mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

and

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT:	**WILLEM JOHANNES ANDREIS BERGH**
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FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/3/2/10876 MP**

1. IMPORTANT NOTICE

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

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

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

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

It is therefore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—

  (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

  (ii) degree to which these impacts—

    (aa) can be reserved;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be avoided, managed or mitigated.

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner:	**ROELINA OOSTHUIZEN**
Tel No.:	**087 527 0713**
Cell No.:	**084 208 9088**
Fax No.:	**086 510 7120**
E-mail address:	**roosthuizen950@gmail.com**

ii) Expertise of the EAP

(1) **The qualifications of the EAP**

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

(2) **Summary of the EAP's past experience**

(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc.
Please refer to attached CV.
(with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	The Remaining Extent of Erf 28; A Portion of Erf 30; Erf 1565 A Portion of a Gravel Road named 'Saamloop Street'; A Portion of an unnamed Gravel Road Extent: 4.9979 Ha District: Barkly West Province: Northern Cape
Application area (Ha)	4.9979 ha (four comma nine nine seven nine hectares)

Magisterial district:	Barkly-Wes
Distance and direction from nearest town	The properties are located approximately 25 km north west of Barkly West on the R31 towards Postmasburg in the magisterial district of Barkly West, Northern Cape Province.
21 digit Surveyor General Code for each farm portion	C00700030000002800000 C00700030000003000000 C00700030000156500000 A PORTION OF A GRAVEL ROAD NAMED 'SAAMLOOP STREET'; AND A PORTION OF AN UNNAMED GRAVEL ROAD

c) Locality map

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

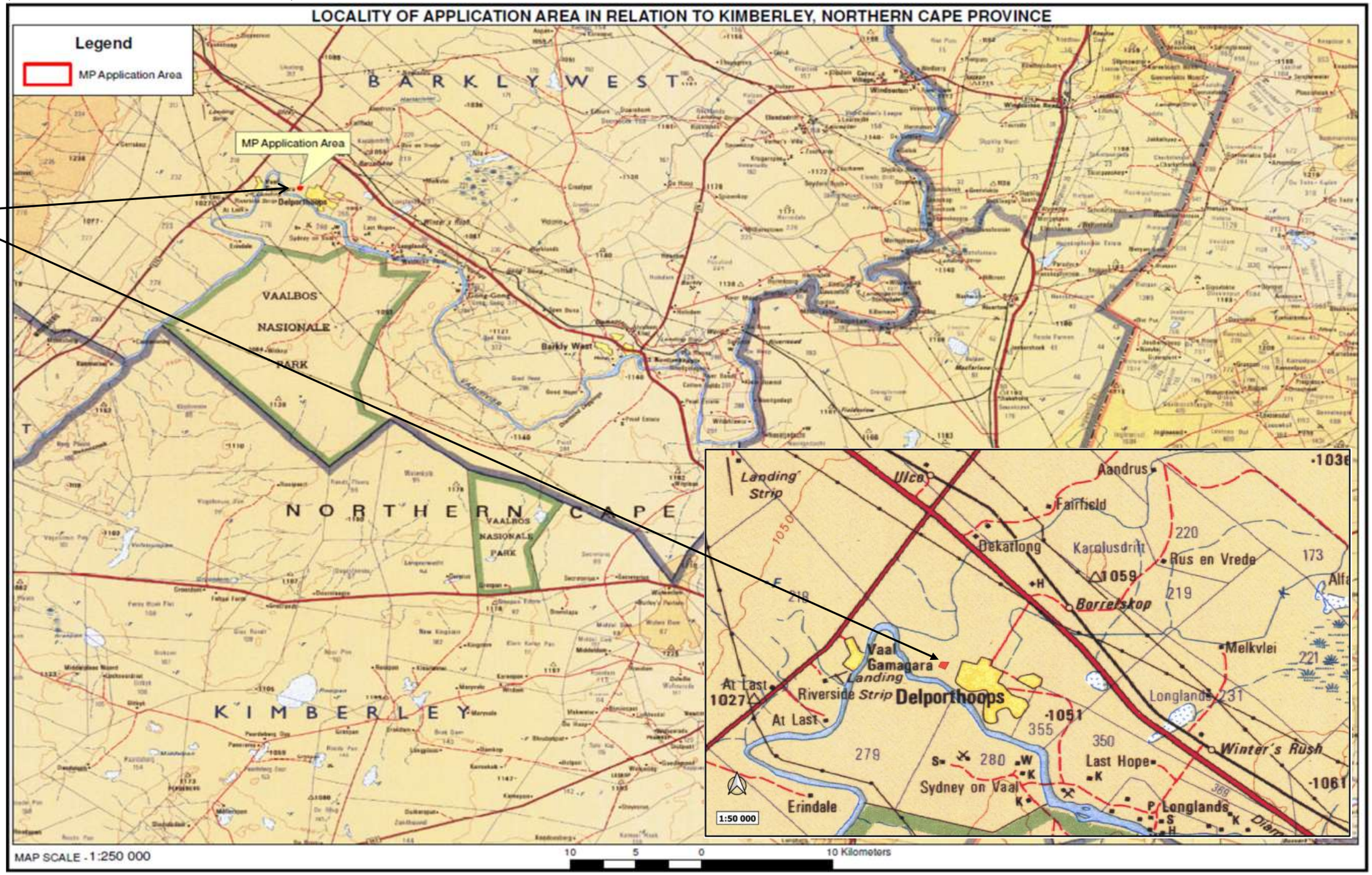


Figure 1. 1:250 000 topocadastral map KIMBERLEY 2824 indicating the application area IN RED with a BLACK ARROW and on 1: 50 000 map insert.

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)

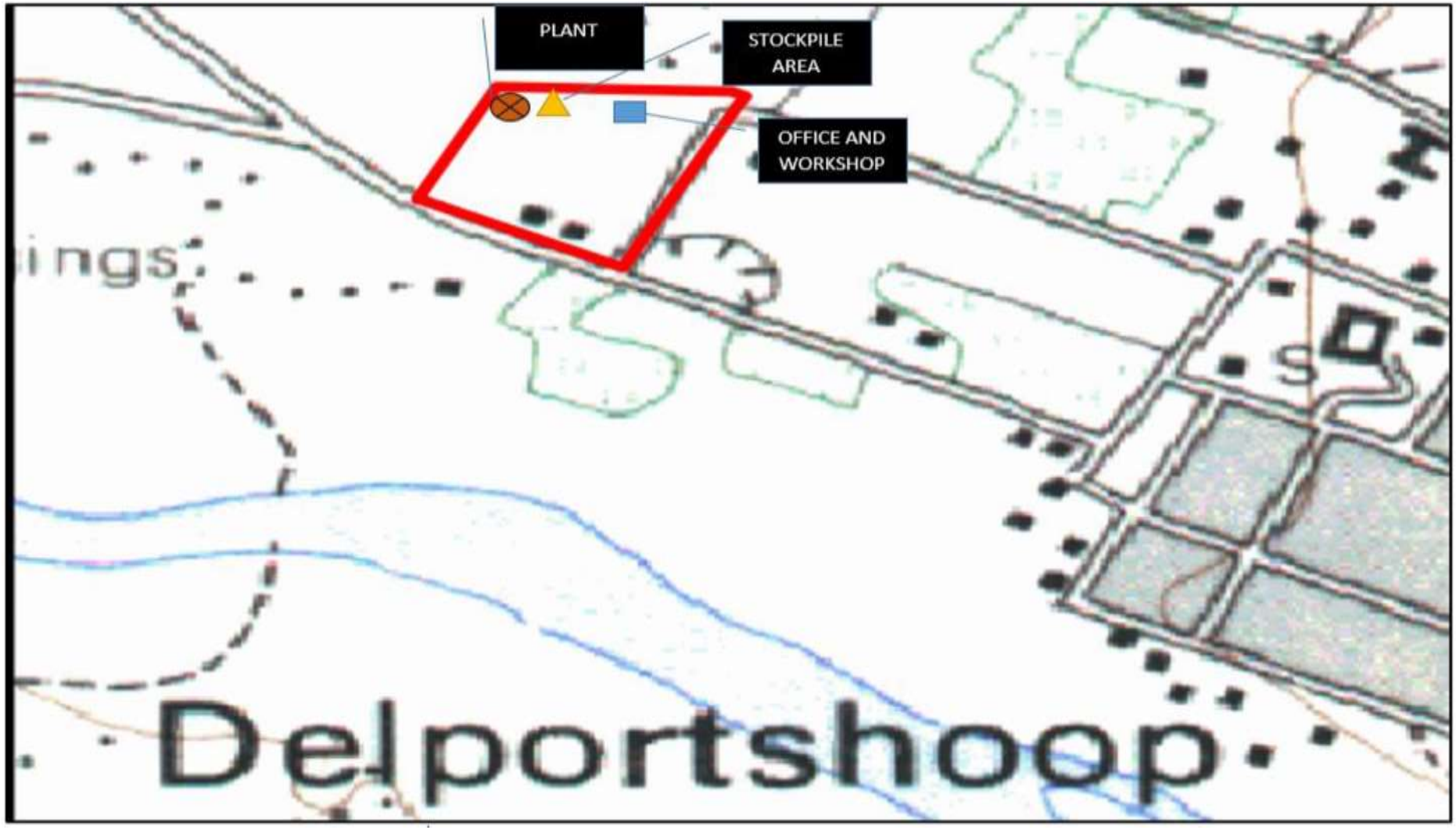


Figure 2. A plan indicating the overall location and extent of listed activities and main infrastructure on the mining.

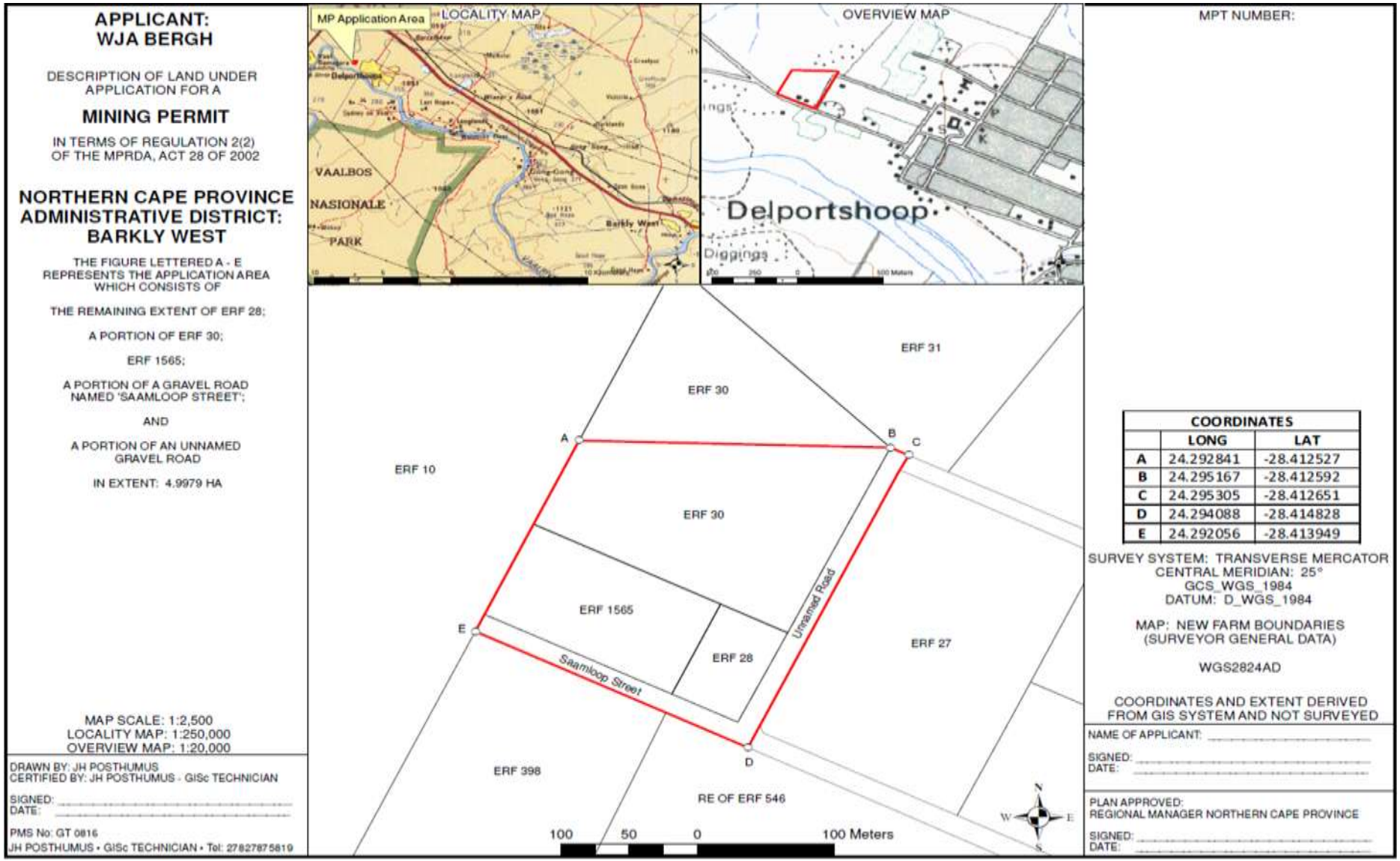


Figure 3. Application map Regulation 2(2) Map

i) Listed and specified activities

Table 1: Listed and Specified Activities

NAME OF ACTIVITY **(E.g. for prospecting** – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route, etc. … etc. … etc. **E.g. for mining** – excavations, blasing, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc. … etc. … etc.)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY (Mark with an **X** where applicable or affected).	APPLICABLE LISTING NOTICE ***(GNR 544, GNR 545 or GNR 546)***	WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act). **(Mark with an X)**
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, 202 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource; (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in listing notice 2 applies.	**4.9979ha**	X	GNR 983	
Activity 24(ii) of NEMA Listing Notice 1 The development of haul roads 15m wide with no reserve	±5 000m² on the Area.	X	GNR983	
Activity 56(ii) of NEMA Listing Notice 1				

The continuous lengthening (and rehabilitation) of haul roads 15m wide with no reserve	±5 000m² on the Area.	X	GNR983	
Activity 27 of NEMA Listing Notice 1 The clearance of an area of 1 hectare or more, but less than 20 ha of indigenous vegetation.	A total of 4.9807 hectares will be physically disturbed were the alluvial diamond material will be removed and washed.	X	GNR983	
Activity 15 of Category A under the National Environmental Management: Waste Act 59 of 2008 The continuous establishment and reclamation of temporary stockpiles resulting from activities which require a mining permit.	10 000m²		GNR 633	X
Activity 12(g) i & ii Listing Notice 3 **The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.**	4.9979ha	X	GNR 985	

i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spacial Biodiversity Assessment 2004; **ii. Within critically biodiversity areas identified in bioregional plans;**				
OTHER ACTIVITIES (Associated infrastructure not considered to be listed activities) Temporary Workshop Facilities Concrete Bund walls and diesel Depots Ablution Facilities Topsoil Stockpiles Overburden Stockpiles	 ±300m² ±250m² ±25m² ±2 000m² ±2 000m²		NOT LISTED	

ii) Description of the activities to be undertaken

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

Mining Method

The mining operation is based on alluvial diamond deposits that are restricted to the alluvial terraces north of the Vaal River (Figure 1). Diamonds will be mined by means of an opencast method using heavy earthmoving machinery. Vegetated soil or overburden will be stripped, and the underlying gravels will be excavated, screened, and treated through a rotary plan plant before fed to a sorting plant for final recovery. The rough diamond product will then be removed for further beneficiation. No ore processing reagents are required or used in the treatment of the ore.

New roads will be created to access mining trenches and infrastructure, including a mobile office and workshop complex, ablution facilities, storm water control berms, water tank, fuel storage facility, wash bay, central processing plants, slimes dam, salvage yard, waste disposal site and pipeline infrastructure will also be established on site.

The application area consist of The Remaining Extent of Erf 28; A Portion of Erf 30; Erf 1565; A Portion of a Gravel Road named 'Saamloop Street'; A Portion of an unnamed Gravel Road within Delportshoop. The entire study area has been transformed through historic land use practises. Currently, it is being used partially as a residence. Existing infrastructure includes a homestead and the historic disturbance footprint (Figure 4).

Figure 4. The mining permit area is indicated in red, with the proposed core footprint of mining activities indicated in white.

e) 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)	- 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	- Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	- Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right	- To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions.	- To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	- 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.	- 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	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.

Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Mining Permit has been applied for (NC) 30/5/1/3/2/10876 MP. - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)	- Control measures are to be implemented upon the approval of the EMPR.

	- Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)	
National Environmental Management: Air Quality Act (Act 39 of 2004)	- 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)	- Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMRE and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	- 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. Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007	- A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered.

	Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - 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)	
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.	- Chapter 2 lists all protected areas.	
National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities	- To be implemented upon the approval of the EMPR.

	- Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)	
National Forest Act (Act 84 of 1998) and Regulations	- 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.	- 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	- 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	- Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure is attached to the PIA. An Archaeological and Heritage Chance Find Procedure is also attached to the HIA.

	or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA	
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- 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 In terms of Section 21 a licence is required for: (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;	- A water use application is in the final stages of preparation and will be lodged with Department of Water and Sanitation (DWS) when the EIA EMP has been finalized. - Control measures are to be implemented upon the approval of the EMPR.

	(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and; - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j))	
Nature Conservation Ordinance (Ord 19 of 1974)	- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.	- Control measures are to be implemented upon the approval of the EMPR.
Northern Cape Nature Conservation Act (Act 9 of 2009)	- Addresses protected species in the Northern Cape and the permit application process related thereto.	- 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	- Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees.	- Control measures are to be implemented upon the approval of the EMPR.
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 - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR

Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GN24, PG329, 24/07/1998)	- Regulations re Northern Cape LDO's	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997)) and regulations, more specifically GN R1130	- 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 André Bergh Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate diamonds for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Frances Baard District.

In addition, the South African National Development Plan aims to eliminate poverty and reduce inequality by 2030. South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society. The André Bergh Project will contribute to achieving this plan in terms of direct and indirect employment of people from the local and district municipalities as well as investment in the region and on a national scale.

Need:

Analysis of the Diamond Industry – ALROSA(website)
The Information on the analysis of the diamond industry was obtained from the ALROSA website which is one of the biggest diamond producers in the world.

The world diamond market is represented by diamond mining and trade in rough diamonds. The bulk of the world diamond mining is concentrated in nine countries, with their share in the global production in physical terms as high as 99%.

The world's largest producers of natural diamonds are Russia, the Democratic Republic of Congo (DRC) and Botswana, all together accounting over 60% of the global diamond production.

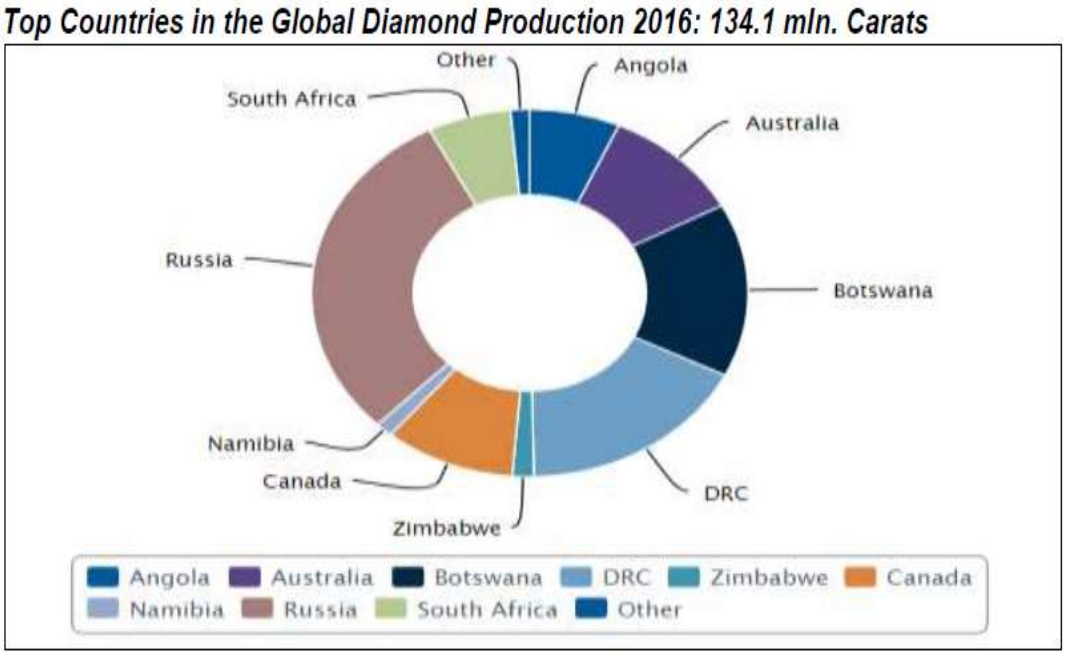


Figure 5. Kimberley Process companies' data Global Diamond Production 2011-16 (thousands carats).

World diamond production based on the costs of produced rough diamonds are dominated by Russia, Botswana and Canada with a combined production of more than 60% of the total worldwide production.

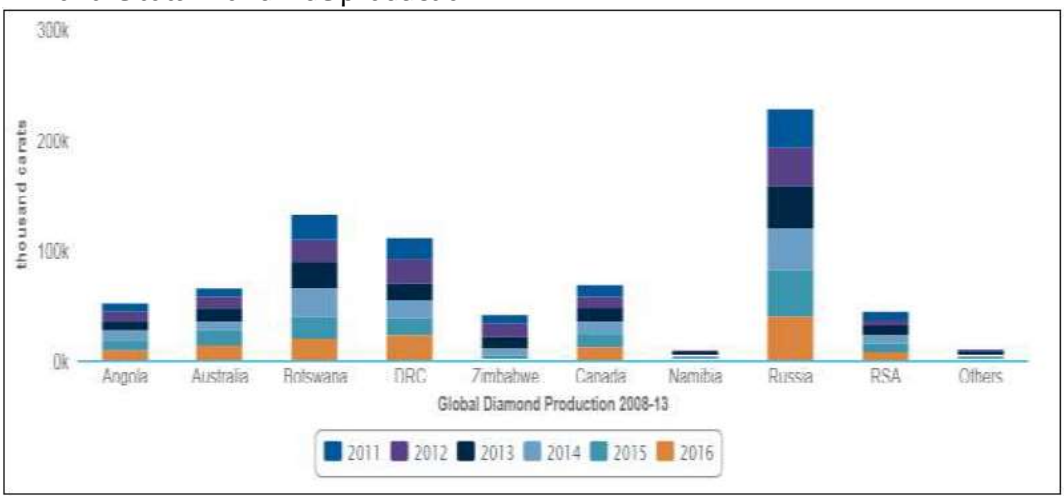


Figure 6. Global Diamond Production 2011-16 (thousands carats) Kimberley Process companies' data.

