mineral resources

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

# SCOPING REPORT

## FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND MINING

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


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| **NAME OF APPLICANT:** | **ROOIDAM PLAAS (PTY) LTD.** |
| **TEL NO:** | **053 551 0344** |
| **CEL NO:** | **084 879 9321** |
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| **POSTAL ADDRESS:** | **PO Box 5; Windsorton; 8510** |
| **PHYSICAL ADDRESS:** | **43 Frere Street, Windsorton; 8510** |


**FILE REFERENCE NUMBER SAMRAD:** **(NC) 30/5/1/2/2/10157 MR**

## IMPORTANT NOTICE

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

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

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

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

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

## OBJECTIVE OF THE SCOPING PROCESS

The objective of the scoping report is to, through a consultative process—

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate 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 and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
(e) identify the key issues to be addressed in the assessment phase;
(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
(g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

# PART A

## SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

### 2) Contact Person and Correspondence Address

### a) Details of:-

#### i) Details of the EAP who prepared the report:


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| Name of the Practitioner: | **ROELIEN OOSTHUIZEN** |
| Tel No.: | **084 208 9088** |
| Fax No.: | **086 510 7120** |
| E-mail address: | roosthuizen950@gmail.com |
| Physical Address: | **4 Millin Street, Hadisonpark 8301** |
| Postal Address: | **P.O. Box 110823, Hadisonpark 8306** |


#### ii) Appointed by:

Rooidam Plaas (Pty) Ltd

#### iii) Expertise of the EAP

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

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

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

(In carrying out the Environmental Impact Assessment Procedure)

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

## b) Description of the property

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| **Farm Name:** | Portion 1 (Jonas Kopje) of the farm Rooidam № 101 and the Remaining Extent of the farm Rooidam № 101, (excluding the 5.5 hectares covered by the mining permit under NC 10377 MP). |
| **Application area (Ha):** | 1934.8367 ha (One thousand nine hundred and thirty four comma eight three six seven hectares |
| **Magisterial district:** | Barkly West |
| **Distance and direction from nearest town:** | The farm Rooidam is situated approximately 70km north of Kimberley. |
| **21 digit Surveyor General Code for each farm portion:** | C00700000000010100000<br>C00700000000010100001 |

**c) Locality map**

(show nearest town, scale not smaller than 1:250 000)

