booysen 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 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, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, Henley Booysen will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of the EMPR.
- Conduct performance assessments of the EMPR as required by the MPRDA and associated Regulations.
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will occur every year. 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 to a state that facilitates compliance with applicable environmental quality objectives.
- Limit the impact on staff whose positions become redundant at the time of closure.
- 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:

- Henley Booysen will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development of surrounding towns 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.
- Henley Booysen 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.
- The mine will fulfil the requirements for closure and the management of downscaling.

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

The financial provision was calculated in accordance with Regulation 54 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002). The quantum was calculated taking into consideration what the outstanding rehabilitation will be in the event of sudden and/or premature closure, decommissioning and final closure of the operational and post closure management of residual environmental impacts. The quantum calculation was based on current disturbances. The total extent of the outstanding rehabilitation in the event of sudden or premature closure was taken into consideration in determining the quantum.

Applicant: DJ De Klerk							
Mining area:							
No.	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	114.3	12.99	1	1	R 1 484.76
2(A)	Demolition of steel buildings and structures	m2	13.4	180.92	1	1	R 2 424.33
2(B)	Demolition of reinforced concrete buildings and structures	m2		206.61	1	1	R -
3	Rehabilitation of access roads	m2	0	32	1	1	R -
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	314.22	1	1	R -
4(A)	Demolition and rehabilitation of non-electrified railway lines	m	0	171.39	1	1	R -
5	Demolition of housing and/or administration facilities	m2	0	361.63	1	1	R -
6	Opencast rehabilitation including final voids and ramps	ha	0.2	184152.9	0.04	1	R 1 473.22
7	Sealing of shaft adits and inclines	ha	0	97.12	1	1	R -
8(A)	Rehabilitation of overburden and spoils	ha	0	126450.4	1	1	R -
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	157491.7	1	1	R -
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	457430.4	1	1	R -
9	Rehabilitation of subsided areas	ha	0	105883.2	1	1	R -
10	General surface rehabilitation	ha	0.4	100170	1	1	R 40 068.01
11	River diversions	ha	0	100170	1	1	R -
12	Fencing	ha	0	114.26	1	1	R -
13	Water Management	ha	0	38087.46	1	1	R -
14	2 to 3 years of maintenance and aftercare	ha	0.5	13330.61	1	1	R 6 665.31
15(A)	Specialist study	Sum	0			1	
15(B)	Specialist study	Sum	0			1	
Sub Total 1							R 52 115.63

1	Preliminary and General	R 0.00	Weighting factor 2 1	
2	Contingencies			R 1 240.23
Subtotal 2				

Vat (14%)	R 7 296.19
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Grand total	R 59 411.81
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- (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-mining 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 emissions, 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 if required.
Fauna	To minimise vegetation destruction in excavation 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 reduced.	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	To control the incidence	The management objective will be	Site Manager/ Foreman	Quarterly reports on fail-

	of unacceptable noise levels on site.	to reduce any level of noise, shock and lighting that may have an effect on persons or animals.	appointed SHE Consultant.	out noise monitoring will be conducted as required by legislation. 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 and sources of surface water.	There are no sources in the vicinity of the mine.	Site Manager/Water Supply	No monitoring will be done to monitor the quality of the surface water.
Ground Water	To minimise and prevent as far as practically possible the contamination of ground water.	No ground water is used.	Site Manager/Water Supply	No monitoring will be done to monitor the levels and quality.

l) Indicate the frequency of the submission of the performance assessment/environmental audit report

EMP monitoring and performance assessments, compliant with Regulation 55 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be conducted until closure. Results in recommendations from monitoring reports will be scrutinized.

An EMPA Report will be submitted to the Management and the DMR on an annual basis.

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 achieving environmental objectives.
- Environmental policies will be availed to 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 mine 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.

- ✓ An environmental, health and safety induction programme will be provided to all employees prior to commencing work, and they will sign acknowledgement of the induction.
- ✓ A daily "toolbox talk" will be held prior to commencing work, which will include discussions on health, safety and environmental consideration. The toolbox talks should be led by the Site Manager.

Environmental Awareness Training Programme Procedure

Natural resources are limited and not always renewable and it is the responsibility of management to ensure that all employees are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible.

Environmental awareness training must be given to new employees on site and any contractors who may come onto site for a short period of time.

Refresher training must be given to permanent employees on an annual basis.

The objective of this procedure is to ensure that all employees on the, including contractors, are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

The environmental topics to be covered in awareness training should include the following:-

- **Resource Management**
 - a. The importance of saving water:
 - i. South Africa is a water scarce country and rivers are polluted.
 - ii. Do not throw litter into river or water drains.
 - iii. Do not dispose of oils in sewers.
 - b. Air pollution – climate change:
 - i. The use of fossil fuels is increasing the amount of greenhouse gasses that are discharged to the atmosphere. Share transport or public transport.
 - ii. Don't burn any rubbish, the smoke pollutes the air.
 - iii. Plant trees, they clean the air, provide us with oxygen and remove greenhouse gas carbon dioxide from the air.
 - c. Soil conservation:
 - i. Prevent overgrazing of farmlands, keep vegetation on the surface of the land to prevent soil erosion.
 - ii. Plant trees.
- **Hazardous Substance Use and Storage**
 - a. Solvent, petrol, diesel, insecticides, chlorine, detergents, chemical fertilisers are harmful to the environment and to your health. Use them sparingly and do not let them get into the water systems. Containers must be disposed of to a licensed hazardous waste disposal facility.
 - b. Hazardous substances must be stored and used correctly.
 - c. Ensure that 16 point Material Substances Safety Data Sheets (MSDA) are available at point of store.
 - d. Compressed gas storage requirements.
 - e. Flammable substances store requirements.
- **Incident and Emergency Reporting**
 - a. The mine must have an emergency/incident reporting system whereby environmental incidents can be reported and actioned to mitigate and follow up on.