Russia ranks first in the world's diamond production. ALROSA Group accounts for 93% of the total diamond production in the Russian Federation in physical terms, and it is the leader of the global diamond mining industry. Major mining companies are engaged in mining in the main diamond-producing countries, the exception being Zimbabwe and the DRC, where diamond deposits are developed by small companies and prospectors. The graph below represents the geography of the companies' activities including exploration.

Diamond Production by Leading Companies, 2016(* - *including Ekati; Companies' data)*
The world's diamond mining is concentrated in the major primary deposits accounting for about 60% of the global diamond production. The remaining production is concentrated in placer deposits, the principal of them located in the DRC (Mbiji-Mayii) and Zimbabwe (Marange).

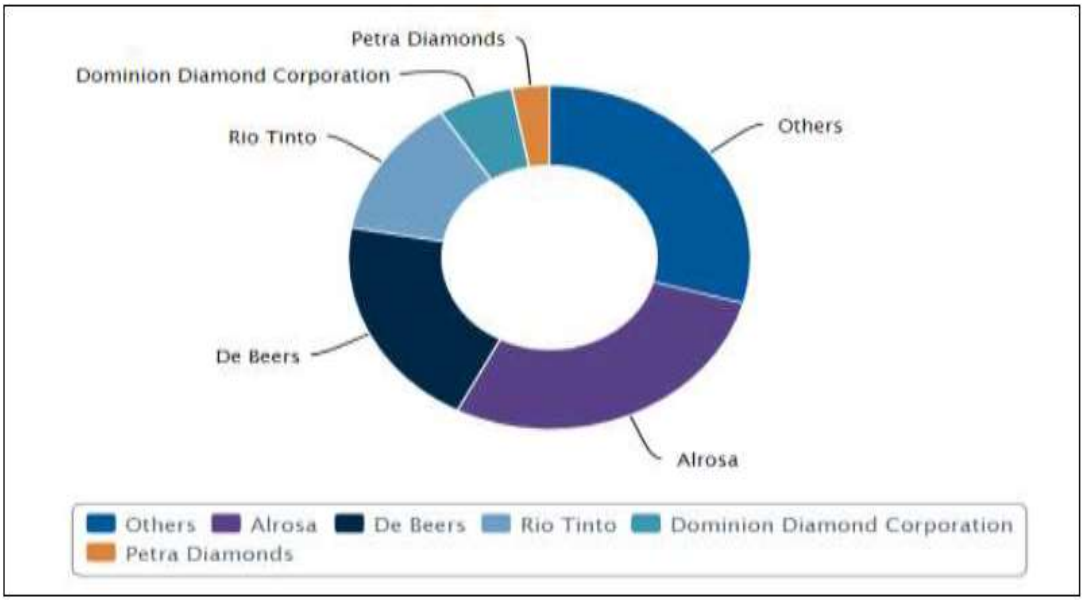


Figure 7. Diamond Production by Leading Companies, 2016 (* - including Ekati; Companies' data)

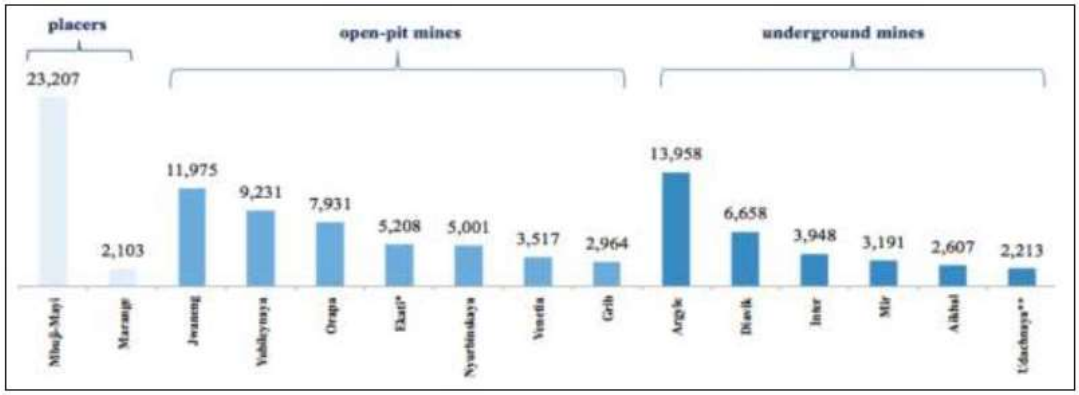


Figure 8. Production Output of the World's Major Diamond Deposits, 2016 (thousand carats) Kimberley Process and companies' data; * - Ekati includes open-pit and underground mining; ** - output, including further development of the open-pit.

By their attributes diamonds from deposits fall into two categories: gem quality and industrial grade diamonds. The former is used in diamond jewellery production, while the latter is used for industrial purposes (manufacture of drills, saws, and abrasive powders). Gem quality rough diamonds are sorted by size, colour, quality and shape, and then are sold to buyers in conformity with the sales policy adopted in a rough diamond production company. Depending on the quality of the mined rough diamonds, the current state of the market, the adopted marketing policy, companies use different approaches to diamond sales: sights, tenders, auctions, spot transactions and long-term contracts.

The world's largest trading centres, which concentrate the bulk of trade in natural rough diamonds, are India, Belgium, the UAE, the USA, Hong Kong and Israel. Being sold from mines, natural rough diamonds arrive at cutting and polishing plants to become polished diamonds that will be used in jewellery making.

(The information above was sourced from the ALROSA website. ALROSA is a world leader in the world diamond mining industry, a Russian partially state-owned diamond mining company)

The Diamond Pipeline

The Diamond Pipeline can be defined as the route the diamond takes from mine to end consumer. The diamond pipeline, typically, comprises**.**

Figure 9. The Diamond Pipeline.

***Exploration/Prospecting*;** involves geologists finding diamond deposits in different areas. Prospecting is vital to the future survival of any diamond business as there is a predicted supply-demand gap.

***Mining and Recovery*;** once diamonds have been discovered and surveys shown that it is financially viable to mine them; they are now recovered from the ground. The manner in which they are mined and recovered depends on their source, thus, where they are found.

Sorting and valuing; process of sorting and valuing of diamonds, categorizing them according to size, quality, model and colour.

Cutting and polishing; refers to manufacturing of diamonds; the process of turning rough diamonds into polished.

Polished Market; this is referred to as the 'diamond exchange bourse', a place where diamonds are traded. These are located in some of the world's major diamond manufacturing centres, e.g. Belgium.

Retailing; polished diamonds find their way to Jewellers and Consumers through Wholesalers and Retailers.

International Diamond Market Trends

Although global financial stability has proven quite volatile over the past 4-5 years, the diamond industry appears to have stabilised somewhat, with moderate increases in diamond prices forecast for the immediate future.

BMO Capital Markets (Sterck, 2011) estimated at the time that Chinese demand for polished diamonds accounted for 5% or USD1 billion of the market in 2010. While this represents a relatively small proportion of the market currently, growth is extremely strong.

De Beers reported that Chinese demand for polished diamonds grew at 25% in 2010, significantly ahead of GDP growth of 13%. Looking ahead, momentum into 2011 suggests that growth of 15% may be possible. From 2012 onwards, growth in household disposable income is forecast to average 11% to 12% per annum. This translates into minimum growth in diamond demand of 13% per annum.

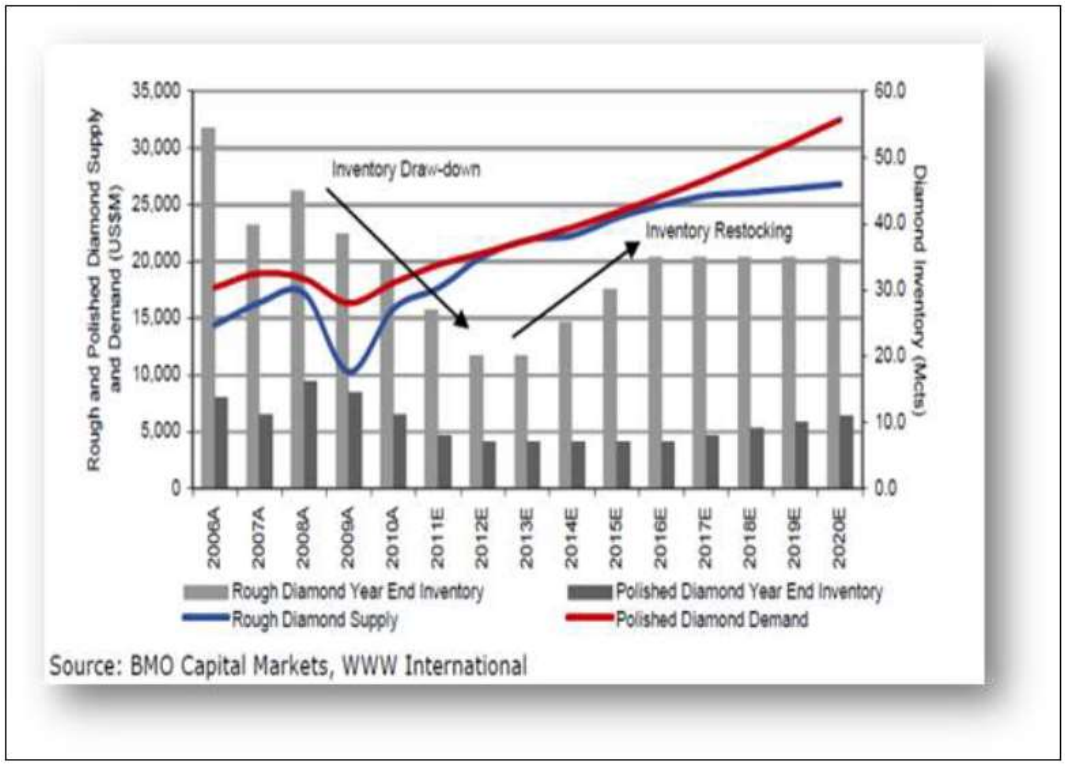


Figure 10. Inventory movements support diamond prices (USDM, Mct)

From 2012 onwards diamond demand is likely to grow in line with economic growth at around 10% per annum. Combining steady demand growth from the established diamond consuming nations and strong growth in demand from emerging consumer's results in a forecast of polished diamond demand almost doubling by 2020, resulting in a total market value of over USD30 billion in nominal terms.

Desirability:

No	Description	Yes/No
1	Does the proposed land use / development fit the surrounding area?	Yes
2	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	Yes
3	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	Yes
4	Will the proposed land use / development impact on the sense of place?	Yes
5	Will the proposed land use / development set a precedent?	No
6	Will any person's rights be affected by the proposed land use / development?	Yes
7	Will the proposed land use / development compromise the "urban edge"?	No

Benefits:

No	Description	Yes/No
1	Will the land use / development have any benefits for society in general?	Yes
2	Will the land use / development have any benefits for the local communities where it will be located?	Yes

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

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

Taking into consideration all the information captured in this report, the most appropriate procedure for planning and developing the proposed mining operation will involve the following:

(a) Mining Method

The location of the mine is determined by the geological location of the mineral resource. This site has proven to have alluvial diamonds as it was mined before and left. Mining for alluvial diamonds by means of the method described, with the understanding that the formulation of an effective Environmental Management Programme and the implementation thereof, as well as the obtainment of an authorisation for the abstraction of water from a resource for mining purposes from the Department of Water and Sanitation in terms of the National Water Act, 1998 (Act No. 36 of 1998, is an inseparable part of the proposed operation.

(b) Labour Force

Employing people who originate from within the boundaries of Dikgatlong Municipality. This will guarantee benefits such as a positive contribution to the local economy; a decrease in local unemployment figures; a decrease in the social phenomena normally associated with unemployment, such as crime and alcohol abuse; and a positive contribution to cultural cohabitation.

(c) Rehabilitation

Making financial provision for the implementation of a rehabilitation strategy as is required by Section 41 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) amended by Government Gazette NO. R. 1147 20 NOVEMBER 2015 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) REGULATIONS PERTAINING TO THE FINANCIAL PROVISION FOR PROSPECTING, EXPLORATION, MINING OR PRODUCTION OPERATIONS.

(d) Environmental Monitoring

Carrying out environmental monitoring on a regular basis, as is required by Regulation 55 of the Regulations published in Government Notice No. 26275 under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) and in the NEMA regulations published 20 November 2015.

(e) General

Being open to possible comments, suggestions and complaints received from neighbouring communities or members of the general public that might result from the implementation of the proposed mining operation.

i) Details of the development footprint alternatives considered

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

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

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

The registered description of the land to which the mining permit application relates:

Farm name and portion	Title Deed	Extent
Remaining Extent of Erf 28; A Portion of Erf 30; Erf 1565 A Portion of a Gravel Road named 'Saamloop Street'; A Portion of an unnamed Gravel Road	T596/1998 T2235/2008 T2757/2008	4.9979 ha

The property on which the Mining Permit was applied for is determined by the geological location of the mineral resource. 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 area is accessible via gravel roads from different directions.

Infrastructure in the Dikgatlong area is well developed with good road and rail networks, electricity grid and water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale diamond mining. Water for Processing Plant will be a crucial element that needs to be secured towards the successful operating of the project. A water application will be submitted to the Department of Water and Sanitation which will include a Section 21 (i) and (c) application.

Alternatives considered:-

No planned alternative to the proposed mining is envisaged. No farming or agricultural activities are currently taking place on the site area. Should mining not proceed the current land use will continue. The planned mining method is Opencast mining with concurrent rehabilitation where possible will minimise the footprint and impact. Any alternative methodology may have a greater impact.

The only other alternative would be not to continue with the operation.

(b) The type of activity to be undertaken:

The mining operation is based on alluvial diamond deposits that are restricted to the alluvial terraces north of the Vaal River (Figure 1). Diamonds will be mined by means of an opencast method using heavy earthmoving machinery. Vegetated soil or overburden will be stripped, and the underlying gravels will be excavated, screened, and treated through a rotary plan plant before fed to a sorting plant for final recovery. The rough diamond product will then be removed for further beneficiation. No ore processing reagents are required or used in the treatment of the ore.

Alternatives considered: -

The mining target area is known to carry diamonds and therefore no alternative to the application area can be considered.
The major land uses in the study region are urban development and mining. The land capability for the study site is non-arable with low to moderate potential for grazing. The grazing capacity is 13 ha/LSU, with the agricultural region being demarcated for cattle farming. The study area also falls within the Northwestern cattle and game ranching Livelihood Zone.

The entire study area has been transformed through historic land use practises. Currently, it is being used partially as a residence. Existing infrastructure includes a homestead and the historic disturbance footprint (Figure 4).

(c) 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 nearby access roads, proximity to the areas earmarked for mining as well as limited additional impact on the environmental (the residence and wind direction), heritage resources and discussions with the relevant Departments and interested and affected parties.

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

- Processing Plant: 1 X 16 feet with conveyers and recovery

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

- Clean & Dirty water system: Berms
  It is anticipated that the operation will establish storm water control berms and trenches to separate clean and dirty water on the mine site.

- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
  It is anticipated that the operation will utilize 2 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.

- Mining Area: Area applied for is an opencast mining process with oversized material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation.

- Roads (both access and haulage road on the mine site):
  New roads will be created to access mining trenches and infrastructure, including a mobile office and workshop complex, ablution facilities, storm water control berms, water tank, fuel storage facility, wash bay, central processing plants, slimes dam, salvage yard, waste disposal site and pipeline infrastructure will also be established on site.

- Salvage yard (Storage and laydown area).

- Product Stockpile area.

- Waste disposal site
  The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:

    - Small amounts of low level hazardous waste in suitable receptacles;
    - Domestic waste;

- Industrial waste.
- Temporary Workshop Facilities and Wash bay.
- Water distribution Pipeline.
- Water tank:
  It is anticipated that the operation will establish 1 x 10 000 litre water tank with purifiers for potable water.

Alternatives considered:-

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

In terms of water use alternatives; the operation is located near to the Vaal River which is a perennial river and is therefore seen as the best water source for the operation. Plastic pipelines are considered to be the best long-term option for transferring water, due to their temporary nature which causes minimum environmental disturbances. A pipeline route will be designed based on the principle of minimum impacts to the environment.

A diamond rotary plant will be established which uses 1 x 16 feet rotary pan. Water use for a 16 feet rotary pan is in the order of 18 000 liters per hour. The operation will only work during daytime hours which will constitute to about 8 hours per day which will bring water consumption to 144 000 litres per day and 720 000 litres per week, 2 880 000 litres per month per pan. A 16 feet pan can on capacity work about 65 tons per hour which constitutes to about 117m^3 per hour.

The locality of the mine residue dam will be selected based on the following considerations, this dam will be very small due to the limited material being processed and the limited water needed:

- The locality is already disturbed and mined out
- It is within reach of (1000m) of the treatment plant.
- It is situated near the access road to the mining activities.
- No underlying ore bodies or geological discontinuities.
- No geomorphological impacts.
- No structures, dwellings or other points of risk on down-stream side.
- Convenient material nearby for construction of dam.
- Top soil from the treatment process will be available for final rehabilitation.

A standard slimes dam design will be established in order to maximise the capacity of the slimes dam and to minimise the risk in terms of the general safety and the DWS regulations.

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

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

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

- **Technique**
  The operational phase of the mining operation will include the mining of alluvial diamonds by means of open cast mining with machinery.

  Topsoil will be removed from the first excavation, where after it will be stored separately on the high ground of the proposed mining area. Stored topsoil will be kept separate from overburden and will not be used for the building or maintenance of access roads. Stored topsoil will be adequately protected from being eroded or blown away.

  Exposed diamondiferous gravel of Excavation 1 will then be removed by means of a back actor and loaded onto a tipper truck, which will transport it to the central mineral processing plant. At the plant the diamondiferous gravel will be sorted by means of a grizzly screen grid and all material larger than 100 mm will be separated from the rest. This material will be used in the backfilling stage.

- **Technology**
  The mining method being employed is an Opencast mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation. Gravels are excavated, loaded, and transported to the nearby treatment facility using articulated dump trucks. Gravels are then loaded onto a vibrating grizzley and the +32 mm oversize material is discarded back into the open pit (about 55% reduction). The remaining –32 mm fraction is loaded into a series of 1 x 16-foot rotary pan, with a treatment capacity of 65 tph. Tracer tests are done regularly to ensure that the pan is operating at the correct density. Concentrate is tapped continuously from the pan every three hours into three ton holding bins and transported with enclosed trucks to a final recovery unit which is, which is designed to use both X-ray and grease diamond recovery methods or any other facility which is chosen by André Bergh.

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

(e) The operational aspects of the activity:

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the run of mine gravels will be fed onto a grizzly for screening out oversize material. The material will be processed through a screening section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract the diamonds. Another area will be used for all processing and dumping operations outside the 1:100 year flood line. The expected lifespan of the mine is 5 years.

Mining activities will primarily make use of existing roads created by previous mining activities, but there is a possibility for additional roads that could be created.

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

(f) The option of not implementing the activity:

The potential land use includes grazing and mining. The majority of the area is classified to have potential for grazing land. Therefore, mining activities are believed to be the most economically beneficial option for the area to establish any potential for mineral resources.

Mining forms an integrated part of the social and economic growth of South Africa and more specifically the Northern Cape Province.

Socio-Economy
The operation will make provision for 10 - 15 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity
*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

The study area falls within the Savanna Vegetation Biome (Mucina and Rutherford 2006) and according to the vegetation map of Mucina and Rutherford (2012), the site is represented by one broad-scale vegetation unit from the Eastern Kalahari Bushveld Bioregion, i.e. Schmidtsdrif Thornveld.

The proposed mining site falls partially within a critical biodiversity area, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The northern half of the site is classified as Critical Biodiversity Area Two. It is unclear why this area was given such high biodiversity importance, but from the field verification it is evident that this is inaccurate. The biodiversity on site has already been severely compromised by past land use activities and most of the natural vegetation has been replaced by alien species.

The Mining and Biodiversity Guidelines (DENC et al. 2013) does not recognise the site to have any biodiversity importance. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector.

Finally, the study area falls within a region where one of South Africa's largest economically most important diamond deposits are found (Gresse 2003). Significant crop irrigation in the Northern Cape also occurs here (Durand 2006). These factors increase the cumulative impacts of the proposed operation.

Heritage and Cultural Resources

*Dr Edward J. Matenga from (AHSA) Archaeological & Heritage Services Africa (Pty) Ltd has been appointed by Anndré Bergh to provide a Heritage Impact Assessment in order to highlight the heritage characteristics of the proposed mining area, and to determine the possible impact of mining on the Heritage status of the application area (**Appendix 5**).*

The Heritage Impact Assessment is a desktop study which was compiled by using field data from other Heritage Impact Assessment studies that have been undertaken in the area around Barkly West, Gong Gong, Longlands and Delportshoop.

According to Dr. Matenga, the terrain features on the property under study are not any different from what was encountered in the area in previous studies. Therefore, it can be concluded that findings of a ground survey would not be fundamentally different from what has been found in the area along the Vaal River from Barkly West to Delportshoop.