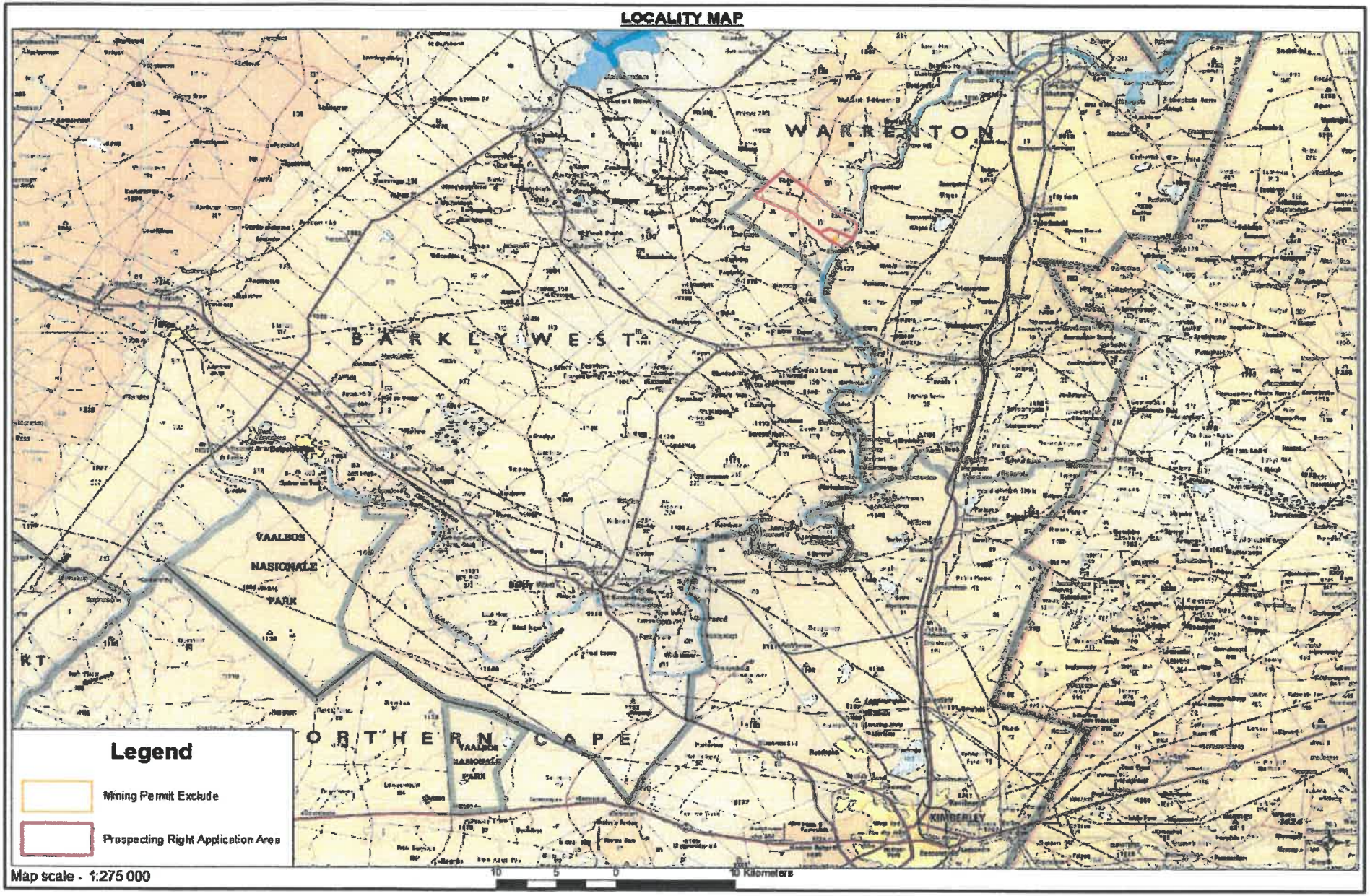


**Figure 1**: 1:250 000 topocadastral map indicating the application area with a RED diagram.

## d) Description of the scope of the proposed overall activity

## i) Listed and specified activities

(provide a plan drawn to a scale acceptable to the competent authority but not less that 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)