- **Oil / Diesel / Petrol Spill Clean Up**
 - a. All employees who work with machines and vehicles must be instructed how to prevent and clean up an oil or diesel spill appropriately. Spill kits must be available on site, drip trays must be used when servicing vehicles.

- **Conservation of Water**
 - a. Campaign to save water on site.
 - b. Clean water is expensive and potable water must be used carefully.
 - c. Prevent pollution of water by preventing spills and dispose of wastes properly.

- **Conservation of Vegetation**

Plants, grasses and trees are very important to our existence on the earth, they provide food, fuel, shelter, raw materials and they clean the air. Indigenous plants are especially important for *muti* and the whole ecology of life. Human activities are destroying the natural forests of the earth. The natural forests are the “lungs” of the planet and unfortunately they are being cleared faster than they can be regenerated.

 - a. EIA's are to be done before virgin bush can be cleared.
 - b. Vegetation cover reduces water and topsoil loss from the ground, do not clear vegetation unnecessarily.
 - c. Indigenous trees provide shade, attract wild birds.
 - d. Do not chop down indigenous trees without good reason.
 - e. Implement a tree planting programme.
 - f. Remove alien invasive trees in your area such as Prosopis, Syringa and Pepper trees, cactus plant.

- **Waste Management**
 - a. Employees must be instructed on how to tell the difference between hazardous waste and general waste.
 - b. They must know how to separate hazardous and general waste and where to dispose of these wastes in the correct way.
 - c. Examples of hazardous waste which must be recycled or sent to Waste Tech for disposal.
 - i. Oil, diesel, batteries, acids, paint, thinners, electronic waste.
 - ii. Pesticides, Jik, Handy Andy.
 - iii. Old oil, old oil filters, old paint is hazardous and must not be disposed of to a general land fill. Oilkol of the Rose Foundation will collect old oil.
 - iv. Mercury in fluorescent light bulbs is hazardous, fluorescent lights must be handled with great care so as not to break the glass and release the mercury vapour into the air which you breathe.
 - d. Examples of general wastes which can go the municipal landfill.

- i. Wood, paper, plastic, glass, old PPE.
- e. Recycle, Reuse, Reduce and Recover wherever possible.

- **Conclusion**

Henley Booysen will utilize the Environmental Awareness Plan to assure that all employees and contractors are aware of the environment and know how to manage it correctly.

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

Air Quality

Control the incidence of unacceptable levels of dust pollution on site.

Surface Water

Conserve water and eliminate the contamination of run-off and sources of surface water.

Ground Water

Minimise and prevent as far as practically possible the contamination of ground water.

Natural Flora

Minimise the destruction of vegetation units and control invasion by exotic and invasive plant species.

Fauna

Minimise vegetation destruction in excavation areas, and therefore a habitat for wildlife and eliminate poaching and the extermination of animal species within the boundaries of the study area, as well as in the surrounding areas.

Noise

Control the incidence of unacceptable noise levels on site.

Aesthetics

Minimise aesthetic disturbance and reduce the visual impact of the proposed mining operation through a process of on-going rehabilitation and reclamation.

Soils

Prevent soil pollution, limit soil compaction, curb soil erosion and reinstate a growth medium able to sustain plant life.

Land Capability

Minimise the reduction of land capability.

Sensitive landscapes

Protect sensitive landscapes from potential negative impacts.

Surface Environment – Waste Management

Ensure that the discarding of any waste material produced as a result of the proposed mining operation, including rubble, litter, garbage, rubbish or discards of any description, whether solid or liquid, takes place only at a site or sites demarcated for such purposes. Prevent waste material from being dumped within the borders or the vicinity of the mining area.

n) Specific Information required by the Competent Authority

Section 41 of the MPRDA and regulation 53 and 54 promulgated in terms of the MPRDA deal with financial provision for mine rehabilitation and closure.

The holder of a right as described in the relevant sections of the MPRDA and its regulations must provide the Department of Mineral Resources (DMR) with sufficient financial provision. 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 mine at that time.

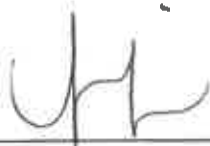
The holder of a prospecting right, mining right or mining permit is required to annually assess the total quantum of environmental liability for the mining operation and to ensure that financial provision are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-mine liability.

It is hereby confirmed that the financial provision will 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) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.



Signature of the environmental assessment practitioner:

M AND S CONSULTING (PTY) LTD
Name of company:

Date: 21 September 2018

-END-