The commonest cultural evidence relates to mining excavations in the last 120 years to retrieve diamonds. Very little of the obtaining landscape and associated structures has been ranked as heritage of high significance. The impact of workings over a period of more than a century is starkly evident from the pits, piles of stones of various grades which have been observed along this section of the Vaal River in previous studies. There are a few places untouched with a possibility of finding Stone Age material in an undisturbed context. In terms of the Stone Age period in the cultural sequence the heritage sensitivity of the area in therefore found to be low.

Palaeontology

Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Dr Edward Matenga, South Africa from (AHSA) Archaeological & Heritage Services Africa (Pty) Ltd has been appointed by WJA Bergh to provide a Palaeontological Impact Assessment in order to highlight the palaeontological characteristics of the proposed mining area, and to determine the possible impact of mining on the palaeontological status of the application area (**Appendix 6**).

According to Prof. Bamford, the proposed site lies on the moderately sensitive aeolian and fluvial Kalahari Sands but any fossils would be out of context because the sands have been transported by wind and water. Nonetheless, a Fossil Chance find Protocol should be added to the EMPr. Based on the information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the developer/ environmental officer/ other designated responsible person once excavations/ drilling/ mining activated have commenced.

Should any other heritage features and/or objects be located or observed, a heritage specialist will be contacted immediately. Observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that a heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. If the mining operation is approved, the heritage resources if any other had been encountered will be protected through the demarcation of no-go zones and fencing off.

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.

Description of the consultation process:-
A copy of the draft Scoping Report (burned to disc) was sent to all interested and affected parties. All Government Departments identified were also notified by registered letters. The surface owner also received a registered letter and personal communication was done- confirmation letter. Letters was also sent to various neighbouring people with adjacent farms or further away.

A notice was also placed on the gates at the entrance of the proposed site to invite any other interested parties to come forward and to register. Other notices were brought up at relevant public places to inform the communities in the surrounding area of the proposed mining operation.

The draft Scoping Report was also placed at the Barkly West Library along with a notice to notify the public of the proposed mining operation as well as to provide access to the draft Scoping Report to the community.

Furthermore, an advert was placed in the DFA Newspaper on 20 August 2021 which invited any other interested or affected party to come forward and register.

A copy of the draft EIA EMP Report (burned to disc) was sent to all interested and affected parties. All Government Departments identified were also notified by registered letters.

Consultation process:

Proof of consultation (attendance registers, minutes of meetings and response forms) is attached as Appendix 3. The consultation process is still in process.

iii) Summary of issues raised by I&APs

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

A Summary of the raised issues and other communication with interested and affected parties can be found in the table attached in **Appendix 3.**

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:*

According to Bosch and Visser (1993) the geological features on the mining permit area comprise Quaternary deposits (Figure 11). Alluvium and scree comprise the western half of the site, while the eastern half of the site contains alluvial diamondiferous gravel (Figure 11).

Figure 11. The distribution of geological features in the study area.

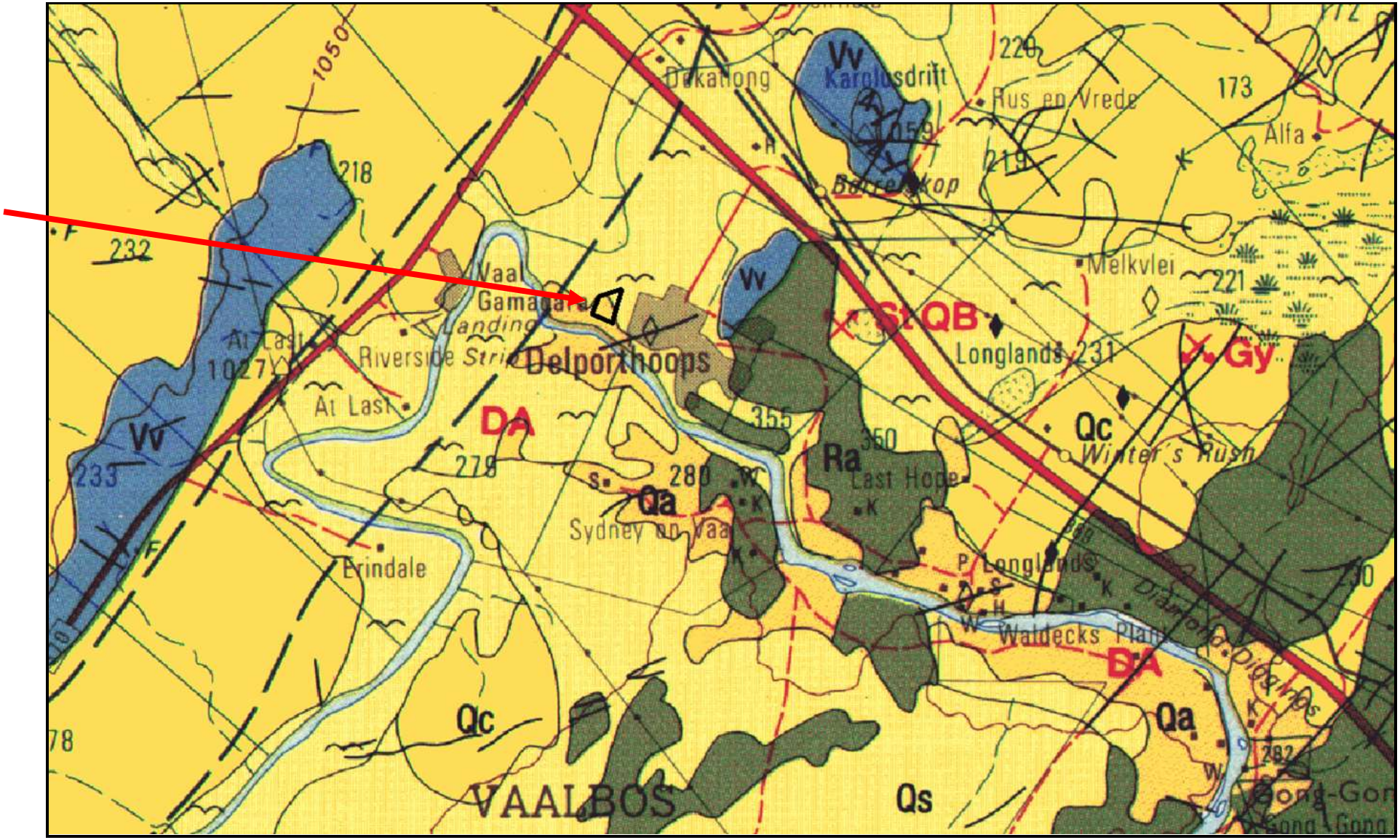


Figure 12. Geological Map application area indicated with red arrow.

CLIMATE:

The immediate region has an approximate mean annual rainfall of 400 mm (Bezuidenhout 1994). This is considered a relatively low rainfall and causes the area to form part of the more arid parts of South Africa. The occurrence of wetlands is therefore not common. Temperature is less erratic than rainfall with cold winters as low as -4˚C while the summer temperatures may be as high as 44˚C.

Regional Climate:-

The Northern Cape is classified as a semi-dessert 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 dessert area – approximately 6 out of 10 years

(3) ***TOPOGRAPHY:***

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

The study area is characterised by plains and the topography is flat, with the terrain indicated by a very gentle slope of <1 %. Altitude across the site is 1 020m above sea level. The land type is DC5 (Figure 13), which includes soils with a marked clay accumulation and that they are strongly structures, with a non-reddish colour. The entire site is represented by terrain unit 4 (Figure 13). The landscape provides low water erodibility risk, but high clay content in the soil increases the risk of water erosion. Rainfall erosivity is however very low due to the arid climate and gentle slopes of the study area. The wind erosion risk is also very low. Sediment delivery potential is also low and therefore the soils also have a very low potential to regenerate, if badly eroded.

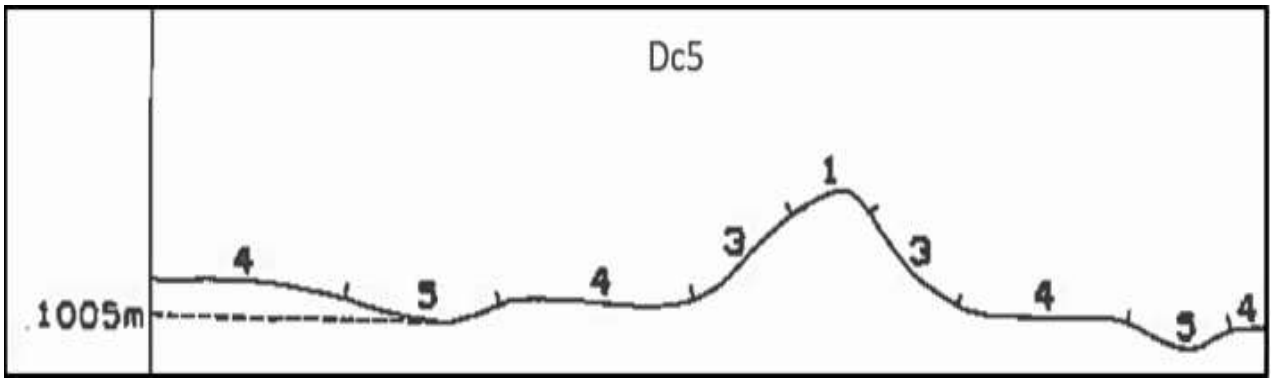


Figure 13. The terrain types and units associated with the land type of the study area.

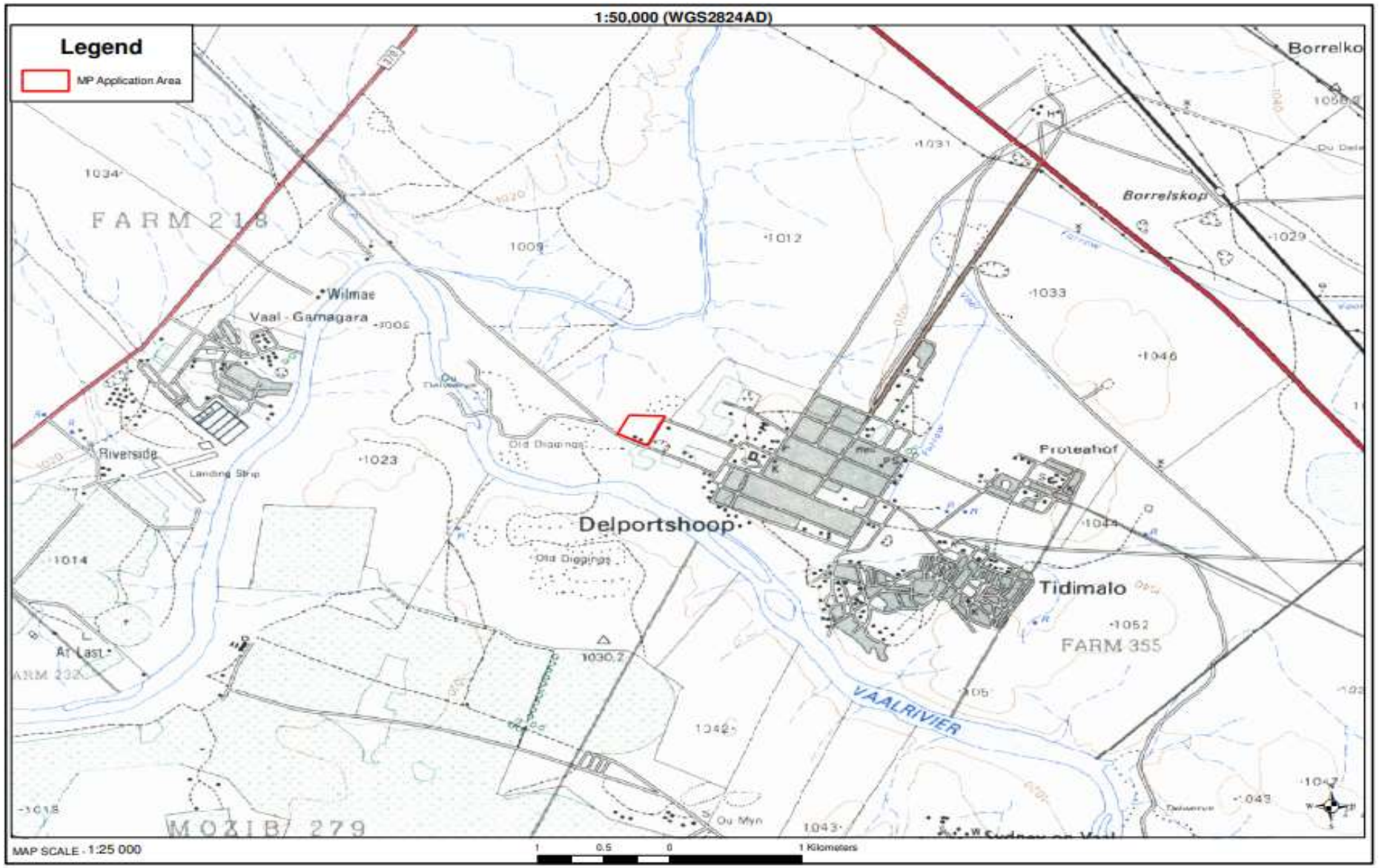


Figure 14. Topographical Map Delportshoop 2824AD 1:50 000 application area indicated by red block.

(4) ***SOILS:***

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

According to Bosch and Visser (1993) the geological features on the mining permit area comprise Quaternary deposits. Alluvium and scree comprise the western half of the site, while the eastern half of the site contains alluvial diamondiferous gravel.

The land type is DC5 (Figure 13), which includes soils with a marked clay accumulation and that they are strongly structures, with a non-reddish colour. These soils have a high clay content which increases the water erodibility but decreases the wind erodibility of the soil.

(5) ***LAND CAPABILITY AND LAND USE:***

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

The major land use in the study region are urban development and mining. The land capability for the study area is non-arable with low to moderate potential for grazing. The grazing capacity is 13 ha/LSU, with the agricultural region being demarcated for cattle farming. The study area also falls within the North-western cattle and game ranching Livelihood Zone.

The entire study area has been transformed through historic land use practises. Currently, it is being used partially as a residence. Existing structures includes a homestead and the historic disturbance footprint.

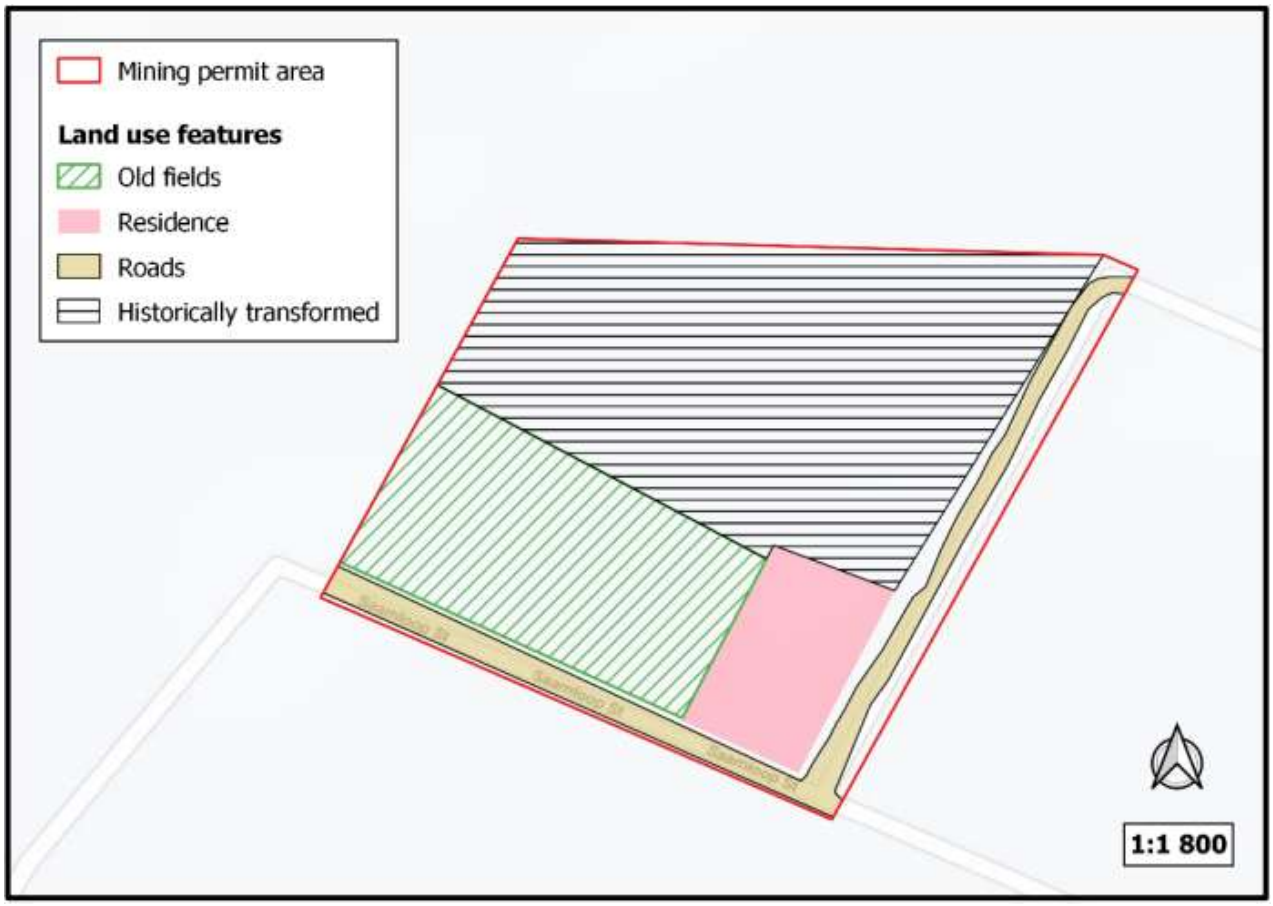


Figure 15. Evidence of past mining activities in the study area is inferred from the "Diggings" label on the topographical map.

(6) NATURAL FLORA:

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

Broad-scale vegetation patterns

The study area falls within the Savanna Vegetation Biome (Mucina and Rutherford 2006) and according to the vegetation map of Mucina and Rutherford (2012), the site is represented by one broad-scale vegetation unit from the Eastern Kalahari Bushvels Bioregion, i.e., Schmidtsdrift Thornveld (Figure 16).

Schmidtsdrif Thornveld is distributed in the Northern Cape, Free State and North-West Provinces at altitudes between 1 000 and 1 350 m. It stretches from the footslopes and midslopes to the southeast and below the Ghaap Plateau from around Douglas in the southwest via Schmidtsdrif towards Taung in the northeast. A small less typical section

is found east of the Ghaap Plateau from Warrenton towards Hertzogville. The unit is typically presented as a closed shrubby thornveld dominated by *Senegalia mellifera* and *Vachellia tortilis*. Apart from grasses, bulbs and annual herbs are also prominent. The vegetation is very disturbed in some areas due to overgrazing by goats and other browsers.

Dwyka diamictites and Ecca shales of the Karoo Supergroup are the most significant geological features in this unit, Shale and dolomite of the Schmidtsdrif Subgroup (Griqualand West Supergroup) are also present. Surface limestone occurs sporadically. The soils are welldrained, stony and shallow (< 0.3 m), with large angular rocks found on the surface. A soilrock complex with Mispah soil form is typical, while the unit is mainly associated with the Ae and Dc land types. The unit is least threatened, with 13 % being transformed mainly by cultivation. A very small portion (0.2 %) used to be conserved in the de-proclaimed Vaalbos National Park, but it is no longer statutorily conserved. Erosion is very low to low. No endemic species are known from this unit and Prosopis spp. are significant alien invaders.

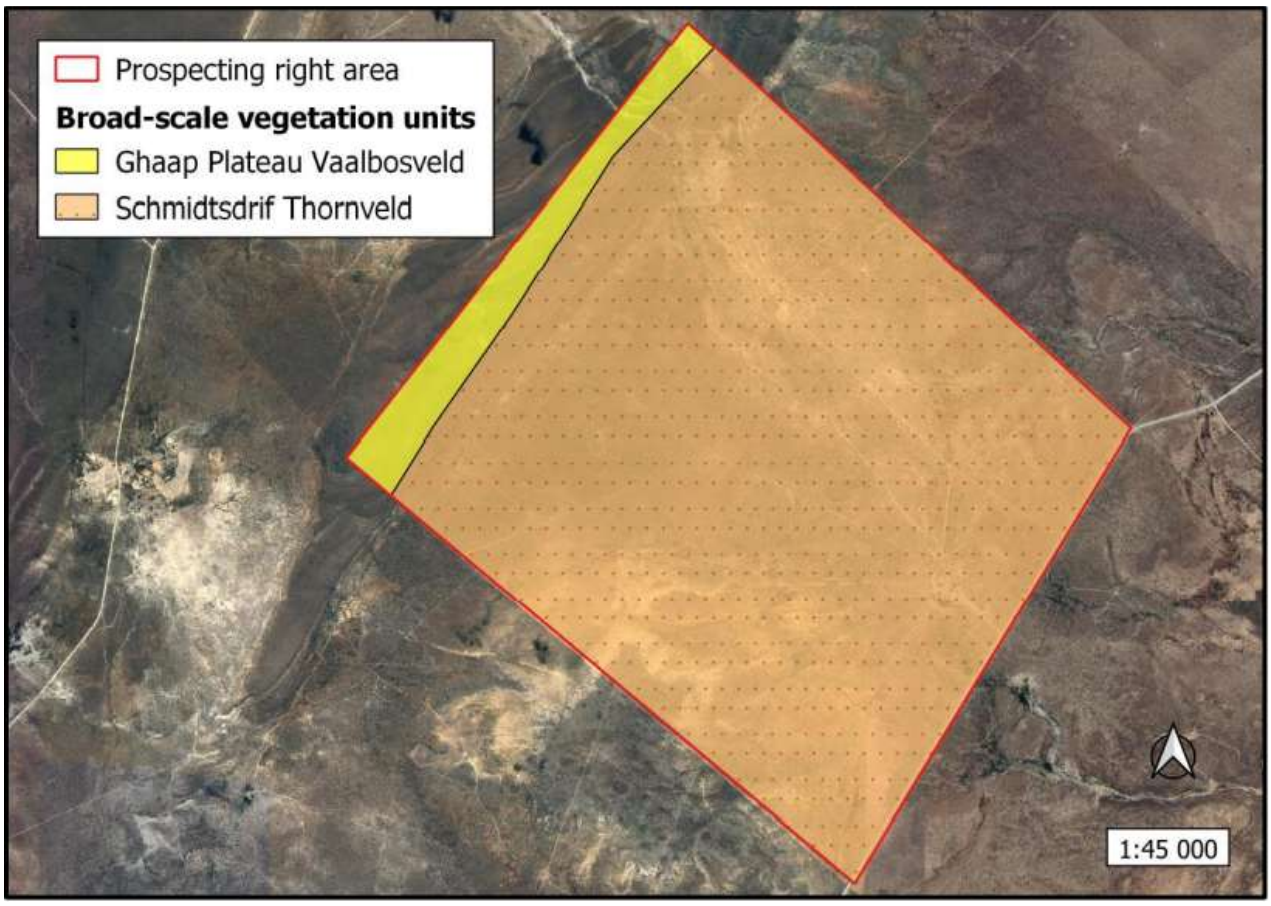


Figure 16. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area.