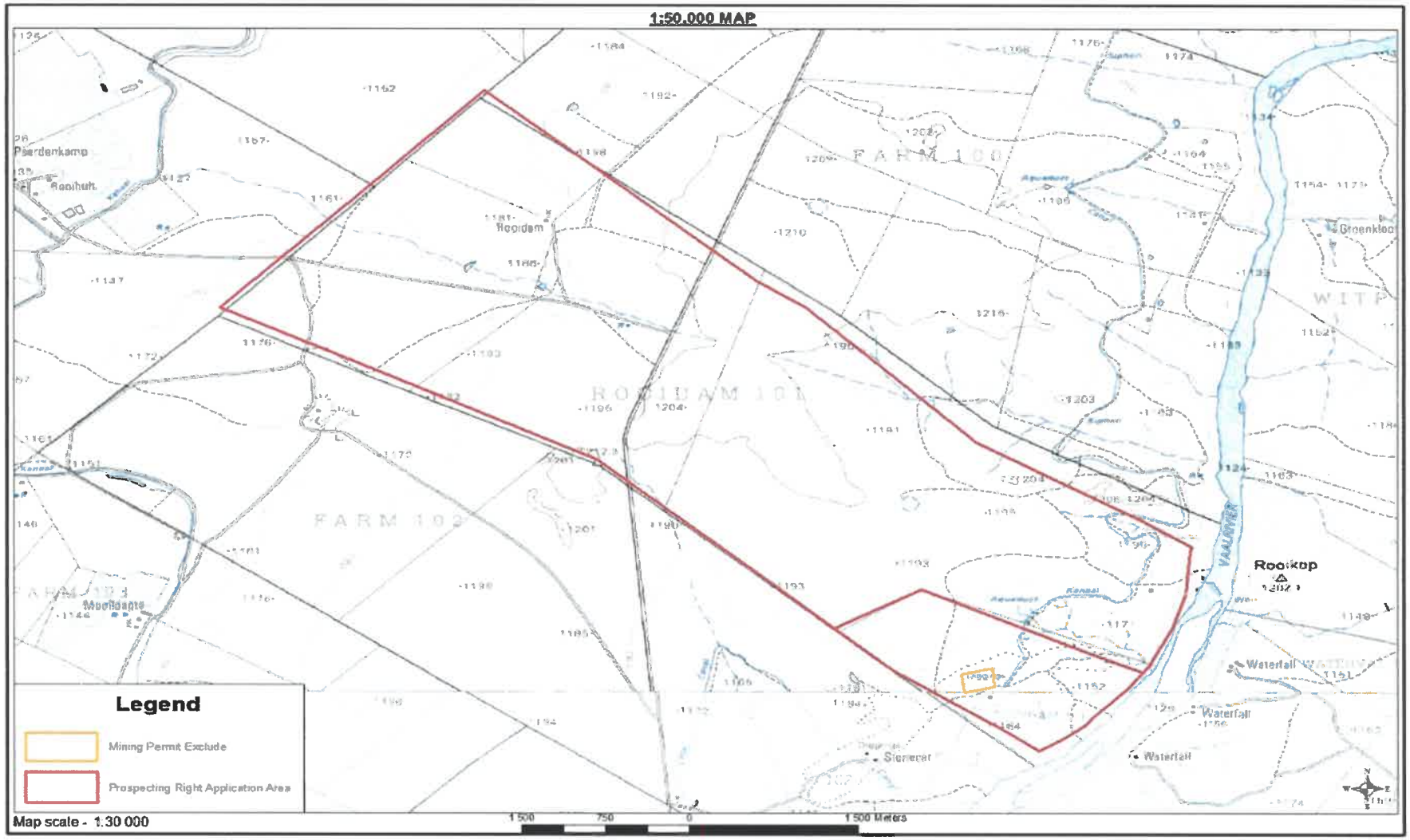


***Figure 2: A map of the area indicating the overall location***

***Table 1: Listed and Specified Activities***

| Name of activity (e.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.) | Aerial extent of the activity (Ha or m²) | Listed Activity (mark with an X where applicable or affected) | Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed) |
|---|---|---|---|
| Activity 9: "The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water-<br>(vii) with an internal diameter of 0.36 metres or more; or<br>(viii) with a peak throughput of 120 litres per second or more; | Water distribution Pipelines | X | NEMA: LN1 (GNR327) |
| Activity 12: "The development of—<br>The development of-<br>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or<br>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;<br><br>where such development occurs—<br>(a) within a watercourse;<br>(b) in front of a development setback; or<br>**(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"**<br><br>Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) | Clean and dirty water system<br>It is anticipated that the operation will establish storm water control berms and trenches to separate clean and dirty water on the mining site. | X | NEMA: LN1 (GNR327) |
| Activity 13: The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic meters or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014 | Possible storage dam and tanks | X | NEMA: LN1 (GNR327) |
| Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, **excavation, removal or moving** of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; | Possible excavation within the 1:100 year flood line if approval is received from DWA | X | NEMA: LN1 (GNR327) |

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| Activity 24: The development of a road-<br>(ii) a road with a reserve wider than 13,5 meters or where no reserve exists where the road is wider than 8 metres. | Access and haul roads<br>10 000m² | X | NEMA: LN1 (GNR327) |
| Activity 17: Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including –<br>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or<br>(b) the primary processing of a mineral resource including winning, extraction, classifying, crushing, screening or washing;<br><br>But excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing notice 2 applies.<br><br>The Rooidam operation directly relates to mining of a mineral resource (diamonds) and requires a mining right. | 1935 ha | X | NEMA: LN2 (GNR325) |
| Activity 14: The development and related operation of facilities or infrastructure for the storage and handling of dangerous goods (fuel), where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic meters. | 2 X 23 000l diesel tanks = 46 000l with capacity for storing of old oils and new oils to be calculated | X | NEMA: LN1 (GNR327) |
| Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-<br>(i) the undertaking of a linear activity; or<br>(ii) maintenance purposes undertaken in accordance with a maintenance management plan. | ±140 ha | X | NEMA: LN2 (GNR325) |
| Activity 15: The establishment of residue deposits resulting from activities which require a mining right. | 0.3ha | | NEMWA: Category A (GNR 633) |
| Office complexes<br>Temporary workshop facilities<br>Storage facilities | ± 200 m2<br>± 300 m2<br>± 2 000 m2 | | Not Listed |

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| Concrete bund walls and diesel depots<br>Ablution facilities<br>Topsoil stockpiles<br>Overburden stockpiles<br>Water tanks | ± 250 m2<br>± 30 m2<br>± 500 m2<br>5 000 m2<br>3m x 3m = 9m² each | | |
| Waste disposal site (domestic and industrial waste):<br>It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:<br>• Small amounts of low level hazardous waste in suitable receptacles.<br>• Domestic waste.<br>• Industrial waste. | 15m x 30m = 450m² | | 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)