Fine-scale vegetation patterns

Plant communities in the study area are delineated according to plant species correspondences and changes in soil structure. One unit occurs on site (Figure 17), which is described below. The homestead and public roads were excluded from the assessment.

- ***Ziziphus mucronata* - *Prosopis glandulosa* transformed woodland**

  This community encompasses the entire study site that is not otherwise occupied by a homestead or public road. It is heavily transformed, with dense stands of trees and shrubs, most of which are alien species.

  The taller woody layer is dominated by *Ziziphus mucronata* and *Prosopis glandulosa*, but other common species include *Searsia lancea, Tamarix ramosissima, Grewia flava* and *Schinus molle*.

  The dense grass layer is dominated by *Enneapogon cenchroides*, with other common species including *Cenchrus ciliaris, Cynodon dactylon, Fingerhuthia africana, Setaria verticillata* and *Eragrostis spp*.

  A variety of annuals occur under the canopies of the trees, with *Bidens bipinnata* being the most conspicuous.

Figure 17. The distribution of fine-scale plant communities in the study area.

Population of sensitive, threatened, and protected plant species

The SANBI Red List provides information on the national conservation status of South Africa's indigenous plants, while the National Forests Act (No. 84 of 1998) (NFA) and the Northern Cape Nature Conservation Act (Act No. 9 of 2009) (NCNCA) restricts activities regarding sensitive plant species. Section 15 of the NFA prevents any person to 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. Section 49 (1) and 50 (1) of the NCNCA states that no person may, without a permit pick, transport, possess, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) plants. Furthermore, Section 51(2) states that no person may, without a permit, pick an indigenous plant (Schedule 3) in such manner that it constitutes large-scale harvesting.

All species from the region are classified as least concern; a category which includes widespread and abundant taxa. One species recorded in the region is protected in terms of the National Forests (NFA) Act No 84 of 1998 (Table 2), i.e., Vachellia erioloba. It was however not recorded on site. Specially protected species (Schedule 1) and protected species (Schedule 2) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009 previously recorded from the region are also listed in Table 2. None of these species were recorded in the study area.

Table 2: Plant species found in the region that are of conservation concern.

FAMILY	Scientific name	Status	NFA	NCNCA
AMARYLLIDACEAE	*Nerine frithii*	LC		S2
APIACEAE	*Choritaenia capensis*	LC		S2
	Deverra burchellii	LC		S2
APOCYNACEAE	*Fockea angustifolia*	LC		S2
	Gomphocarpus tomentosus subsp. *tomentosus*	LC		S2
	Pentarrhinum insipidum	LC		S2
ASPHODELACEAE	*Trachyandra laxa* var. *rigida*	LC		S2
CELASTRACEAE	*Gymnosporia buxifolia*	LC		S2
CRASSULACEAE	*Crassula lanceolata* subsp. *transvaalensis*	LC		S2
FABACEAE	*Lessertia annularis*	LC		**S1**
	Lessertia depressa	LC		**S1**
	Vachellia erioloba	LC	X	
SCROPHULARIACEAE	*Jamesbrittenia tysonii*	LC		S2
	Nemesia lilacina			S2

In addition to these protected species, according to Section 51(2) of NCNCA, a permit is required from the Northern Cape, Department of Environment and Nature Conservation (DENC) for any large-scale clearance of all indigenous (Schedule 3) vegetation, before such activities commence.

Weeds and invader plant species

Weeds and invasive species are controlled in terms of the National Environmental Management: Biodiversity (NEMBA) Act 10 of 2004, the Conservation of Agricultural Resources (CARA) Act 43 of 1993, as well as the NCNCA. These are species that do not naturally occur in a given area and exhibit tendencies to invade that area, and others, at the cost of locally indigenous species.

Table 3: A list of declared weeds and invasive species recorded in and around the study area.

Scientific name	Common name	CARA	NEMBA	NCNCA
Atriplex lindleyi	Sponge - fruit saltbush	3	1b	6
Prosopis glandulosa	Honey mesquite	2	3	6
Tamarix ramosissima	Pink tamarisk	1	1b	6
Verbena bonariensis	Wild verbena	-	1b	-

Indicators of bush encroachment

Bush encroacher species are controlled in terms of Regulation 16 of CARA; where land users of an area in which natural vegetation occurs and that contains communities of encroacher indicator plants are required to follow sound practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs. Declared indicators of bush encroachment in the Northern Cape, recorded on site, are listed in Table 4.

Table 4: A list of declared bush encroachers in the Northern Cape recorded in the study area.

Scientific name	Common name
Grewia flava	Wild raisin

(7) NATURAL FAUNA

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected (Schedule 2) or specially protected (Schedule 1) wild 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. According to the act "wild animal" means a live vertebrate or invertebrate animal, and the egg or spawn of such animal.

The landscape features on the mining permit area do not provide diverse habitat opportunities to faunal communities, and the site is situated in an urban area which further decreases the likelihood that a diverse assemblage of fauna will be present. The natural vegetation has been replaced by alien species, which nevertheless provides micro-habitats on site. Animals likely to be found in the study area are discussed in their respective faunal groups below.

Mammals

As many as 59 terrestrial mammals and nine bat species have been recorded in the region. Nine terrestrial mammal species and two bat species from the region are listed either in the IUCN or Mammal Red List of South Africa. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA. The African Straw-coloured Fruit-bat has a high chance of occurring on the site, given their wide habitat tolerances. Dent's Horseshoe Bat, Aardvark and Striped Polecat have a moderate chance of occurring on site. Although their habitat preferences are similar to the habitat found on site, the transformed status of the site will most likely limit their presence here. Ground Pangolin, South African Hedgehog, Aardwolf, African Wild Cat, Black-footed Cat, Cape Fox, Brown Hyaena, Bat-eared Fox, African Striped Weasel and Honey Badger would normally have a higher chance to occur on site based on their habitat requirements but are not expected to be found on site due to the town setting. Spectacled Dormouse have a low potential to occur on site due to their preference for rocky habitats, while Cape Clawless Otter and Spottednecked Otter are also not expected to be found here due to their association with rivers. Problem animals (Schedule 4) with a high likelihood to occur on site include Vervet Monkey.

Table 5. Mammal species of conservation concern that are likely to occur in the region. Conservation values are indicated in terms of the international (IUCN) Red List, the Mammal Red List of South Africa (MRLSA) and Schedule 1 of the Northern Cape Nature Conservation Act (NCNCA).

Scientific name	Common name	IUCN	MRLSA	NCNCA
Eidolon helvum	African Straw-coloured Fruit-bat	NT		
Rhinolophus denti	Dent's Horseshoe Bat		NT	
Orycteropus afer	Aardvark			X
Graphiurus ocularis	Spectacled Dormouse		NT	
Manis temminckii	Ground Pangolin	VU	VU	X
Atelerix frontalis	South African Hedgehog		NT	X
Proteles cristata	Aardwolf			X
Felis silvestris	African Wild Cat			X
Felis nigripes	Black-footed Cat	VU	VU	X
Vulpes chama	Cape Fox			X
Aonyx capensis	Cape Clawless Otter	NT	NT	
Hydrictis maculicollis	Spotted-necked Otter	NT	VU	X
Parahyaena brunnea	Brown Hyaena	NT	NT	X
Otocyon megalotis	Bat-eared Fox			X
Poecilogale albinucha	African Striped Weasel		NT	X
Ictonyx striatus	Striped Polecat			X
Mellivora capensis	Honey Badger		NT	X

Reptiles

The mining permit area lies within the distribution range of at least 55 reptile species. 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. Specially protected species include Karusasaurus polyzonus (Southern Karusa Lizard) and Chamaeleo dilepis dilepis (Namaqua Chamaeleon). The Karusa Lizard is a rock-dwelling species inhabiting rocky outcrops and is not expected to be found here. The Common Flap-neck Chameleon is typically found high up in bushes or trees and might be found on site. South African endemics include Pachydactylus mariquensis (Common Banded Gecko), Agama aculeata distanti (Eastern Ground Agama) and Homopus femoralis (Greater Dwarf Tortoise). The Common Banded Gecko prefers sandy soil and sparse vegetation in a variety of habitats such as sandy plains and dry riverbeds. The Eastern Ground Agama is primarily associated to grassland and woodland habitat but is sometimes also found in rocky areas, while the Greater Dwarf Tortoise occurs in rocky areas with dense vegetation where they take shelter among rocks or under plants. Of these, the Eastern Ground Agama has the highest likelihood to be found on site.

Amphibians

Six amphibian species are known from the region. Only those species which are independent of water (i.e., Guttural Toad, Bubbling Kassina, Boettger's Caco and Tremolo Sand Frog) are likely to be common on site, where they are expected to take refuge under rocks or in holes. However, frog activity will increase during the rainy season, especially if temporary pools form after high rainfall events. These pools are normally utilised by the frogs to breed. None of the frog species from the study region are listed or endemic, but they are all protected according to Schedule 2 of NCNCA.

Avifauna

The study site does not fall within or near (< 30 km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 289 bird species have been recorded from the region, of which as many as 28 are listed bird species, classified as Vulnerable, Near Threatened, Endangered or Critically Endangered according to the IUCN or SA Red Data Book of birds.

Furthermore, all birds are protected either according to Schedule 1, 2 or 3 of NCNCA.

Plants in general, from grass tufts to shrubs and trees provide important micro-habitats to birds and therefore the study area is expected to host

a moderately high bird density, especially the more common and generalised species. Protected bird species with a high affinity for woodland habitat, i.e., Martial Eagle, Tawny Eagle, Lanner Falcon, Red-necked Falcon, Red-footed Falcon, White-backed Vulture, Lappet-faced Vulture, Kori Bustard, Roller- and Owl species, have the highest likelihood to occur on site, but might be reluctant to forage, nest or pass through the site due to the town setting. None of the protected water birds (i.e., Chestnut-banded Plover, Storks, Black-winged Pratincole, Maccoa Duck, Lesser Flamingo and Greater Flamingo) or high-altitude rock associated species (Verreaux's Eagle, African Rock Pipit and Cape Vulture) are expected to occur on site.

Invertebrates

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993, Weisser and Siemann 2004). In general, they are widely distributed and extremely diverse, which makes it almost impossible to list all species that may possibly occur on site without a dedicated study. Invertebrates have also not been surveyed as comprehensively as plants and mammals and therefore current available data on their distribution is much scarcer. Nevertheless, key morphospecies and species of conservation concern are discussed here, as well as the major habitats which delimit possible invertebrate communities on site.

Seventeen invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species. However, none of these species' distribution ranges overlap with that of the study area. In addition, those species that are specially protected according to Schedule 1 of the NCNCA include all Velvet worms as well as some baboon spider species, Stag Beetles and the Flightless Dung Beetle. None of these taxa are known to occur in the study region either. All Rock- Creeping- and Burrowing Scorpions are protected according to Schedule 2 of the NCNCA, along with several beetles, butterflies, and moths. Of these, Gossamer-winged Butterflies, Skippers, Brushfooted Butterflies and Satyrs have the highest likelihood to be found on site.

The major natural habitat delimiting possible invertebrate communities in the study area is classified as bushveld for insect preference (Picker et al. 2004). Species associated with this habitat type are diverse and are widely distributed. The study area itself is expected to host several generalised invertebrate species, due to the various micro-habitat opportunities.

(8) ***SURFACE WATER AND WETLANDS***

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

The study area falls within the Vaal D/S Bloemhof quaternary catchments C91E of the Lower Vaal Water Management Area (Figure 18). The quaternary catchment has been allocated a Present Ecological State (PES) of 'largely modified' (D) by Delport and Mallory (2002) and information regarding mean annual rainfall, evaporation potential and runoff for the quaternary catchments is provided in Table 6.

Table 6: Catchment characteristics for the Vaal D/S Bloemhof quaternary catchment in which the study area falls, as presented by Delport and Mallory (2002).

Quaternary catchment	Catchment Area (km^2)	Mean Annual Rainfall (mm)	Mean Annual Evaporation (mm)	Mean Annual Runoff (10^6 m^3)
C91E	1 509	371	2 140	1.82

According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), the study area falls within the Eastern Kalahari Bushveld Bioregion, where 1.3 % of the land area is covered by inland wetlands, including depressions, floodplains, seeps and valley-bottom wetland types (Van Deventer et al. 2019). Depressions are most abundant in the bioregion, with the majority in natural or near-natural condition (Table 10). The remaining wetland types have been moderately to severely modified. According to SAIIAE, no water resources (rivers, wetlands, or drainage channels) occur on site.

Table 7: Inland wetland spatial extent of the Eastern Kalahari Bushveld Bioregion.

Wetland type	Total Extent (%)	% Natural or near-natural (A/B)	% Moderately modified (C)	% Heavily to severely/critically modified (D/E/F)
Depression	57.1	70.5	5.7	23.8
Floodplain	2.2	0.6	48.8	50.5
Seep	17.2	10	15.1	75
Valley-bottom	23.5	0.9	29.6	69.5

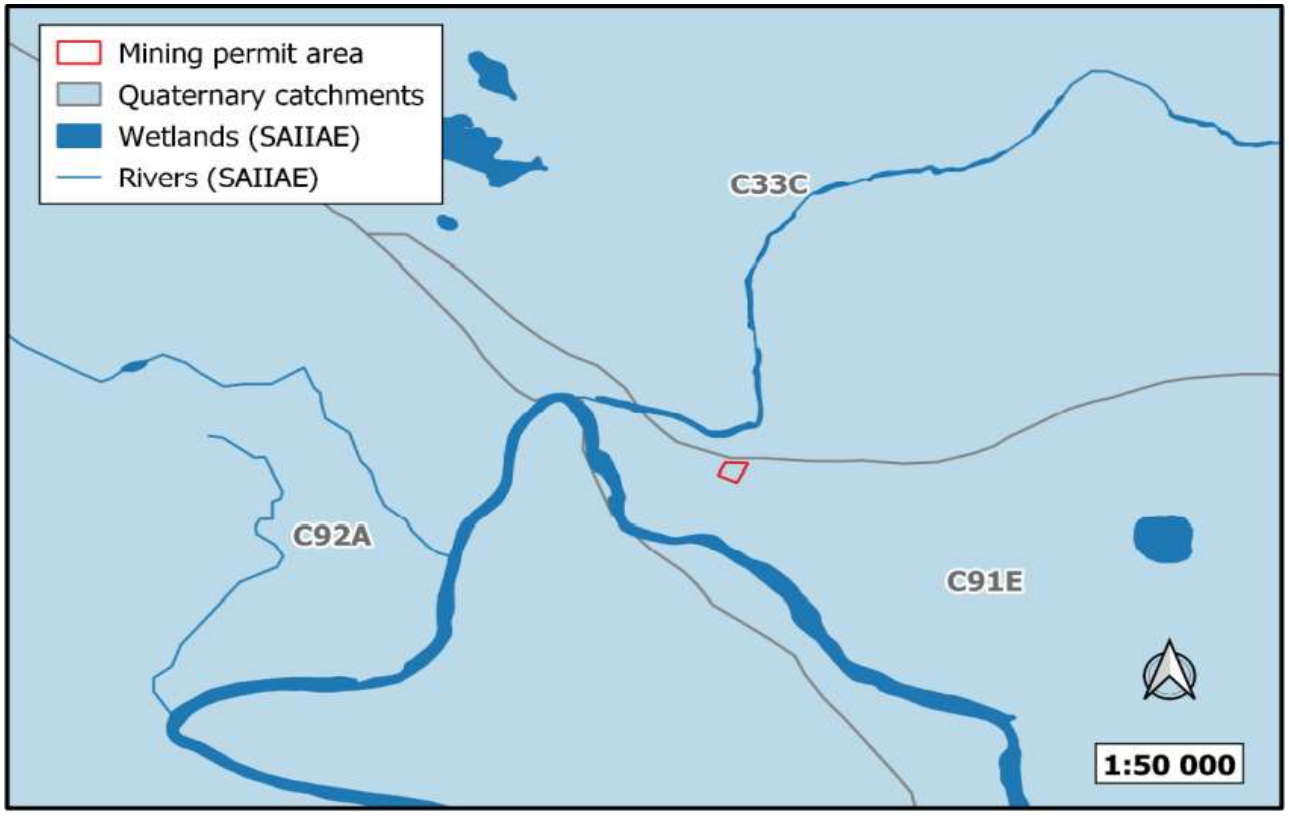


Figure 18. The locality of the Vaal River mining site in relation to the quaternary catchments of the Lower Vaal Water Management Area.

(9) ***GROUND WATER:***

Depth of water-table(s):
Groundwater flow is in the direction of the Vaal River following the surface drainage direction from the higher grounds.

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

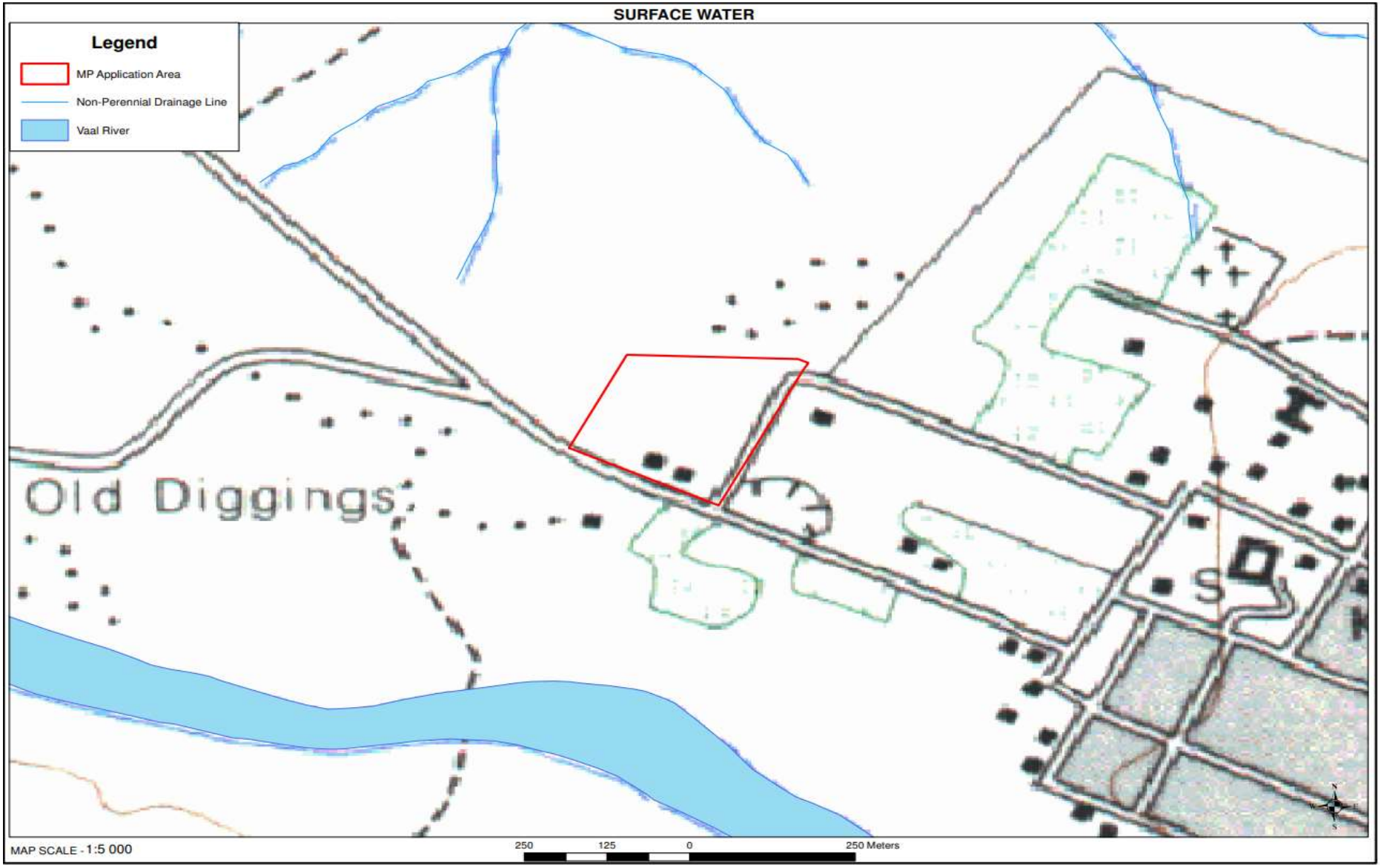


Figure 19. Surface Water Map with the Mining Permit indicated in red.

(10) ***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 on the farm.

Existing sources

The current source of air pollution in the area stems from numerous gravel roads and from vehicles travelling on the ravel roads of the area. No other significant sources of air- or dust pollution currently exist in the study area. Negligible amounts of exhaust fumes are emitted by the mining machinery and vehicles used on the farm. A small amount of dust pollution is furthermore caused by the trucks transporting products to the markets.

New source

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

Areas of impact

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

Noise

Existing sources:

Noise on site will come from the large vehicles (ADT trucks, front-end loader, back actor), from the working pan. Although these operations do generate noise the overall impact can be described as negligible.

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

Noise is normally encountered during the normal operation hours at the processing plant. Processing plant noise and mine vehicles are limited between 7am and 5pm every day during the week. Noise levels are

monitored on the mining area and where necessary, protective equipment is used in certain areas where machinery is used.

(11) VISUAL ASPECTS:

The mining area is reached via a gravel road that transects the application area and gravel street roads. There are a residence on the application area and within the surrounding area. There is however no method of reducing the impact during mining operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of open excavations as mining progress.

(12) CULTURAL AND HERITAGE RESOURCES:

Dr. E. Matenga was appointed by WJA Bergh to compile a desktop Heritage Impact Assessment for their Mining Permit application. The information below was gathered from this report.

For thousands of years the lower Vaal Basin was occupied by hunter-gatherers who subsisted on stone tool technologies. Scatters of stone tools have been encountered on the ancient floodplain and the ridges and saddles close to the river. Many field studies have been undertaken to support heritage impact assessment. Observations comprise mainly scatters of formal tools and less formal tools (flake waste). These findings indicate general hunter-gatherers' activity in the river corridor and beyond, on the plateaus. Stone Age communities were likely to have been very active along the floodplain attracted by the perennial water in the Vaal River. After a century of sporadic diggings for alluvial gold, it is no longer possible to find any stone tools in a sealed context.

Historical Context

Historically the area is home to the Tlhaping segment of the Tswana, who descended from the Iron Age and probably from as far back as the Stone Age. The early 19th century was a political turning point with an increasingly uncertain security situation and internal displacements playing out. One of the key episodes was the Difaqane, was characterised by inter-tribal raids. From the late 18th to early 19th centuries Griqua herders (people of Coloured stock from the southwest) settled in this area establishing a town called Klaarwater and subsequently renamed Griquatown. Meanwhile white hunters, traders and missionaries also entered the area. A little later the Afrikaners arrived bringing their stock as part of a mass exodus from the Cape called the Great Trek. The discovery of diamonds at Kimberley sparked the "rush". The area which became known as Griqualand West was subsequently incorporated into the Cape Colony in the 1880s.

Brief history of Vaal River alluvial diamond diggings

The mining of alluvial diamonds in the Vaal River Valley started in 1869 carried out by a party of prospectors from Natal organised by the British Army. As they continued the search for the gemstones they struck good finds at Klipdrift (Barkly West). These finds sparked South Africa's first diamond rush. Following the news men began to flock from Britain and elsewhere to the new diggings. By April 1871 c. 5000 men had swarmed the Vaal, Modder, and Orange Rivers. The alluvial finds from the region proved to be of high quality. The miners staked claims while the local Griqua chiefs and the Boer Republics of the Transvaal and Orange Free State also joined in the fray. Ownership rights were initially given to local chiefs and Boer Trekkers. But the diggers proclaimed the Klip Drift Republic on 30th July 1870 with Stafford Parker as its elected president. In the same year Sir Henry Barkly, governor of the Cape visited the diggings, which prompted the miners to rename Klipdrift Barkly West. In 1872, the British annexed the diamond fields and proclaimed Griqualand West as a crown state. It was subsequently incorporated into the Cape Colony in 1880. The majority of the prospectors abandoned the various Vaal River claims in the wake of richer finds at Kimberley in 1871. Mining of the river gravels has been going on sparking sporadic rushes over the last nearly one and half centuries.

The target area is likely to have been disturbed by alluvial diamond diggings which occurred in the last 120 years. As a result there is little prospect of finding stone age tools which commonly occur in the Vaal – Orange River Basin in undisturbed context.

Prof. M. Bamford was appointed by WJA Bergh to compile a desktop Palaeontological Impact Assessment.

The palaeontological sensitivity of the area under consideration is presented in Figure 20. The site for development is in the Quaternary alluvium and sands (orange and green, respectively).

The Tertiary calcretes can trap fossils and artefacts when associated with palaeo-pans or palaeo-springs (Partridge et al., 2006). Where deflation has occurred, for example along the west coast of South Africa, any trapped materials in the different levels can be concentrated in the depo-centre of the pan or dune and thus it can be challenging to interpret the deposit (Felix-Henningsen et al., 2003).

The Aeolian sands of the Gordonia Formation do not preserve fossils because they have been transported and reworked. Conditions required for the preservation of organic material and formation of fossils are burial in a low energy, anoxic environment such as overbank deposits,

lake muds or clays (Briggs and McMahon, 2016). Aeolian sands are high energy, well-oxygenated environments. In some regions the sands may have covered pan or spring deposits and these can trap fossils, and more frequently archaeological artefacts. Usually, these geomorphological features can be detected using satellite imagery. No such features are visible.

Exploration and research along the palaeo-rivers of Southern Africa, now only present as abandoned palaeochannels, or captured by the present-day rivers, the Vaal and Orange Rivers in this case, the gravels and sands might include transported robust and fragmentary fossils. Examples of these are heavy bone fragments and silicified wood fragments, as well as diamonds (de Wit, 1999; de Wit et al., 2000).

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old to contain fossils or the materials have been transported. Furthermore, the material to be mined or sifted through is transported, high energy and well oxygenated sand and this does not preserve fossils. Since there is a small chance that fossils from the Quaternary may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

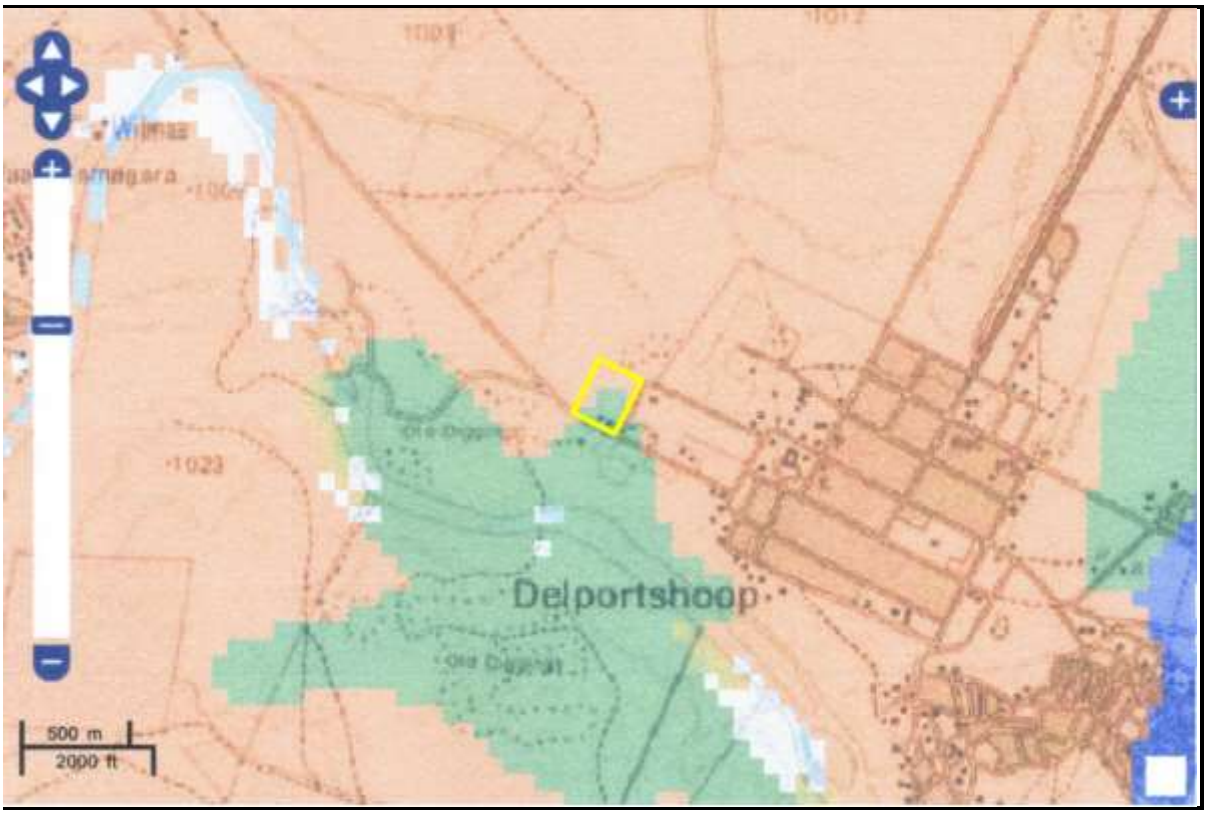


Figure 20. SAHRIS palaeosensitivity map for the site for the Mining Permit Application in

Delportshoop shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very high sensitivity; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Chance Find Protocol

Monitoring Programme for Palaeontology – to commence once the excavations / drilling / mining activities begin.

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

The Screening Report compiled for the Environmental Authorization indicates a low sensitivity for the *Archaeological and Cultural Combined Sensitivity Theme.* Whereas the *Palaeontology Combined Sensitivity Theme* indicates a medium to high sensitivity.

Figure 21. Archaeological and Cultural Heritage Combined Sensitivity.

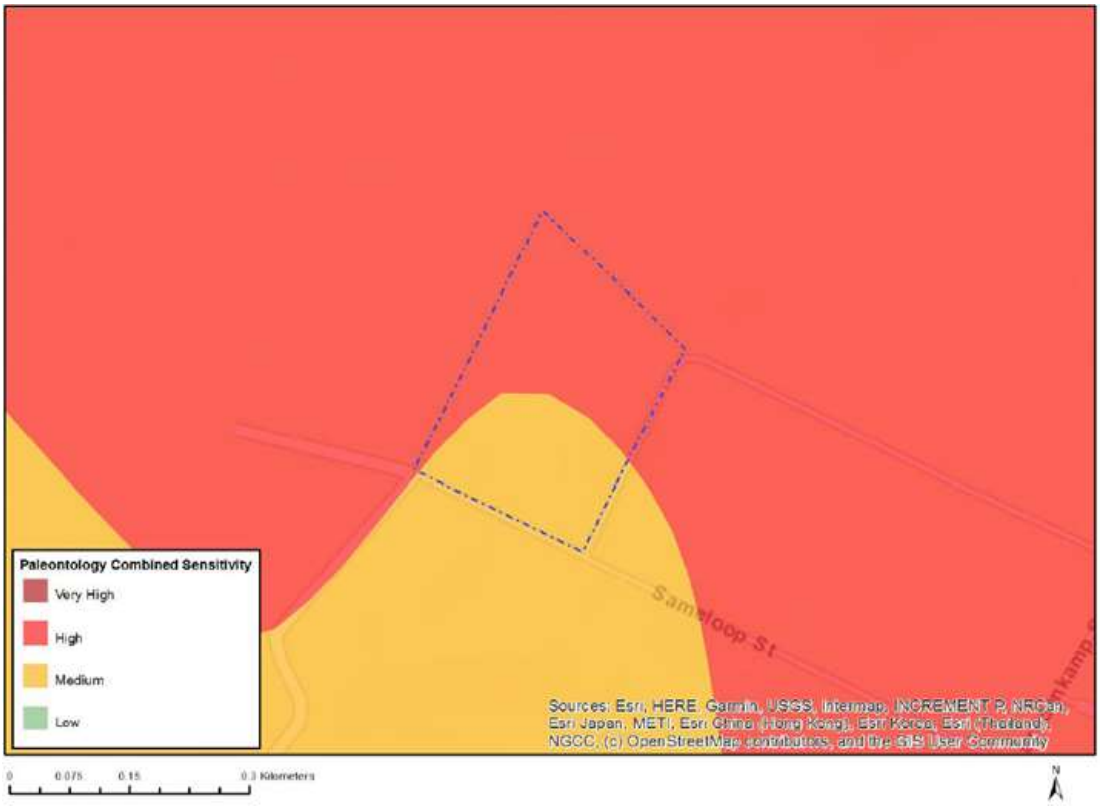


Figure 22. Palaeontology Combined Sensitivity

(13) ***BROAD-SCALE ECOLOGICAL PROCESSES:***

*Dr. Elizabeth (Betsie) Milne from Boscia Ecological Consulting cc has been appointed by WJA Bergh to provide an Ecological Assessment Report in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impacts of mining on the ecological status of the application area. (**Appendix 4**)*

The proposed mining site falls partially within a critical biodiversity area (Figure 23), as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The northern half of the site is classified as Critical Biodiversity Area Two (Figure 23). It is unclear why this area was given such high biodiversity importance, but from the field verification it is evident that this is inaccurate. The biodiversity on site has already been severely compromised by past land use activities and most of the natural vegetation has been replaced by alien species.

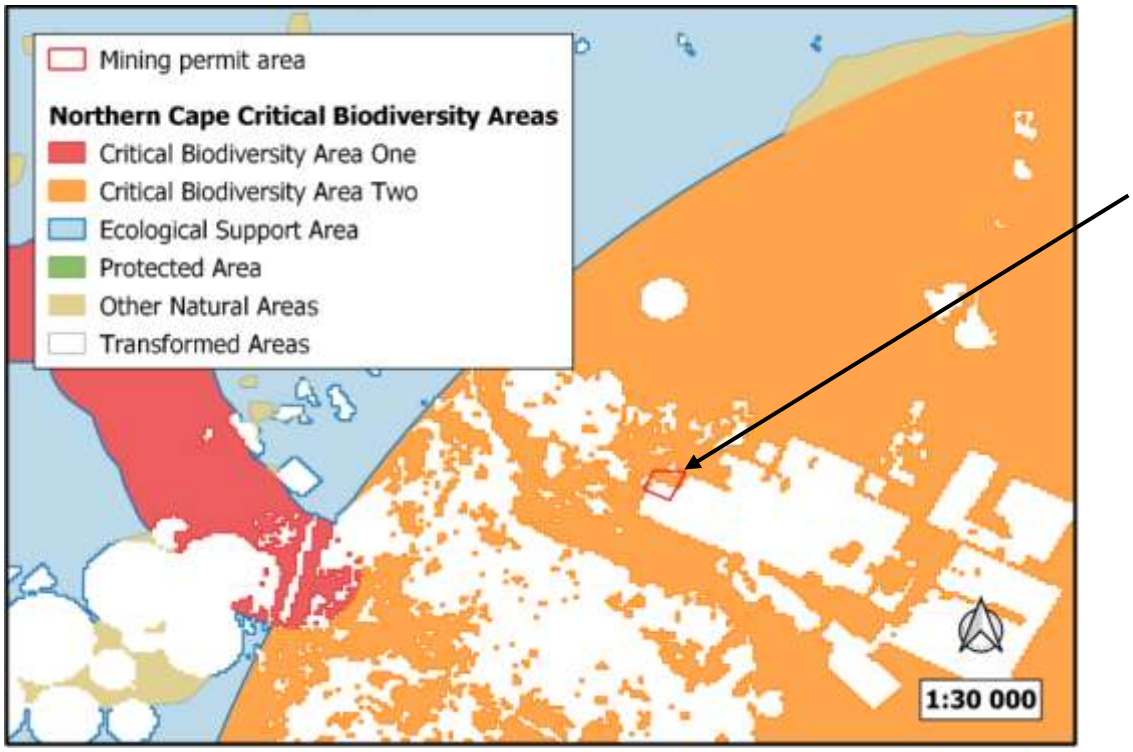


Figure 23. The study area in relation to the Northern Cape Critical Biodiversity Areas.

The Mining and Biodiversity Guidelines (DENC et al. 2013) does not recognise the site to have any biodiversity importance. These guidelines

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

According to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features (Figure 24). The northern half of the site is of very high sensitivity based on the Terrestrial Biodiversity Theme. However, this sensitivity is based on the inaccurate representation of the Northern Cape Critical Biodiversity Areas Map, as discussed above. The site is of low sensitivity based on the Plant- and Animal Species, as well as the Aquatic Biodiversity Themes.

Figure 24. Environmental Sensitivities in the study area, according to the National Web based Environmental Screening Tool.

According to the Dikgatlong Spatial Development Framework (2014) the study area falls within the urban area of Delportshoop, with the southern half of the site zoned for agriculture. No area on site has been considered for conservation planning.

The study area also falls within the core area of the Griqualand West Centre (GWC) of Endemism as defined by Frisby et al. (2019). A centre of plant endemism is an area with high concentrations of plant species with

very restricted distributions, known as endemics (Van Wyk and Smith 2001). Relatively small disturbances in a centre of endemism may easily pose a serious threat to its many ranges restricted species. Endemics are specifically vulnerable due to their restricted distribution ranges. However due to the degraded state of the natural vegetation on site, any potential contribution in harbouring unique species within this centre of endemism has been lost.

Finally, the study area falls within a region where one of South Africa's largest economically most important diamond deposits are found (Gresse 2003). Significant crop irrigation in the Northern Cape also occur here (Durand 2006). These factors increase the cumulative impacts of the proposed operation.

Site Sensitivity

The sensitivity map for the mining permit area is illustrated in Figure 26. The entire site is of low sensitivity due to the natural ecological habitat already being highly transformed and invaded by alien plants. There is likely to be a negligible impact on ecological processes and biodiversity. Most activities can proceed within this area with little ecological impact.

(14) *SOCIO-ECONOMIC STRUCTURE OF THE REGION:*

Basic Municipal Profile – Dikgatlong Municipality

[Information obtained from the Draft Dikgatlong IDP – 2018-2019]

Demographic Profile of Municipality

Population And Population Growth

According to Statistics South Africa census 2011, Dikgatlong Local Municipality has seen an increase in total population of 46 841 to 48473 with a total 3.5 increase in population over the last five years. The annual growth is 0.7% and if this trend continues the population will increase to 50 907 by 2023. The population is divided into various racial groups: the majority being Black African (58.47%), followed by Coloured (28.48%), other (8.88%) while Whites (3.62%) and Indians or Asian (0.28%) being the least represented.

Table 8: Population Growth from 2011 to 2016.

2011	2016	Change	Increase/Change per Annum	2023 Exponential Growth Population Projection
46841	48473	1633 (3,5%)	0,70	50 899

Dikgatlong Local Municipality saw an 18% growth in households between 2011 and 2016 and a decline in household size from 3.9 to 33.

Gender And Age Groups

The Dikgatlong LM is seeing a slight aging in its population, with a 5,4% decline in the age category of between '15 and 34', while the '0-14' age category saw a slight decline and the '35-64' age category increased by 8,9% between 2011 and 2016. Similar to the other local municipalities, the 'older than 64' category saw a large increase of 54,1% (see Table 9 below).

Table 9: Change is age groups of population according to gender.

Age	0-14		15-34		35-64		Older than 64		Total	
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Dikgatlong 2011	7484	7341	8103	8136	6466	6849	1009	1452	23062	23778
Dikgatlong 2016	7571	7197	7975	7435	7304	7198	1443	2350	24293	24180
Change in numbers	88	-144	-129	-702	838	349	434	898	1231	402
% Change between 2011 and 2016	1,2	-2,0	-1,6	-8,6	13,0	5,1	43,0	61,8	+5,3%	+1,7%

An interesting trend however is the decline in the female population aged between '15-34' by 8,6% (702 individuals).

Education

Dikgatlong Local Municipality had a large number of people with some secondary school followed by those with some primary levels from 2011. Currently 10% of the Dikgatlong LM population that is older than 20 years in 2016 have 'no schooling', a steep decline of 37% in actual numbers from 18% in 2011. Only 23% of the 2016 population that is older than 20 years of age have Gr.12, up from 20% in 2011, these low levels of education place certain limitations on employment creation (See Tables 10 and 11 below).

Table 10: Population older than 20 without schooling. [Source: StatsSA]

	2011		2016		% Change 2011 to 2016
	Pop. 20+ with no Schooling	% Pop. 20+ with no Schooling	Pop. 20+ with no Schooling	% Pop. 20+ with no Schooling	
Sol Plaatjies	10758	7%	7412	5%	-31%
Dikgatlong	**4864**	**18%**	**3079**	**10%**	-37%
Magareng	2371	17%	1834	13%	-23%
Phokwane	6418	18%	4976	14%	-22%
Frances Baard	24411	10%	17301	7%	-29%
Northern Cape	76861	11%	58818	8%	-23%

Table 11: Population older than 20 with grade 12. [Source: StatsSA]

	2011		2016		% Change 2011 to 2016
	Pop. 20+ with Gr.12	% Pop. 20+ with Gr.12	Pop. 20+ with Gr.12	% Pop. 20+ with Gr.12	
Sol Plaatjies	44506	29%	53303	33%	+20%
Dikgatlong	**5567**	**20%**	**6628**	**23%**	+19%
Magareng	3419	24%	4055	28%	+19%
Phokwane	7963	22%	8741	24%	+10%
Frances Baard	61456	26%	72728	30%	+18%
Northern Cape	154008	22%	200860	27%	+30%

Tertiary education is decidedly low in Dikgatlong LM, with only 1,1% of the population older than 34 having some type of tertiary education, a 1,81% increase from 2011 (see Table 12 below).