The Mining area consists of 1934.8367 ha along the Vaal River. The following is a description of a typical South African alluvial diamond mining operation, which is also being utilized at Rooidam Plaas.
The mining method being employed is a strip mining process with oversize material from the gravel scalping and the tailings from the plant, being used as backfill material prior to final rehabilitation. Gravels excavated, loaded and transported to the nearby treatment facility using tipper trucks. Gravels are screened to remove the rough boulder material from the fined gravels (In-pit screening). The latter is then transported to the processing plant while the rough material is used for initial backfilling.
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 block, 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 blocks will them 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 screen grid and all material larger than 100 mm will be separated from the rest. This material will be used in the backfilling stage.
Screened material smaller than 100 mm will be transported to a stockpiling area via frondend loader. From here it will be transported to a conveyor belt, which will feed it onto a wet rotary screen and then directly onto 2 X 18 foot diamond rotary washing pans. The following procedure will be followed in terms of backfilling and rehabilitation: Surplus material from processes such as stripping, screening, and washing is used for initial backfilling.

The coarse gravel sifted at the screen, tailings from the pans and fine concentrate will be transported back to and dumped into the open excavation. During this process of backfilling, variation in the dumping sequence of different sized materials will be followed to ensure better compaction and stability of the reclaimed gravel. This will ensure that the voids surrounding the coarse gravel will be filled up with finer sediments. Compaction will be achieved through the movement of heavy vehicles over the area during the backfilling stage.

The mining sequence will be followed until the last block is reached. Topsoil stored at the beginning of the mining operation will now be utilized for the final rehabilitation of the last block. There will be continual backfilling of soil which will be stripped and hauled to already backfilled areas or stockpiled on surface for later use should there not be an immediate backfilling area. Thus is not planned to permanently dump any material on surface.

## e) Policy and Legislative Context

***Table 1: Applicable legislation and guidelines used to compile the report***

| 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;<br>- Section 6: Control measures.<br>- 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<br>- Section 25: Rights in Property<br>- 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.<br>- 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. |

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| 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.<br>- Regulations GN R527 | - A Mining Right has been applied for (NC) 30/5/1/2/2/10157 MR.<br>- 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.<br>- Section 24: Foundation for Environmental Management frameworks.<br>- Section 24N:<br>- Section 24O:<br>- Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care.<br>- 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)<br>- Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities)<br>- Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal)<br>- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption)<br>- Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) | - Control measures are to be implemented upon the approval of the EMPR. |

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| | - 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<br>- Section 34: Control of noise<br>- Section 35: Control of offensive odours<br>- 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)<br>- 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.<br>- This is also legislated by Mine Health and Safety from DMR and is to be adhered to. |
| National Environmental Management: Biodiversity Act (Act 10 of 2004) | - 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.<br>- Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process.<br>- 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.<br><br>Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007<br>GNR 150/GG 29657/23-02-2007<br><br>Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * | - A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. |

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| | Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 *<br>- 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.<br>- Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.<br>- Regulation GN R151, published on 23 February 2007 (List fo Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA<br>- Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA<br>- 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. | - Not applicable. The mining operation does not fall within any protected area. |
| National Environmental Management: Waste Management Act (Act 59 of 2008) | - Chapter 4: Waste management activities<br>- Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations)<br>- Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities)<br>- National Norms and Standards for the Remediation of contaminated Land and Soil | - To be implemented upon the approval of the EMPR. |

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| | Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations)<br>- Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations)<br>- Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles)<br>- 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.<br>- 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.<br>- Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.<br>- 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. | - Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure is attached to the PIA. |

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| | - 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.<br>- 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.<br>- Section 19: Prevention and remedying the effects of pollution.<br>- Section 20: Control of emergency incidents.<br>- Section 21: Water uses<br>In terms of Section 21 a licence is required for:<br>(a) taking water from a water resource;<br>(b) storing water;<br>(c) impeding or diverting the flow of water in a watercourse;<br>(f) Waste discharge related water use;<br>(g) disposing of waste in a manner which may detrimentally impact on a water resource;<br>(i) altering the bed, banks, course or characteristics of a watercourse;<br>(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;<br>- Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities)<br>- Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) | - A water use application was lodged and approved by the Department of Water and Sanitation (DWS)<br>- Control measures are to be implemented upon the approval of the EMPR. |