Table 12; Populatuion older than 34 with Tertiary Education, 2011-2016

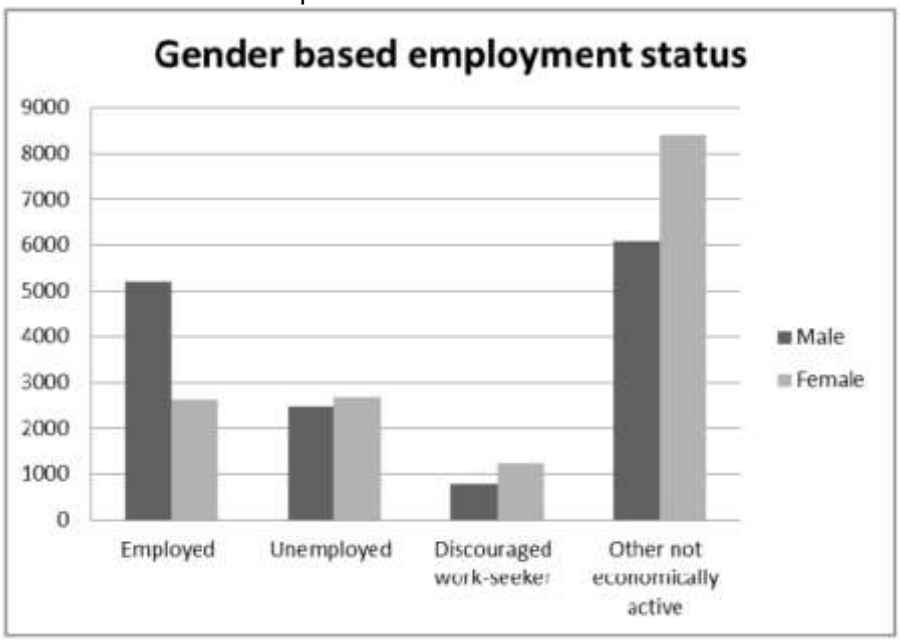
	2011		2016		% Change 2011 to 2016
	Pop. older than 34 with Higher Education	% of pop. older than 34	Pop. older than 34 with Higher Education	% of pop. older than 34	
Sol Plaatjies	1053	1,2%	1494	1,5	+0,13%
Dikgatlong	**107**	**0,7%**	**208**	**1,1**	**+1,81%**
Magareng	84	1,0%	149	1,6	+2,12%
Phokwane	189	0,9%	394	1,7	+1,10%
Frances Baard	1307	0,3%	1736	1,1	+0,10%

Unemployment

The number of those who are not economically active is very high, which means a large portion of the population is highly dependent on social grants or on those that work. The number of employed people has increased from 5924 people (2001) to 7841 (2011). Thus the unemployment rate has decreased from 45.3% (2001) to 39.7% (2011).

The Stats SA 2011 indicates that more men are employed than their female counterparts.

Furthermore women are the most discouraged work seekers. Additionally, the economical not active female population is also higher than their male counterparts.



Graph 1: Employment status based on gender.

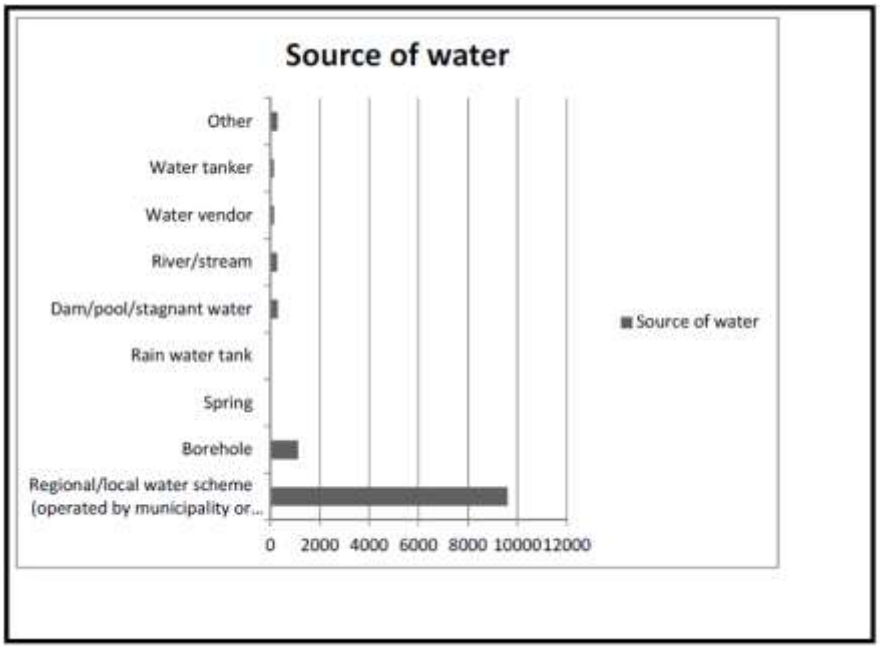
Households And Household Services

There has not been a significant change in the dwellings indicators of Dikgatlong Local Municipality. Those living in formal structure constitute

78.5% compared to the 73.2% of 2001. Those living in informal settlements constitute 11.5% of the total households. Currently those living in informal settlements have access to the following basic services; communal stand pipes, electricity and limited refuse removal.

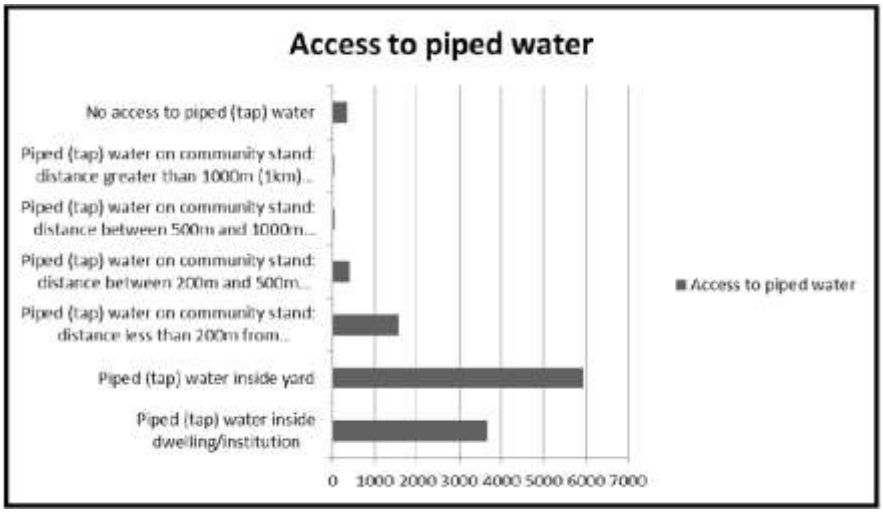
Water

Access to clean water and proper sanitation are key environmental elements that affect health outcomes of households. From the graph below it is evident that a large number of households receive water from a regional/local water scheme. However there are still those households who drink water from the river/stream, dam/pool/stagnant water and those that could not be ascertained as to where they get their water from. Drinking water that has not been purified can make the households vulnerable to a number of communicable diseases such as diarrhoea. The municipality is the water service authority for ward 6, 7 and portion of ward 5. The rest of the municipal area is supplied with water by Sedibeng Water.



Graph 2: Water Sources

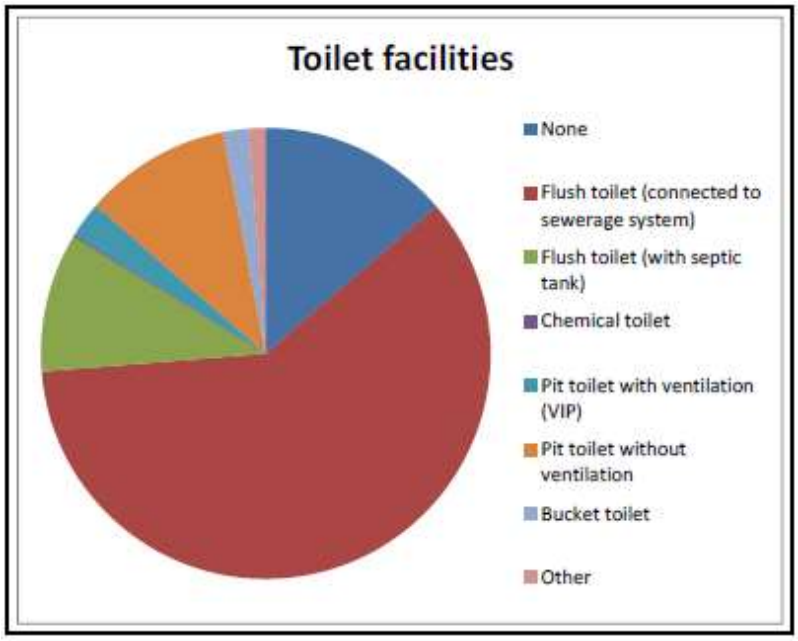
The majority of household (5935) have access to piped water inside their yard, followed by those who have access to piped water inside their dwelling (3670). The concern is for those households that must travel more than 1km (more than 20 minutes) to access a community piped water stand (0.24%), as it technical indicates that such a service is not accessible. The concern is also for those who have no access to tap water (2.77%), as they might be drinking water that is un-purified and not good for health purposes.



Graph 3: Acess to piped water.

Sanitation

The Millennium Development Goal states the need for "sustainable access to safe drinking water and basic sanitation". 13.72% of households in the Dikgatlong LM do not have access to basic sanitation, while 1.84% still uses the bucket toilet. The 13.72% of none access, is higher that the Provincial one which is 8.04% of households with no access to basic sanitation.

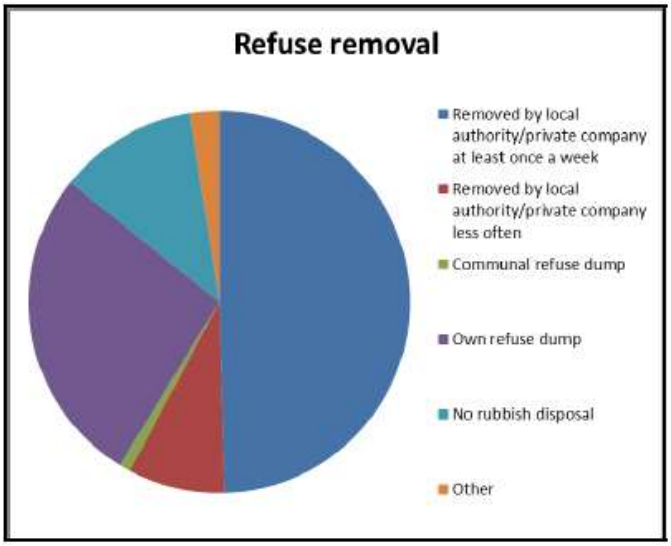


Graph 4: Toilet facilities.

Waste management

Proper waste management is important for sustainable development because if waste is not disposed of properly it can cause environmental and health problems. 49.57% of households have their refuse removed by a local authority at least once a week, while 27% have their own refuse dump and 11.78% have no rubbish disposal. It is a great concern for those

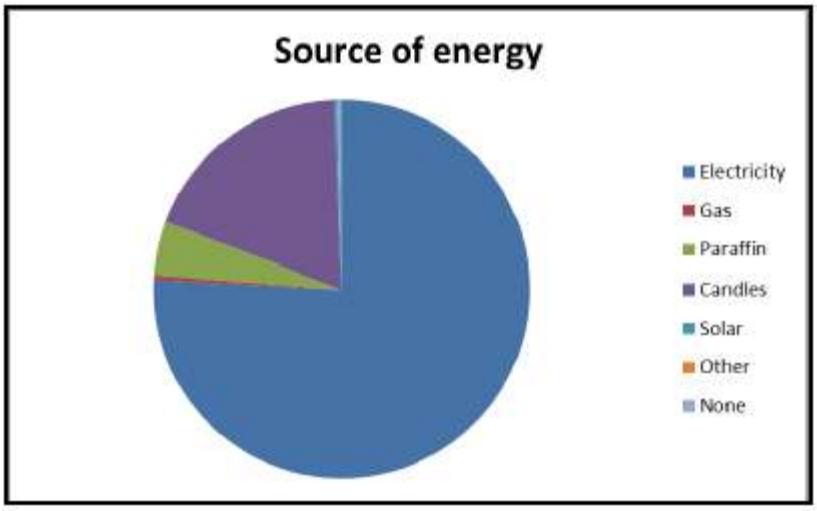
who have no rubbish disposal because they can dispose their refuse in a manner that is not in line with sustainable development principles.



Graph 5: Refuse removal.

Electricity and energy

There has been an improvement on the energy use across the whole country. The majority of household (75.86%) use electricity as the source of energy for lighting, this was previously 68.5% (in 2001). The number of households that use candles has also decreased from 32% to 18.66% as well as those that use gas and paraffin. However there seems to be no visible efforts of using solar energy, to decrease the dependency of electricity.



Graph 6: Source of energy for households.

(b) Description of the current land uses

(1) *Land Use before Mining:*

Prior to the first mining activities, the properties were used for livestock farming. Currently, the major land uses in the study area are urban development and mining.

The land capability for the study area is non-arable with low to moderate potential for grazing. The grazing capacity is 13 ha/LSU, with the agricultural region being demarcated for the cattle farming. The study area also falls within the Northwestern cattle and game ranching Livelihood Zone.

The entire study area has been transformed through historic land use practices. Currently, it is being used partially as a residence. Existing infrastructure includes a homestead and the historic disturbance footprint.

(2) Evidence of Disturbance:-

The study area has been transformed by previous mining operations.

(3) Existing Structures:-

The existing structures on the study area includes a homestead with stores.

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

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

(d) Environmental and current land use map

(Show all environmental, and current land use features)

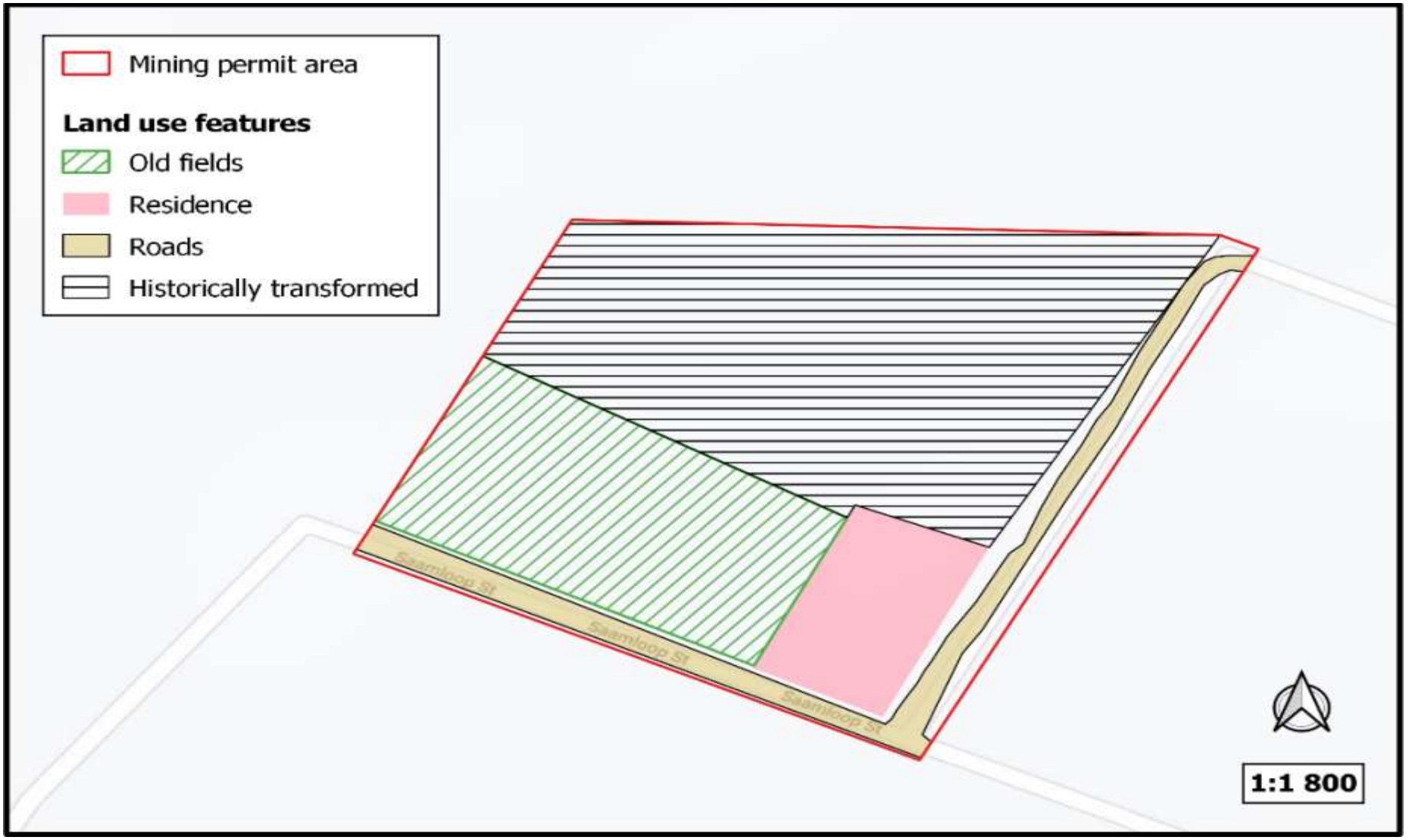


Figure 25. Environmental and current land use map with previous distubances evident

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	Life of operation	insignificant Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Medium	Possible for life of operation	Life of operation	Low Local	• Mining of all alluvial gravels continuously, if possible and does not influence mining and safety requirements. • Employ effective rehabilitation strategies to restore surface topography of excavations, dumps and plant site. • Stabilise the mine residue deposits. • All temporary infrastructures should be demolished during closure.
Soils	Soil Erosion During clearing of an area for mining and roads. Vegetation will be stripped for	Low - Medium	Possible for life of operation	Residual	Medium On-site	• Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • Ground exposure should be minimised in terms of the surface area and duration.

	construction of new roads and for mining; and these areas will be bare and susceptible to erosion. Any topsoil that is stripped and piled on surrounding areas can be eroded by wind, rain and flooding.					• The operation must co-ordinate different activities to optimise the mining operation in such a way to prevent repeated and unnecessary disturbances to the vegetation and soil. • Disturbances during the rainy season (November to March) should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) to avoid excessive erosional induced losses. • Any excavated and stockpiled material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate. • Regular monitoring during the mining operation should be carried out to identify areas where erosion is occurring;

						followed by appropriate remedial actions.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Loss of soil fertility Clearing of an area for mining, and roads. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the mining activities, loss of soil fertility can also occur through soil compaction. Rainwater can also cause leaching and erosion of topsoil	Low-Medium	Possible for life of operation	Residual	Low-medium On-site	• 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 must not be handled when the moisture content exceeds 12%. • Topsoil stockpiles must be kept separate from sub-soils. • The topsoil should be replaced as soon as possible onto the cleared areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

	stockpiles, resulting in the loss of nutrients.					
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Soil pollution Spillage of hazardous material; runoff.	Low-Medium	Possible for life of operation	Residual	Low-Medium On-site	• 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.	Very Low	Possible for life of operation	Life of operation	Minimal Local	Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and	Very low	Possible for life of operation	Life of operation	Minimal Local	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.

	ineffective rehabilitation					
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon Spills Hydrocarbon spills from construction vehicles and fuel storage areas may contaminate the groundwater resource locally	Medium	Possible for life of operation	Life of operation	Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Surface Water	• 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.	Medium to Low	Possible	Life of operation	Low Local	Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources. Dirty storm water trenches should be inspected regularly (once before the rainy season and after each occurrence of a storm) to clean the trench from excess soil particles to prevent overtopping of the channel wall during a sudden storm which will result in

	Significant levels of dust may emanate from the use of heavy construction vehicles which in turn will impact on runoff water quality. • Materials used during construction may impact negatively on the runoff water quality. • increased sedimentation of watercourses, • increased establishment of weeds and invaders and increased erosion due to mining in watercourse channels. • Mining in close proximity to the river and within the main channel will clear					mixing of the dirty and clean water systems. 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: • Only environmentally friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources. • Pipe leakages should be minimized. • Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment. • Non mining waste i.e., grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated

	vegetation, disturb the soil surface and mobilise soils. This may cause high levels of sedimentation within the river.					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. • It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Due to the clearing of
	• Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP. • A high potential of soil erosion exists due to an increased percentage of bare surfaces.	High	Possible	Life of operation	Low to Moderate Local	
	• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution.	Moderate to High	Possible	Life of operation	Low Local	

	• Removal of vegetation could lead to erosion and sediment transportation. • Significant dust levels will emanate from the use of heavy construction vehicles.					vegetation these sediments will be transported downstream and in the Vaal River. Disturbance of the bed surface and streamflow after rain events will also lead to erosion of the riverbed and banks. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	**Loss of and disturbance to indigenous vegetation** During the construction of roads	Low to medium	Certain for life of operation	Residual	Low to Medium On-site	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads where possible. • Encourage proper rehabilitation of mined areas,

	and during mining, and through vehicular movement. The construction of roads, as well as mining activities will damage or destroy natural vegetation. Due to the transformed status of the vegetation, any further destruction to natural vegetation will be at a very small scale. However, it is not expected that these areas will recover following disturbance events without active rehabilitation plans. Vehicle traffic also generates dust which can reduce the growth success and seed dispersal of many small plant species.					by effective backfilling and returning the stockpiled topsoil. • Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearances have taken place. • Ensure measures for the adherence to the speed limit to minimise dust plumes. • Apply for permits to authorise the clearance of indigenous plants from DENC at least three months before such activities will commence.