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| | - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams)<br>- Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j))<br>- Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b) )<br>- Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) – rehabilitation of wetlands)<br>- Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 ( c ) and (i) )<br>- 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.<br>- 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.<br>- 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. |

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| 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;<br>- To specify the relationship between the spatial planning and the land use management, amongst others<br>- 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. |
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| 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. |

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| Land Survey Act (Act 8 of 1997) ) and regulations, more specifically GN R1130 | - To control land surveying, beacons etc. and the like;<br>- 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<br>- (Draft regulations s21) | - To be implemented upon approval of the EMPR |
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| 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 current land use on the site and surrounding region is primarily concerned with livestock grazing. Alluvial diamond mining is also a common land use in the area along the Vaal River. The mining area is situated approximately 10 km north of the town of Windsorton on the western banks of the Vaal River. The study area is approximately 1934.8367 hectares in size and includes the entire mining area (Map 1).

The location of the mining is determined by the possible geological location of the mineral resource.

After mining the land will be utilized for grazing again.

## g) Period for which the environmental authorisation is required

30 years.

## h) Description of the process followed to reach the proposed preferred site

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

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

A Mining Right application was lodged to mine the identified preferred areas on the property. The mining will be an open cast mining operation.

Mining Site Location

A Mining Right application was lodged to mine the identified preferred areas on the property. The mining will be done open cast.

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

The mining method of opencast with continued backfilling is the only economic viable method currently being used by the alluvial diamond fraternity; it is also the only cost effective method. There is no alternative mining method.

Fuel Storage Tanks

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 terms 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 mining operations.

Water Use

If mining continues a diamond rotary plant will be established which uses (2 X 18 feet rotary pan). Water use for a 18 feet rotary pan is in the order of 18000 litres per hour. The operation will only work in daytime hours which will constitute about 8 hours per day which will bring water consumption to 144000 litres per day and 720 000 litres per week 2880000 litres per month. Total cubic metres tested will be 81206.25 $m^3$ a 18 feet pan can on capacity work about 65 tons per hour which constitutes about 117$m^3$ per hour.

Mine Residue Dam

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 water needed:

- The locality is already disturbed or mined out.
- It is within reach of (1 000m) of the treatment plant.
- It is situated near the access road to the mine.
- 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 risks in terms of general safety and the DWS regulation.

### i) Details of the development footprint alternatives considered

With reference to the site plan provided as Appendix 4 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 registered description of the land to which the mining right application relates:

| Farm Name | Title Deed | In Extent |
|---|---|---|
| Portion 1 (Excluding the 5.5 hectares covered by the mining permit issued under NC 10377 MP) and the Remainder of the farm Rooidam No. 101, Barkly-Wes | T828/1979 | 1934.8367ha (One thousand nine hundred and thirty four comma eight three six seven hectares.) |

Alternatives considered:-

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

Therefore there are no alternatives to the area.

**(a) The type of activity to be undertaken:**

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. The various alternatives were assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality the mining operation do not form part of the discussion as the location of the mining operation is determined by the geological location of the mineral resource (as discussed in section f).

**Land Use**

No specialist comparative land use assessments were conducted, but the mining area has low agricultural potential and is used for grazing by the property owners.

It would however be feasible to determine if there is any economically viable minerals to mine as mining can also generate income for the property owner that can be used for further development of the property.

The miners will have to promote rehabilitation strategies to ensure that excavations are backfilled. There will be infield screening to ensure that all oversize material is deposited back into the excavations. This material should be covered with the

overburden (where available), and topsoil that has been previously put aside for this purpose. The post-mining land use should be determined so that the development strategies of the farm can still be continue beyond the prospecting and mining of the area.

Project Infrastructure

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

Mining Method

The Mining method of open excavations with continued backfilling is the only economic viable method currently being used by the diamond fraternity. There is no alternative mining method for the mining of diamonds.

Proceed without the Mine (no go)

Land Use

The current land use is grazing with limited agricultural lands. If the mining operation does not continue, the limited grazing capacity and agriculture will continue. Water from the Vaal river will be obtained for mining and a Water Use Licence had already been obtained for the operation. The mining operation will not abstract any ground water.

Socio-Economy

The mining plan is to employ 15- 25 people. The non-approval if this mining operation would impact negatively on the employment rate for Barkly-Wes / Windsorton and Warrenton and the families who are likely to benefit from the positive employment opportunities. Substantial tax benefits to the State and Local Government will also be lost.