	Loss of flora with conservation concern Removal of listed or protected plant species during the construction of roads, or during mining. Intentional removal of listed or protected plant species for non-mine related purposes, e.g., illegal medicinal trade, cultural beliefs or fire wood collection. No species of conservation concern were observed on site. However, it should not be assumed that those historically recorded in the region are not present at all. Due to the time constraints, the site was only assessed once-off and due to	Low to medium	Possible for life of operation	Residual	Low to Medium On-site	• All footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to any destructive activities. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout plan and left in situ. • However, if threatened by destruction, these plants should be removed (with the relevant permits from DAFF and/or 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. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related

	seasonal variations, some protected species could have been overlooked.					disturbance and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ measures to ensure that no illegal harvesting takes place.
	Proliferation of alien vegetation During the clearing of vegetation, and general disturbances cause through mining activities. The extent of alien invasive species in the earmarked area, especially Prosopis and Tamarisk	Low - Medium	Possible, infrequent	Residual	Medium Local	• 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.

	is extremely high. General clearing of vegetation destroys natural vegetation, whereafter invasive plants usually 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. In fact, the proposed mining activities could potentially reduce the extent of these invaders. By clearing stands of these species during mining, and then effectively rehabilitating the cleared areas, it can have a positive effect on the biodiversity.					
	Encouragement of bush encroachment During the clearing of vegetation, and general disturbances cause through mining activities. Only one bush encroaching species (Grewia flava) occur	Low	Low likelihood, temporarily	Residual	Low On site	• 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.

	in the study area. Bush encroachment is usually a natural phenomenon characterised by the excessive expansion of certain shrub species at the expense of other plant species, especially grasses. While general clearing of the area and mining activities destroy natural vegetation, bush encroaching plants can increase due to their aggressive nature in disturbed areas. If encroaching plants establish in disturbed areas, it may lower the potential for future land use and decrease biodiversity. In the earmarked area however, this species has not expanded in such a way,					

	and its presence has been masked by the vast extent of alien plants.					
Fauna	**Loss, damage and fragmentation of natural habitats** During the clearing of vegetation, and general disturbances cause through mining activities. Mining activities could result in the loss of connectivity and fragmentation of natural habitat, which generally leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the	Medium-High	Possible for life of operation	Residual	Medium-high Local	• All activities associated with the mining operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for all people and machinery. • Limit the removal of indigenous adult trees as far as possible.

	study site. Pockets of fragmented natural habitats hinder the growth and development of populations.					
	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement on site resulting from mining activities. The transformation of natural habitats will result in the loss of micro habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g., birds that nest in	Low	Certain for life of operation	Life of operation	Low On-site	• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the mining activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone. • If any protected fauna species are threatened by habitat destruction, the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • Everyone on site must undergo environmental induction for awareness on

	trees, or animals residing in holes in the ground. Increased noise and vibration will disturb and possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Intentional killing of snakes, reptiles, vultures and owls will negatively affect the local populations.					not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site. • 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 on public roads as well as driving mindfully on-site tracks to lower the risk of animals being killed while traversing the property.
Ecological processes	**Compromise of ecological processes** **Clearing of vegetation and disturbance during the construction of roads; mining activities.** **The mining operation is expected to cause some habitat**	Medium High	Residual	Possible for life of operation	Medium High Local	• All activities associated with the mining operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area

	transformation and will thereby contribute moderately to cumulative habitat loss and the disruption of the broad-scale landscape connectivity in the region. 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.					except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for all people and machinery. • Limit the removal of indigenous adult trees as far as possible.
Air Quality	Sources of atmospheric emission associated with the mining operation are likely to include fugitive	Low	Certain	Possible for life of operation	Low Local	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.

	dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of road dust.					
SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil Noise increase at the boundary of the mine footprint	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Construction of internal Roads	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels.
	Clearing of new open cast mining areas, stripping and stockpiling of topsoil. Noise increase at the boundary of the mine footprint.	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Diesel generators Noise increase at the boundary of the mine footprint.	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers

						specifications on acceptable noise levels
	Additional traffic to and from the mine	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Mining activities	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Maintenance activities at the site.	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Back fill of mine footprint area Noise increase at the boundary of the mine footprint and at the residents living close.	Medium	Possible	Possible for life of operation	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	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.
Visual impacts	Potential visual impact	Medium	Certain	Possible for life of operation	Low Local Site	The design of the proposed mining development will determine the visual impact. As the visual impact would be low.
	Potential Visual Impact on the surrounding land users/ residents	Medium Regional	Highly Likely	Possible for life of operation	Medium 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.	Medium Regional	Highly likely	Operational	Medium Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact. • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; • Rehabilitation of disturbed areas and re-establishment of vegetation;
Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low likelihood	Possible for life of operation	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
	Population Impacts	Medium Positive	Probable	Possible for life of operation	Medium Positive	• A community skills audit should be undertaken by

Socio-Economic	Employment Opportunities and skills Inequities				Local	André Bergh. Alternatively, the existing Dikgatlong Labour Desk could be used to determine which skills are locally available and which employees could come into consideration for employment. • Training courses should be accredited and certificates obtained should be acceptable by other related industries.
	Safety and Security Risks	Low Negative	Possible for life of operation	Life of Operation	Low Negative Local	• A Fire/Emergency Management Plan should be developed and implemented at the outset of the construction phase. • 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.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	• Management
	Health Impacts	Low Negative	Possible for life of mine	Life of operation	Low Negative Local	• Maximise the employment of locals where possible • First aid supplies should be available at various points at the construction site • Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the construction site • The general health of construction workers should be monitored on an on-going basis
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the mining company.	Low to medium	Possible for life of mine	Life of operation	Low Local	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**

Impact Assessment

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

1	**Processing Plant : 1 X 16 feet pan with conveyers and recovery**
2	**Ablution Facilities:** In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
3	**Clean & Dirty water system: Berms** It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.
4	**Fuel Storage facility (Concrete Bund walls and Diesel tanks):** It is anticipated that the operation will utilize 2 x 23 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.
5	**Mining Area:** Opencast mining to mine for alluvial diamonds.
6	**Salvage yard (Storage and laydown area).**
7	**Product Stockpile area.**
8	**Waste disposal site** The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: o Small amounts of low level hazardous waste in suitable receptacles; o Domestic waste; o Industrial waste.
9	**Roads (both access and haulage road on the mine site):** Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 2 - 4 km of roads, with a width of 6 meters.
10	**Temporary Workshop Facilities and Wash bay.**
11	**Water distribution Pipeline.**
12	**Water tank :** It is anticipated that the operation will establish 1 x 10 000 litre water tanks with purifiers for potable water.

The criteria used to assess the significance of the impacts are shown in the table 13 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:

(Severity + Extent + Duration) x 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 13. Consequence of impacts is defined as follows.

CONSEQUENCE				
Colour Code	**Consequence rating**	**Rating**	**Negative Impact**	**Positive Impact**
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Low- Medium	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

Consequence 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.

Low Medium 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 made the following evaluation, criteria need to be described.

Table 14. Criteria used to assess the **SIGNIFICANCE** of impacts

Weight	Severity	Spatial scope (Extent)	Duration
5	Disastrous	Trans boundary effects	Permanent
4	Catastrophic / Major	National / Severe environmental damage	Residual
3	High / Critical / Serious	Regional effect	Decommissioning
2	Medium / slightly harmful	Immediate surroundings / local / outside mine fence	Life of Operation
1	Minimal/potentially harmful	Slight permit deviation / on-site	Short term / construction (6 months – 1 year)
0	Insignificant/ non harmful	Activity specific / No effect / Controlled	Immediate (0 – 6 months)

Table 15. Explanation of **PROBABILITY** of impact occurrence

Weight number		1	2	3	4	5
Frequency						
Probability	Frequency of impact	Highly unlikely	Rare	Low likelihood	Probable / Possible	Certain
		Practically impossible	Conceivable but very unlikely	Only remotely possible	Unusual but possible	Definite
	Frequency of activity	Annually or less	6 months/ temporarily	Infrequent	Frequently	Life of Operation

Table 16. Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
0	Insignificant/ non harmful	There will be no impact at all – not even a very low impact on the system or any of its parts.
1	Minimal/potentially harmful	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.
2	Medium / slightly harmful	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.
3	High / Critical / Serious	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.
4	Catastrophic / Major	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.
5	Disastrous	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

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

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

During the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and excavations /dumps will alter the topography by adding features to the landscape. Removal of alluvial gravels will unearth the current topography. 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 making excavations, 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 mining of alluvial gravels with no proper rehabilitation. The land capabilities and land use potential can be restored with proper rehabilitation.

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

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

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

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

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

Geology and mineral resource

Level of risk: Very low

Mitigation measures

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

Topography

Level of risk: Low

Mitigation measures

- Mining of alluvial gravels continuously, if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled backfilling at excavations and plant site;
- Stabilise the mine residue deposit;
- All temporary infrastructures should be demolished during closure.

Soil erosion

Level of risk: Low-Medium

Mitigation measures

- Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.
- Ground exposure should be minimised in terms of the surface area and duration.
- The operation must co-ordinate different activities to optimise the mining operation in such a way to prevent repeated and unnecessary disturbances to the vegetation and soil.
- Disturbances during the rainy season (November to March) should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) to avoid excessive erosional induced losses.
- Any excavated and stockpiled material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.

- Regular monitoring during the mining operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

Loss of **Soil Fertility**
Level of risk: Low-Medium
Mitigation measures

- Topsoil needs to be removed and stored separately before any vegetation is stripped.
- These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.

Land capability and land use
Level of risk: Low
Mitigation measures

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

Ground water
Level of risk: Low
Mitigation measures

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

Surface water

Level of risk: Low - Medium

Mitigation measures

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The mining site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmentally friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources.
- Pipe leakages should be minimized.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non 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 rehabilitated disturbed areas must 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.
- Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined.

Loss of **Indigenous flora**

Level of risk: Low to medium

Mitigation measures

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads where possible.
- Encourage proper rehabilitation of mined areas, by effective backfilling and returning the stockpiled topsoil.

- Encourage the growth of natural plant species by sowing indigenous seeds or by planting seedlings where major vegetation clearances have taken place.
- Ensure measures for the adherence to the speed limit to minimise dust plumes.
- Apply for permits to authorise the clearance of indigenous plants from DENC at least three months before such activities will commence.

Loss of Red data and / or protected species

Level of risk: Low to Medium

Mitigation measures

- All footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to any destructive activities.
- It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout plan and left in situ.
- However, if threatened by destruction, these plants should be removed (with the relevant permits from DAFF and/or 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.
- The designation of an environmental officer is recommended to 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. The environmental induction should occur in the appropriate languages for the workers who may require translation.
- All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species.
- Employ measures to ensure that no illegal harvesting takes place.

Introduction or spread of Alien invasive plants

Level of risk: Low to medium

Mitigation measures

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

Encouraging bush encroachment

Level of risk: Low to medium

Mitigation measures

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

- Annual follow-up operations to be implemented.

Disturbance, displacement and killing of Fauna

Level of risk: Low

Mitigation measures

- Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.
- The extent of the mining activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone.
- If any protected fauna species are threatened by habitat destruction, the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.
- Everyone on site must undergo environmental induction for awareness on not harming or collecting species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.
- 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 on public roads as well as driving mindfully on-site tracks to lower the risk of animals being killed while traversing the property.

Habitat

Level of risk: Medium - High

Mitigation measures

- All activities associated with the mining operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.
- Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for all people and machinery.
- Limit the removal of indigenous adult trees as far as possible

Air quality

Level of risk: Low-Medium

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for mining only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.

- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.
- The length of time where open areas are exposed should be restricted. Mining should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, be implemented at all areas that may / are exposed for long periods of time.
- For all mining activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
    - Speed limits;
    - Spraying of surfaces with water;
    - Mining of alluvial gravels and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Medium

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Construction activities to take place during daytime period only.
- Noise monitoring on a quarterly basis.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Emergency generators to be placed in such a manner that it is not a nuisance for any other parties.
- Noise monitoring to be done along the mine footprint and noise sources within the mine boundary on a monthly basis after which the frequency can change to a quarterly basis.
- The siren when conveyor, hauling vehicles area reversing and/or any other mine vehicle to be replaced with a vibrating type siren if it is approved by the Department of Labour.
- Haul roads to be levelled on a regular basis to avoid the formation of potholes.

Visual impacts

Level of risk: Low Medium

Mitigation measures

Mitigation measures may be considered in two categories:

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

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

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

Traffic and road safety

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

Heritage resources

Level of risk: Low

Mitigation measures

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

A principal aim of the CFP (Chance Finds Procedure) is to raise awareness of all personnel in the project regarding the prospect of finding archaeological resources that unseen during the Phase 1 scoping heritage assessment and establish a protocol for the protection of these resources. The appointed Environmental Control Officer (ECO) and Site Manager keep copies of the CPF at the field offices. Training of field personnel on cultural heritage resources that might potentially be found on area should be provided.

PROCEDURE FOR ARCHAEOLOGICAL FINDS

If you discover what you suspect may be a possible archaeological site:

- Stop all work in the area to avoid damaging the site.

- Do not disturb any archaeological remains that you may encounter.
- The finds must be reported to ECO or Site Manager
- The finds must be reported to the heritage authority, i.e. SAHRA and/or the provincial heritage resources agency.
- The heritage authority will send a heritage specialist and /or ask the permit holder to appoint a heritage specialist to make a preliminary assessment of the findings.
- If the potential significance of the finds are deemed to warrant further action and they cannot be avoided, then then heritage specialist will submit a report advising SAHRA accordingly.
- SAHRA will determine the appropriate course of action.

PROCEDURE FOR GRAVES, BURIAL GROUNDS AND HUMAN REMAINS

If you discover what you suspect may be possible human remains:

- Stop all work in the area to avoid damaging the site.
- Do not disturb any possible human remains that you may encounter.
- The finds must be reported to ECO or Site Manager.
- The finds must be reported to the local area station of SAPS.
- The finds must be reported to the SAHRA Burial Grounds and Graves (BGG) Unit.
- The BGG Unit will send a heritage specialist and /or ask the permit holder to appoint a heritage specialist to make a preliminary assessment of the findings.
- If the graves/human remains cannot be avoided SAHRA will require that the human remains be re-interred in a formal cemetery.
- Public participation to identify interested and affected parties (if any) will be undertaken in terms of NHRA Regulations 39, 41 and 41 in the Government Notice No R548 (year 2000).
- An application will be lodged to the BGG for the relocation of the human remains in terms of NHRA Regulations 34 in the Government Notice No R548 (year 2000).
- If the graves/ human remains must not be relocated, the BGG Unit may require that any damage done to the site is repaired and a 100m buffer zone is enforced around the site.

Socio-economic

Level of risk: Low-Medium

Mitigation measures

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

- Implement the mitigation measures as proposed in this report.
- As job creation is one of the most pressing socio-economic needs in the local community, through the development of the André Bergh Mine should focus on related local job creation, whilst considering the limitations of the available local skills.
- Assistance in terms of skills development for those that would be employed during the project would be necessary. Education is critical to sustain the socio-economic

development of the community members living in the area. Continued support for training and capacity building thus remain important.

- Ensuring continued contact and communication between André Bergh, Dikgatlong Local Municipality, and local community leaders, as well as nearby landowners is critical, especially during the start-up and construction phase, but should also continue for the life of mine.

Interested and affected parties

Level of risk: Low

Mitigation measures

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

ix) Motivation where no alternative sites were considered

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

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

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

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

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

i) Assessment of each identified potentially significant impact and risk

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

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

	Soil contamination Surface water contamination		Operational Decommissioning Closure		construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage areas. Excavations for Alluvial gravel, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipes will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	

Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Low
Mining Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Medium	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays MRD stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. It is therefore recommended that measures be implemented to prevent	Low

					sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	

					The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, 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. 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 minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Low
Product Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Medium	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to take	Low

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

Temporary Workshop Facilities and Wash bay	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Low
Water tanks: 1 X 10 000 litre water tanks and purifiers for potable water.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) Summary of specialist reports

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS HTAT 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
Appendix 4 **ECOLOGICAL ASSESSMENT REPORT WJA BERGH Delportshoop Diamond Mining Permit** **Prepared by** **Dr. Elizabeth (Betsie) Milne** **March 2022**	Conclusion, Recommendations and Opinion Regarding Authorisation One plant community occur on site, which has already been highly transformed through past land use activities. This is mostly evident through the vast extent of alien invasive species that form dense stands on the property. Furthermore, no species of conservation concern were recorded on site and therefore the study area is of low sensitivity. The most profound impacts expected to be related to the proposed mining operation include cumulative loss of remaining natural habitat as well as potential loss in soil fertility. The significance of these impacts will ultimately be affected by the success of the proposed mitigation measures implemented during the mining operation. In my opinion, authorisation for the proposed operation can be granted.	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()
Appendix 5 **HERITAGE IMPACT ASSESSMENT for a Mining Permit Application on the Remaining Extent of Erf 28, a Portion of Erf 30, Erf 1565, a Portion of a Gravel Road Named Saamloop Street and a Portion of an**	Conclusion The targeted area is likely to have been disturbed by alluvial diamond diggings which have occurred in the last 120 years. As a result there is little prospect of finding stone age tools which commonly occur in the Vaal – Orange River Basin in undisturbed contexts. In light of this findings, mining should be allowed to go ahead. If some important discoveries are made during	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of

Unnamed Gravel Road, in extent 4.9979 Ha, at Delportshoop in the Dikgatlong Local Municipality, Northern Cape Province **Prepared by** **Dr. Edward J. Matenga** **30 January 2022**	mining operations, the provincial heritage resources authority or SAHRA must be notified in order for an investigation and evaluation of the finds to take place.		impact management required for the aspects contemplated in paragraph()
Appendix 6 **Palaeontological Impact Assessment for the Mining Right Application near Delportshoop (Remaining Extent of Erf 28, a Portion of Erf 30, Erf 1565, a Portion of a Gravel Road Named Saamloop Street and a Portion of an Unnamed Gravel Road, in extent 4.9979 Ha, at Delportshoop) Dikgatlong Local Municipality Northern Cape Province** **Prepared by** **Prof. Marion K. Bamford** **January 2022**	Recommendations Based on experience and the lack of any previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a small chance that fossils may have been transported with the sands so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, miners or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. Since the impact in the palaeontological heritage would be low, it is recommended that the project is authorised.	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

Attach copies of the Specialist Reports as appendices (All studies attached as Appendixes from 4 – 6)

k) Environmental impact statement

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

- The Processing plant may have a medium impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Ablution facilities will have a low impact on groundwater and soil in case of an emergency spill after mitigation.
- The Clean & Dirty water systems may have a low impact on groundwater, soil and surface water after mitigation.
- The Fuel Storage facility (Diesel tanks) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Mining Area may have a medium impact on air quality fauna, flora, noise, soil, surface water and topography after mitigation.
- The Salvage yard (Storage and laydown area) may have a low impact on fauna, flora, groundwater, soil and surface water after mitigation.
- The Security Gate and guard house at access control point may have a low impact on air quality, fauna, flora and soil after mitigation.
- The waste disposal site (domestic and industrial waste) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Roads (both access and haulage road on the mine site) may have a low impact on air quality, fauna, flora, noise, soil and surface water after mitigation.
- The Workshop and Wash Bay may have a low impact on groundwater, soil and surface water after mitigation.
- The Water distribution Pipeline may have a low impact on fauna, flora, and surface water after mitigation.
- The Water tanks may have a low impact on fauna, flora, and surface water after mitigation.

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

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

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

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

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

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

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

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

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

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 25)**

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 is also indicated.

No mining operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams, waste dumps, or any other structure whatsoever including such structures 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;

No construction or excavation work shall be executed within 11 metres from any Eskom power line structure, and/or within 11 metres from any stay wire.

Please see Final Site Map below.

Figure 26. Final Site Surface layout map.

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

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

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

The mining operation will provide 11 - 15 jobs and will also add to the increased economic activity and the area surrounding the application area.

Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration.

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. However, the site layout plan has been developed not to place any infrastructure where resource materials could be located. The infrastructure and excavations /dumps will alter the topography by adding features to the landscape. Topsoil removal and Mine Residue Dumps will change the natural topography. 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 mining of alluvial gravels, 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 grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources 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.

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

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.

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

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

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

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

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

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

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

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

It is furthermore important to ensure that any negative impacts as a result of the mining activities on the residents should be limited.
The mining activities and associated infrastructure by itself will thus not introduce new social risks and hazards, but only increase the probability and scale of those already associated with the existing mining activities.

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

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

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

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

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

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

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

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

Air Quality

To limit the creation of nuisance dust the following management guidelines must be followed:

- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the mining operation with water.

- Speed limits of vehicles inside the mining area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

Archaeology:

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

Fauna

To ensure a minimum of impact to animals the following management guidelines will be followed:

- Speed limits of vehicles inside the application area must be strictly controlled to avoid road kills.
- Continuous controlled dumping.
- Operational areas must be low angled as a preventative measure to ensure an escape route for animals.
- No hunting (snares) must be allowed at the application area or in the surrounding area.
- All mining and access roads must be fenced.

Flora

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

- The end objective of the re-vegetation program must be to achieve a stable self-sustaining habitat unit.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
    - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
    - All efforts must be made to move the broken-down vehicle or piece of equipment to the maintenance area.
    - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.
- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel al fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

Noise

- Working hours must be kept between sunrise and sunset as far as possible.
- As a minimum, ambient noise levels emanating from the mining activities may not exceed 82dBA at the site boundary.
- The Company must comply with the Occupational Noise Regulations of the Occupational Health and Safety Act, Act 85 of 1993.
- The company must comply with the measures for good practice with regard to management of noise related impacts during construction and operation.

- The management objective must be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant area and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection must be provided to all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

Mechanical equipment

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

Screening / Migration Control:

- Appropriate measures must be specifically being installed and / or employed at the plant to act as screen and to reflect/reduce the noise.
- Appropriate non-metallic washers/insulation must be used with any joining of apparatus made from materials such as corrugated iron. Such apparatus must be maintained in a fixed position.

Safety

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

Soil

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

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

Surface water

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Due to the clearing of vegetation these sediments will be transported downstream and in the Vaal River. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined.
- An application for an integrated Water Use Licence must be submitted at the Department of Water Affairs for all actions to be performed which requires authorization in terms of water uses.
- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.

- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.

Topography

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

Visual

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

The impact management objectives for the André Bergh planned mining operation should include:

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.

- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive mine infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed mining development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) Final proposed alternatives

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

The location of the central mining site and associated infrastructure 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.

It will therefore cause additional impacts if this infrastructure is moved and render the consideration of alternative mining sites useless.

The mining activities and methodologies associated with mining of alluvial diamonds is the only economic viable method currently being used by the diamond's fraternity. There is no alternative mining method for the mining of alluvial diamonds.

n) Aspects for inclusion as conditions of Authorisation

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

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

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

(Which relate to the assessment and mitigation measure proposed)

The above mitigation measures are tried and tested over many years in the diamond mining industry. The Company must monitor the potential impacts throughout the life of operation,

and mitigate any deviations detected. This has been proven to be very effective in existing operations.

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

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

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

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

ii) Conditions that must be included in the authorisation.

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

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

(2) Rehabilitation requirements

A Detailed rehabilitation plan will be appended to the EMPR. The Mine had to provide to the DMR, a financial rehabilitation guarantee to the amount as calculated in terms of the financial quantum Guideline and approved by the DMR.

Infrastructure areas

On completion of the mining operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into

any open pits. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

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

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

Topsoil and Stockpile Deposits:
Disposal Facilities: Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the 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:
Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

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

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

Water Monitoring Points
Surface water: The Vaal River which may be impacted by the mining activity are perennial. Monitoring takes place by collecting surface water samples every quarter.

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 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 and Energy – Kimberley, as described in Regulation 55 and amended with new legislation promulgated in the new NEMA regulations NO. R. 1147 20 NOVEMBER 2015 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998, (ACT NO. 107 OF 1998) REGULATIONS PERTAINING TO THE FINANCIAL PROVISION FOR PROSPECTING, EXPLORATION, MINING OR PRODUCTION OPERATIONS.

Maintenance (Aftercare):

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore all agreed commitments should be implemented by Mine Management.

After-effects Following Closure:

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

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

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

q) Period for which the Environmental Authorisation is required

5 years. Thus the period required is for the Life of Mine of the Mining Permit.

r) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

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

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the André Bergh Mine site as it stands currently (risking premature rehabilitation) is estimated to be R597 623 according to the DMR calculations and calculation table that were used.

Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	300	15,68	1	1	4704
				1	1	
Demolition of steel buildings and structures	m2	0	218,41	1	1	0
Demolition of reinforced concrete buildings and structures	m2	250	321,86	1	1	80465
Rehabilitation of access roads	m2	5000	2,29	1	1	11450
Demolition and rehabilitation of electrified railway lines	m	0	379,34	1	1	0
Demolition and rehabilitation of non-electrified railway lines	m	0	206,91	1	1	0
Demolition of housing and/or administration facilities	m2	200	436,81	1	1	87362
Opencast rehabilitation including final voids and ramps	ha	1	222313,32	0,04	1	8892,5328
Sealing of shafts adits and inclines	m3	0	117,25	1	1	0
Rehabilitation of overburden and spoils	ha	0,4	152653,61	1	1	61061,444
Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,3	190127,32	1	1	57038,196
				1	1	
Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	552219,84	1	1	0
				1	1	
Rehabilitation of subsided areas	ha	0	127824,41	1	1	0
General surface rehabilitation	ha	1	120927,41	1	1	120927,41
River diversions	ha	0	120927,41	1	1	0
Fencing	m	0	137,94	1	1	0
Water management	ha	0	45980,00	1	1	0
2 to 3 years of maintenance and aftercare	ha	1	16093,00	1	1	16093
Specialist study	Sum	0			1	0
Specialist study	Sum	0			1	0
				Sub Total 1		447993,5828
Preliminary and General		26879,61497		weighting factor 2 1		26879,61497
Contingencies				44799,35828		44799,35828
				Subtotal 2		519672,56
				VAT (15%)		77950,88
				Grand Total		597623

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

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

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

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

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

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

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

ii) Motivation for the deviation

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

u) Other information required by the competent Authority

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

(1) Impact on the socio-economic conditions of any directly affected person

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

From a social perspective the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).

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

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

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

(Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage

Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)*(i)*(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

Mr Edward J. Matenga from (AHSA) Archaeological & Heritage Services Africa (Pty) Ltd has been appointed by André Bergh to provide a Heritage Impact Assessment in order to highlight the heritage characteristics of the proposed mining area, and to determine the possible impact of mining on the Heritage status of the application area **Appendix 5**.

The following is a summary of the findings of the desktop study:

1. *Observations*

(i) Terrain features on the property under study are not any different from what was encountered in the area in previous studies. It can be reasonably concluded that the findings of a ground survey were not likely to turn out to be fundamentally different from what has been found in the area along the Vaal River from Barkly West to Delportshoop. It is an established fact that the area has been disturbed by mining activities in the last century, which rules out the charge of finding Stone Age provenances which are undisturbed.

(ii) There is poor prospect of finding Stone Age tools in undisturbed contexts due to the erosion of the surface and upper cultural horizons as a result of mine excavations over the past 120 years

(iii) The commonest cultural evidence relates to mining excavations in the last 120 years to retrieve diamonds. Very little of the obtaining landscape and associated structures has been ranked as heritage of high significance. The history of mining in the area was outlined in Section 5.9 above. The impact of workings over a period of more than a century is starkly evident from the pits, piles of stones of various grades which have been observed along this section of the Vaal River in previous studies. There are a few places untouched with a possibility of finding Stone Age material in an undisturbed context. In terms of the Stone Age period in the cultural sequence the heritage sensitivity of the area is therefore found to be low.

2. The probability of occurrence of different grades of sites confirms the view that no finds in the study area are likely to warrant further action apart from documentation. During the mining phase the Chance Finds Procedure will be applied as a monitoring tool.

3. *Chance Finds Procedure (CPF)*

When the environmental and heritage approvals have been received and mining commences, an Archaeological and Heritage Chance Find Procedure (CPF) will be applied as a manual for the protection of

unidentified heritage resources which may occur in the footprint of the mining right.

4. *Conclusion and recommendations*
   The targeted area is likely to have been disturbed by diamond diggings which have occurred in the last 120 years. As a result there is little prospect of finding stone age tools which commonly occur in the Vaal – Orange River Basin in undisturbed contexts. In light of this finding, mining should be allowed to go ahead. If some important discoveries are made during mining operations, the provincial heritage resources authority or SAHRA must be notified in order for an investigation and evaluation of the finds to take place

Palaeontology

Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Dr Edward Matenga, South Africa from (AHSA) Archaeological & Heritage Services Africa (Pty) Ltd has been appointed by André Bergh to provide a Palaeontological Impact Assessment in order to highlight the palaeontological characteristics of the proposed mining area, and to determine the possible impact of mining on the palaeontological status of the application area **Appendix 6**.

A Palaeontological Impact Assessment was requested for a Mining Permit Application on the Remaining Extent of Erf 28; a Portion of Erf 30; Erf 1565; a Portion of a Gravel Road Named 'Saamloop Street'; and a Portion of an Unnamed Gravel Road, in extent: 4.9979 Ha at Delportshoop in the Dikgatlong Local Municipality, Northern Cape Province. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the moderately sensitive aeolian and fluvial Kalahari Sands but any fossils would be out of context because the sands have been transported by wind and water. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the developer/ environmental officer/ other designated responsible person once excavations/drilling/mining activities have commenced. As far as the palaeontology is concerned, the project should be authorised.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, granites, sandstones, shales and sands are typical for the country and might contain fossil plants or vertebrate material that has been transported from another site, and fragmented. The sands of the Quaternary period would not preserve fossils.

Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a small chance that fossils may have been transported with the sands so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, miners or other responsible person once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. Since the impact on the palaeontological heritage would be low, it is recommended that the project be authorised.

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

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

There are no alternatives, as the application area applied for is the area where the applicant has proven diamonds and has found potential for a diamond mining operation. No other site can be investigated.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

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

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

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

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

c) Composite Map

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

Figure 27. A sensitivity map for the proposed mining area.

d) Description of impact management objectives including management statements

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

The main closure objectives of the planned mining operation are:

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

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

Rehabilitation of infrastructure areas

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

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

- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Mine Residue Dump (Porrel Dam)

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

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

Management principles pertaining to Mine Residue dump include:

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

Maintenance

The necessary agreements and arrangement will be made by the André Bergh 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 Mine Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

Performance assessments

As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually

assessed in terms of its appropriateness and adequacy. In order to achieve this, André Bergh will undertake the following:

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

Decommissioning and closure objectives

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

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Limit the impact on staff whose positions become redundant at the time of mine closure, as addressed in the SLP;
- 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:

- André Bergh will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.

- André Bergh 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.

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

There won't be a need for this, as based on the specialist reports.

Information taken out of the Ecological assessment by Dr. Betsie Milne from Boscia Ecological Consulting.

Biodiversity Condition and Sensitivity Rating

The entire site is of low sensitivity due to the natural ecological habitat already being highly transformed and invaded by alien plants. There is likely to be a negligible impact on ecological processes and biodiversity. Most activities can proceed within this area with little ecological impact.

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

No potential risk for Acid Mine Drainage exists.

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

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

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

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

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

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

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

The only activity relating to the cost of water in the mining operations relates to dust suppression in the mining area and on the roads when hauling and transporting material to the processing plant, and doing continuous backfilling as part of the rehabilitation process.

It must however be noted that the water supply to the activities will be sourced from the Vaal River. There will be an industrial rate applied for water used and the cost will be the pumping cost.

The processing plant (diamond pan) scrubbers and final recovery will have an impact on the cost of water used. The cost of water will have an upward trend over time as a result of the national capacity and demand situation. Water are however recycled as far as possible and redirected to the processing plants. It must however be noted that the water supply to the activities will be sourced from the Vaal River.

viii) Has a water use licence been applied for?

A new WULA application has been prepared and are in the final stages to be submitted. The EIA EMP is a minimum requirement for the application and therefor the application will be submitted shortly after the EIA EMP had been submitted to the competent authority. The Proof of submission will be sent onto the competent authority as soon as it is received.

ix) Impact to be mitigated in their respective phases

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

ACTIVITY Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).	**PHASE** of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND SCALE** of disturbance (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when Required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Processing Plant 1X 16 feet pan	Construction Commissioning Operational Decommissioning Closure	0.03 ha Steel, concrete, electric wires	Access control Maintenance of processing plant Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		Removal of processing plant upon closure of mining permit.

Ablution facilities Chemical toilets	Construction Commissioning Operational Decommissioning Closure	25m² or 0.0025ha	Maintenance of container Plants Removal of container plants upon closure		Removal of container plant upon closure of the Mining Permit.
Clean & Dirty water systems: Berms	Construction Commissioning Operational Decommissioning Closure	This area also includes the re-fuel and lubrication station, wash bay and office area.	Maintenance of berms and trenches Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation)
Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	250m² Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Mining Permit.
Mining Area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint of 5 hectares of alluvial diamond excavations.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill		Upon cessation of the individual activity (continuous rehabilitation)

			Drip trays Dump control and monitoring Erosion control		
Salvage yard (Storage and laydown area)	Construction Commissioning Operational Decommissioning Closure	1000m² or 0.1 ha No construction material, area to be levelled with a grader and fenced with a gate and access control	Access control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill		Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining permit.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining permit.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road = 5 000m²	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining permit.
Workshop and Wash bay	Construction Commissioning Operational	300m² Concrete and Steel	Concrete floor with oil/water separator		Removal of wash bay equipment, breaking and removal of rubble from the

	Decommissioning Closure		Storm water run-off control Immediately clean hydrocarbon spills		concrete floors and bund walls upon closure of mining permit.
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the mining permit.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m²	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the mining permit.

e) Impact Management Outcomes

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

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** **(e.g. construction, commissioning, operational, Decommissioning, closure, post closure)**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**STANDARD TO BE ACHIEVED** **(impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Processing Plant 1X 16 feet pan	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	
Ablution facilities	Soil contamination	Soil Groundwater	Construction Commissioning	Maintenance of sewage facilities on a regular basis.	Minimize the potential for a chemical spill on soil, which

Chemical Toilets	Possible Groundwater contamination		Operational Decommissioning Closure	Removal of container on closure	could infiltrate to groundwater.
Clean & Dirty water systems:	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	Soil Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. 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. It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that	Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point.	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

	vegetation cover and natural habitat of fauna Soil contamination Surface disturbance			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.	
Mining Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints.	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible. 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). Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, 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. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining;	

				Snares & traps removed and destroyed; and Maintenance of firebreaks. It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage lines. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

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

				Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Workshop and Wash bay	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures	Safety ensured. Rehabilitation standards and closure objectives to be met.

f) Impact Management Actions

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

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required.** **With regard to Rehabilitation specifically this must take place at the earliest opportunity.** **With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.**	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: 1 X 16 feet pan	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Re-locate noise sources to areas which are less noise sensitive, to Develop a mechanism to record and respond to complaints.	Removal of processing plant upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

		It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly		• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.		
Ablution Facilities Chemical Toilets.	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of container plants on closure	Removal of container plant upon closure of the Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the

				operation adheres to the contents of the EIA and EMPr documents.
Clean & Dirty water systems: Berms	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the mining area. Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. 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. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable	Upon cessation of the individual activity (continuous rehabilitation) Levelling of storm water berms upon closure of Mining Permit	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.		
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Mining Area.	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a	Upon cessation of the individual activity (continuous rehabilitation)	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible. 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). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for		

		stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed; and Maintenance of firebreaks. Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.		
Salvage yard (Storage and laydown area)	Surface Water contamination Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents

	Surface disturbance Surface water contamination			of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Product Stockpile area	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints.	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

				• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination Contamination of soil Surface water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

				• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Roads (both access and haulage road on the mine site):	Dust Surface Water contamination Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining permit.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan.

				• Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the

				contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water distribution Pipeline	Surface disturbance	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Removal of pipeline upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water tanks:	Surface disturbance	Maintain water tanks and structures	Removal of water tank and steel structure upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

i) Financial Provision

(1) Determination of the amount of Financial Provision

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22(2)(d) as described in 2.4 herein.

Closure:

The main closure objective of this mine 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.

André Bergh will ensure that the mine site 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.

André Bergh 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.

André Bergh will subscribe to the optimal exploitation and utilization of South Africa's mineral resources (diamonds).

André Bergh will ensure that the mining site is closed efficiently and cost effectively.

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

André Bergh will ensure that the interest of all interested and affected parties will be considered.

André Bergh 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 environmental impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing mine 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- & overburden stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.
- It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined.

Historical and Cultural aspects:

The mining permit area has been disturbed by previous mining activities.

No sites of cultural (archaeological and historical) heritage significance were found when conducting the desktop studies.

Any sites that may be find will be of low significance.

Finally, it should be noted that the subterranean presence of archaeological and/or historical sites, features or artefacts are always a distinct possibility. Care should therefore be taken during any development activities that if any of these are accidentally discovered, a qualified archaeologist be called in to investigate.

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

The owners have been notified and all documents have been sent to them for comments and concerns and consultation is still ongoing.

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

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

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

Dismantling of processing plant and related structures:

- The processing plant in total is expected to cover an area of **± 300** m^2, of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and

other items used during the processing activities, such as conveyor belts, pipelines and power lines.
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of steel buildings and structures:
- All steel buildings and structures are expected to amount to 0 **m²**. These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.
- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

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

Rehabilitation of access roads
- Mine roads in total, is expected to cover an area of **5 000 m²**. After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.

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

Demolition and rehabilitation of electrified railway lines

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

Demolition and rehabilitation of non-electrified railway lines

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

Demolition of housing and/or administration facilities

- There are 200m² other housing or administration facilities associated with the mining activities, other than those in the form of mobile containers. These were however included in the section for demolition of steel buildings and structures.

Opencast rehabilitation including final voids and ramps

- Opencasts and ramps associated with the mining activities are expected to cover 1 **ha** at any time.
- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the Mining activities.

Rehabilitation of overburden and spoils

- The total final overburden and spoils are estimated to amount to **0.4 ha** and includes waste dumps as well as earth walls. Pre-planning should be conducted in order decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed

bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with pollution potential

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

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

- The processing waste deposits on the mining area is estimated to cover an area of **± 0.3 ha**. Pre-planning should be conducted in order decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- For backfilled trenches the topography should be shaped to be in line with the natural contours, but where compaction occurred, the areas should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Storm water management

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

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

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

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

River diversions
No river diversions are planned.

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

Water management
It is therefore recommended that measures be implemented to prevent sediment from entering the river. Measures such as berms and cut-off trenches can be investigated. Due to the removal of vegetation and disturbance of the soil surface the mining area will be highly susceptible to the establishment of invasive weeds. It is therefore recommended that weed control be judiciously and continually practised. Monitoring of weed establishment should form a prominent part of management of the mining area. Further mitigation which will decrease these anticipated impacts should include that the entire site should not be mined at the same time but that the mining area should be divided into several portions and each portion mined separately. Each mined portion should be rehabilitated before the next portion is commenced. This will decrease the area of impact and will allow each portion to stabilise before the next is mined.

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

- Annual fertilising of rehabilitated areas.
- Monitoring of surface and subsurface water quality,
- Control of alien plants, and

- General maintenance, including rehabilitation of cracks and subsidence.
- Erosion control and monitoring of the slopes of the slimes dams;

Specialist study

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

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

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

The ultimate rehabilitation of the mining site that involves the sloping, levelling, replacement of topsoil and the seeding of an grass seed mix in areas that does not recover acceptably as agreed to by the land owner will ensure that the site could be regarded as safe for humans and animals and will also ensure that the site is stable from an erosion point of view and also ensuring that the site could be used for grazing again.

The removal of waste material of any description from the mining area and the disposal thereof at a recognised landfill facility.

- The removal of infrastructure, equipment, plant and other items from the site.

- The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was

present prior to the prospecting operation, if the re-establishment of vegetation is unacceptably slow).

- The mining of alluvial diamonds and the backfilling and covering thereof with previously stored topsoil (where-after this area will also be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the proposed operation, and seedlings protected for a period of one) if the re-establishment of vegetation is unacceptably slow.

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

The total cost to rehabilitate and mitigate the André Bergh Mine site as it stands currently (risking premature rehabilitation) is estimated to be R597 623 according to the DMRE calculations. The detailed calculation DMR quantum is presented in Table 17. The total rehabilitation costing is based on the assumption that the mining operation will do continuous concurrent rehabilitation throughout the project.

Table 17: Financial Quantum

Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	300	15,68	1	1	4704
				1	1	
Demolition of steel buildings and structures	m2	0	218,41	1	1	0
Demolition of reinforced concrete buildings and structures	m2	250	321,86	1	1	80465
Rehabilitation of access roads	m2	5000	2,29	1	1	11450
Demolition and rehabilitation of electrified railway lines	m	0	379,34	1	1	0
Demolition and rehabilitation of non-electrified railway lines	m	0	206,91	1	1	0
Demolition of housing and/or administration facilities	m2	200	436,81	1	1	87362
Opencast rehabilitation including final voids and ramps	ha	1	222313,32	0,04	1	8892,5328
Sealing of shafts adits and inclines	m3	0	117,25	1	1	0
Rehabilitation of overburden and spoils	ha	0,4	152653,61	1	1	61061,444
Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,3	190127,32	1	1	57038,196
				1	1	
Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	552219,84	1	1	0
				1	1	
Rehabilitation of subsided areas	ha	0	127824,41	1	1	0
General surface rehabilitation	ha	1	120927,41	1	1	120927,41
River diversions	ha	0	120927,41	1	1	0
Fencing	m	0	137,94	1	1	0
Water management	ha	0	45980,00	1	1	0
2 to 3 years of maintenance and aftercare	ha	1	16093,00	1	1	16093
Specialist study	Sum	0			1	0
Specialist study	Sum	0			1	0
				Sub Total 1		447993,5828
Preliminary and General		26879,61497		weighting factor 2 1		26879,61497
Contingencies				44799,35828		44799,35828
				Subtotal 2		519672,56
				VAT (15%)		77950,88
				Grand Total		597623

(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 *annual basis* 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 *annual basis* or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the mine minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in mining areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an *annually basis* 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 *twice a year basis* (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.

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
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times. To control the incidence of unacceptable noise levels on site.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant and that which may migrate outside the plant area.	The manager during the construction phase and the responsible person (Manager / Environmental Department) during the Operational phase of the project.	Quarterly reports on fall-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. Increased sedimentation of watercourses Increased establishment of weeds and invaders increased erosion due to mining in watercourse channels. Mining in close proximity to the river and within the main channel will clear vegetation, disturb the soil surface and mobilise soils. This may cause high levels of sedimentation within the river.	The Vaal River are the nearest source in the vicinity of the mine. The Vaal River will be monitored by collecting surface water samples quarterly.	Site Manager/Water Supply	The Vaal River which may be impacted by the mining activity. Monitoring takes place by collecting surface water samples every quarter.

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

Auditing of compliance with environmental authorisation, the environmental management programme and the closure plan should be conducted annually by an independent EAP and an Environmental Audit Report should be compiled in such a way that it meets the requirements in terms of Regulation 34 of the National Environmental Management Act 107 of 1998): Environmental Impact Assessment Regulation, 2014.
The rehabilitation plan should also be reviewed annually in order to fulfil the requirements of Section 41(3) of the MPRDA and should be conducted by an independent EAP. Subsequently, an Annual Rehabilitation Plan should be developed to meet the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).
These reports should be submitted annually to the Northern Cape DMRE offices in Kimberley.

m) Environmental Awareness Plan

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

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

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

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management will build awareness and motivate and reward employees for achieve environmental objectives;

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

General environmental awareness training as part of the induction at the André Bergh operation should focus on the following:

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

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

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

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

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

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

Environmental awareness topics to be covered in training should include:

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

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

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

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	The first person causing or observing the incident shall report the incident to an immediate supervisor where the environmental incident is observed.
Line management in the relevant area of responsibility where the incident occurred	Line management in the relevant area of responsibility where the incident occurred shall: • Investigate the incident and record the following information: - How the incident happened; - The reasons the incident happened; - How rehabilitation or clean up needs to take place; - The nature of the impact that occurred; - The type of work, process or equipment involved; - Recommendations to avoid future such incidents and/or occurrences; • Inform the environmental manager/ECO and the Operations Manager on a daily basis of all incidents that were reported on site; • Consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Assist the Environmental Manager and/or Operations Manager with applicable data in order to accurately capture the incident into the reporting database; • Ensure that remediation measures are implemented as soon as possible.

Site managers	The site managers shall: • Forward a copy of the incident form to other line managers; • Forward a copy of the incident form to the Environmental manager/ECO; • Inform the relevant department/person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High-Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Operations Manager by telephone or email to ensure immediate response/action. • Forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.
Environmental manager/ECO	The appointed environmental manager or ECO shall: • Complete an incident assessment form to assess what level of incident occurred; • Make recommendations for clean-up and/or appropriate alternate actions; • Enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager; • Enter the incident onto the database in order to monitor the root causes of incidents; • Include the reported incidents in an appropriate monthly/quarterly report; • Highlight all incidents for discussion at HSEC meetings.

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually)

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

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

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

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

2) UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports;

b) the inclusion of comments and inputs from stakeholders and I&APs;

c) the inclusion of inputs and recommendations from the specialist reports where relevant; and

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

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Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting (Pty) Ltd

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Name of Company:

Date: 28 April 2022

- END –