Biodiversity

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

Heritage and Cultural Resources

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

The alluvial diamond deposits along the Vaal River, between Warrenton and Barkly West, have been worked for more than one century by thousands of private diggers.

The diamonds are recovered from two sedimentary units of Cenozoic age, collectively known as the "Older" and "Younger Gravels", which in turn rest on a basement of Ventersdorp Supergroup andesites and Karoo Sequence sediments that have been intruded by Cretaceous kimberlites. A foot survey of Area 1 revealed no evidence of Quaternary fossil remains or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of settlement structures, graves, rock art or historical buildings older than 60 years within the Area 1 footprint. The site context of the stone tool surface scatter in Area 1 is clearly derived / removed / disturbed etc., but viewed within the context of cultural landscape, the weathered / ex situ stone tool scatters can be regarded as clear indication of Stone Age human presence on the landscape, and as such, is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 1 may proceed with no further assessments required. If, in the unlikely event that localized fossil material is discovered within the sandy overburden in Area 1, it is recommended that a professional palaeontologist be called to assess the importance and rescue the fossils if necessary. It is also advised that the graves and structural remains of the Koranna mission station previously identified by Morris (2012) is fenced off and avoided. A foot survey of Area 2 revealed extensive degradation of the terrain as a result of past excavation activities into "Older Gravel" deposits with no evidence of in situ fossil exposures or Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of graves, rock art or historical buildings older than 60 years within the Area 2 footprint. Area 2 is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 2 may proceed provided that the two stone – walled structures identified during the survey are protected by a 10 m-wide buffer zone (Taken out of the HIA by Lloyd Rossouw on the farm Rooidam 101, ).

**(b) 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 (non-perrennial drainage lines and wind direction), heritage resources and discussions with the relevant Departments.

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

- Processing Plant : 2 X 18 feet
- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
- Clean & Dirty water system: Berms
  It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mining site.

- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
  It is anticipated that the operation will utilize 1 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.

- Mining Area: Area applied for to mine for diamonds.

- Processing plant:

- 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 1.5 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the mining 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 tanks with purifiers for potable water.

**Alternatives considered:-**

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

In terms of water use alternatives; the operation is located near to the Vaal River which are a perennial river as the best water source for the operation. Plastic pipelines are

considered to be the best long term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

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

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

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

**(c) The technology to be used in the activity:**

- Technique

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

- Technology

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

  **Alternatives considered:-**

  The planned mining activities include open cast workings 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 extracdtion of alluvial diamonds.

**(d) 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 gravels will be fed onto a grizzly for screening out oversize material. The tailings will be processed through a screening and crushing section for delivery to a recovery plant. Concentrate from the recovery plant will be processed through an X-Ray/Sortex plant to extract possible diamonds.

Mining activities will primarily make use of existing roads, but additional roads will most likely 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 possible alluvial diamonds.

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

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

***Socio-Economy***

The operation will make provision for 15 – 25 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***

The majority of the relevant area is covered by vegetation.

The vegetation types within the study area consists of Scmidtsdrif Thornveld (SVk 6), Kimberley Thornveld (SVk 4) and Upper Gariep Alluvial Vegetation (AZa 4). According to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) these vegetation types are considered to be of least Concern (LC) (Map 3). They are not currently subjected to any pronounced transformation or development pressures.

The mobility and in many cases the adaptability of many bird species has meant that they more than any other vertebrate group have taken advantage of many of the changes we have brought about in the environment.

***Heritage and Cultural Resources***

A Phase 1 Heritage Impact Assessment was carried out by L Rossouw on the farm Rooidam 101 near Windsorton in the Northern Cape Province. The assessment pertains to the application for prospecting rights in two different areas on the farm, designated Area 1 and Area 2.

Area 1 is underlain by Ventersdorp andesites that is largely capped by a dark red sandy overburden laced with a veneer of polymict gravels. One isolated LSA core was mapped during the pedestrian survey of the terrain. A foot survey of Area 1 revealed no evidence of Quaternary fossil remains or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of settlement structures, graves, rock art or historical

buildings older than 60 years within the Area 1 footprint. The site is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 1 may proceed with no further assessments required. It is also advised that the graves and structural remains of the Koranna mission station previously identified by Morris (2012) is fenced off and avoided. Area 2 is underlain by a cobble grade conglomerate with granular to pebbly clasts made up of quartz, quartzite, agate, chert or banded ironstone and set within a matrix of dark red, fine to medium sand. The terrain has been severely degraded following decades of prospecting activities in the region. A large rectangular stone – walled structure is located on the riverbank while the remains of a circular stone-walled structure are situated higher up and about 650 m west of the river bank. A foot survey of Area 2 revealed no evidence of in situ fossil exposures or Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of graves, rock art or historical buildings older than 60 years within the Area 2 footprint. Area 2 is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 2 may proceed provided that the two stone – walled structures identified during the survey are protected by a 10 m-wide buffer zone.

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 prospecting 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.

The process as described by NEMA for Environmental Authorisation was followed. See table 2 below for the identification of Interested and Affected Parties to be consulted with. The landowner, and or occupants and direct neighbours were consulted.

An Advert (Notice) will be placed in the DFA on 10 July 2020 to notify all other interested and affected parties to come forward and register.

Registered consultation letters will be send on 07 July 2020 to all identified parties and government departments with a Scoping Report document on disc in the envelope.

Notices were placed at the gate to the mining site.

### iii) Summary of issues raised by I&APs

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

***Table 2: Summary of issued raised by I&APs***

| Interested and Affected Parties<br>List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted | | Date Comments Received | Issues Raised | EAPs response to issues as mandated by the applicant | Section and paragraph reference in this report where the issues and or response were incorporated |
|---|---|---|---|---|---|
| AFFECTED PARTIES | | | | | |
| **Landowner/s** | **X** | | | | |
| Estate late Gabriel Eduard Du Toit<br>PO Box 135<br>Hartswater<br>8570 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| **Lawful occupier/s of the land** | | | | | |
| | | | | | |
| | | | | | |
| **Landowners or lawful occupiers on adjacent properties** | **X** | | | | |
| Mr. F van Zyl<br>PO Box 745<br>Jan Kempdorp<br>8550 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| Tradeprops 1073 CC<br>PO Box 755<br>Kimberley<br>8300 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| HJ Haasbroek<br>14 Langstraat<br>Warrenton<br>8530 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| BE Hunt<br>toppy@swf1.co.za | X<br>e-mail letter with Scoping Report | | | | |
| WJ Kamfer<br>55 Jacobsonlaan<br>Eltoropark<br>Kimberley<br>8301 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| **Municipal Councillor** | **X** | | | | |
| **Municipality** | **X** | | | | |
| Dikgatlong Local Municipality<br>Municipal Manager and Mayor<br>Private Bag X 5<br>Barkly-Wes<br>8375 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| Frances Baard District Municipality<br>Private Bag X6088<br>Kimberley<br>8300 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| **Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA** | | | | | |
| ESKOM Environmental Division<br>P O Box 356<br>Bloemfontein<br>9300<br>Ms A van Gensen | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| ESKOM Holdings SOC Limited Northern Cape Operating Unit: Land Development | X<br>07 July 2020<br>mailed registered letter with Scoping | | | | |

| | | | | | |
|---|---|---|---|---|---|
| PO Box 606<br>Kimberley<br>8300 | Report document.. | | | | |
| SANRAL<br>PO Box 415<br>Pretoria<br>0001 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| Transnet<br>PO Box 72501<br>Parkview<br>2122 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| NC Department of Roads and Public Works<br>PO Box 3132<br>Squirehill Park<br>Kimberley<br>8300 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| **Communities** | | | | | |
| No Communities | | | | | |
| **Dept. Land Affairs** | | | | | |
| Department of Agriculture, Land Reform and Rural Development<br>Private Bag X 5018<br>Kimberley<br>8300 | X<br>07 July 2020 mailed registered letter with Scoping Report document. | | | | |
| **Traditional Leaders** | | | | | |
| No Traditional Leaders | | | | | |
| **Dept. Environmental Affairs** | | | | | |
| Northern Cape Department of Environment and Nature Conservation | X<br>07 July 2020 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Private Bag X6102<br>Kimberley<br>8300 | mailed registered letter with Scoping Report document. | | | | |
| **Other Competent Authorities affected** | | | | | |
| Department of Water and Sanitation<br>Private Bag X6101<br>Kimberley<br>8300 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| SAHRA<br>P.O. Box 4637<br>Cape Town<br>8000 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| Department of Rural Development and Land Reform<br>Private Bag X 5007<br>Kimberley<br>8300 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| Dept. of Agriculture, Land Reform & Rural Development<br>Private Bag X5018<br>Kimberley<br>8300 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| National Dept. of Public Works<br>Private Bag 5002<br>Kimberley<br>8300 | X<br>07 July 2020<br>mailed registered letter with Scoping Report document. | | | | |
| Department of Agriculture, Forestry and Fisheries | X<br>07 July 2020 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Attention: Jacoline Mans<br>Tel: 054 – 338 5909<br>Fax: 054 – 334 0030<br>Web: www.daff.gov.za<br>e-mail:<br>JacolineMa@daff.gov.za | mailed registered letter with Scoping Report document. | | | | |
| **OTHER AFFECTED PARTIES** | | | | | |
| None | | | | | |
| | | | | | |
| **INTERESTED PARTIES** | | | | | |
| None | | | | | |

## iv) The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

### (1) Baseline Environment

#### (a) Type of environment affected by the proposed activity

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

(1) *GEOLOGY:*

**Alluvial Geology of the Kimberley Area**

The erosion of diamondiferous kimberlites liberates diamonds onto the land surface, for redistribution by streams and rivers. The processes that lead to the deposition and concentration of diamond in river sediments are obviously of direct importance in the formation of economic alluvial diamond deposits (or diamond placers).

The South African alluvial deposits are distributed in a southwest-trending belt that stretches from the Limpopo River to the Namaqualand coast. The major deposits are concentrated along the Vaal and Orange River valleys and some tributaries of the Vaal River. The deposits invariably consist of gravel resting on Precambrian bedrock. This bedrock contains trap sites for diamonds in the form of scour channels, potholes, gulleys and plunge pools, and in all cases, its competence and irregularity is sufficient to trap coarse debris that, in turn, act to entrain diamonds.

The bedrock comprises a wide variety of rock types, including granite, gneiss, lava, dolomite, tillite, shale and quartzite, and cross-cutting dykes perpendicular to the fluvial channels and paleochannels are important in the development of trap sites.

The diamonds were originally derived from kimberlites on the Kalahari Craton, mostly within South Africa and transported by rivers to their placer sites. Many of these placers were subsequently reworked during the Cenozoic and redeposited as younger placers in downstream locations.

The paucity of alluvial placers on the Karoo Supergroup is due to the fact that the horizontally bedded sedimentary rocks are generally insufficiently lithified for the formation of trap sites, except where dolerite intrusions are present. Where rivers and palaeo-rivers leave the Karoo base along the northern rim of the Karoo Basin, and encounter the pre-Karoo surface, especially where this is composed of Ventersdorp Supergroup rocks, significant placer development occurs.

The age of the alluvial placers ranges from Late Cretaceous to Quaternary with depositional peaks coinciding with fluvial phases during the Late Cretaceous, Miocene and Plio-Pleistocene. These ages post-date the emplacement of all the diamondiferous kimberlites on the Kalahari Craton from which the diamonds were derived. As a result of erosion during the Cenozoic era, only six Late Cretaceous placers are

preserved. These comprise Droogeveld, 25 km west-northwest of Barkly West, which is placer gravel in bedrock-bounded channels of a paleo-Vaal
River and Nooitgedacht, 15 km southeast of Barkly West which is unrelated to the paleo-Vaal drainage and represents colluvial gravel that contains diamonds, which were directly eroded and washed from the nearby Kimberley pipes.

Deposits of Miocene, Pliocene and Pleistocene age occur along the Vaal River valley between Christiana and Douglas and along the Orange River valley between Hopetown and Prieska. These deposits are located at elevations between present river level and 120m above present river levels. The diamonds were probably transported from kimberlites located near Kroonstad, Welkom, Theunissen, Boshof, Koffiefontein, and in northern Lesotho via former drainage courses of the Vals, Vet, Riet and Orange Rivers and a so-called Kimberley River that tapped the Boshof kimberlites prior to being captured by the Modder River during the Pliocene. The deposits are relatively small but numerous large stones have been produced from these gravels with a 511-carat stone from Nooitgedacht near Barkly West the largest. Diamond grades vary between 0.1 and 2 carats per hundred tonnes (cpht).

**Local Geology**
Studies of the Lower Vaal, Harts and Middle Orange River alluvial deposits shown that there are five broad phases of prominent alluvial deposit development in these areas reflected by several deposit types.

Cretaceous aged Nooitgedacht-Droogeveldt Terraces-considered to be the oldest alluvial deposits and they occur between 80 - 120 meters above the modern Vaal River S-W of Barkly West. These deposits probably conform in age to the initial period of late-Cretacous uplift which triggered a period of accelerated river incision and simultaneous lowering and peneplanation of the land surfaces, accompanied by the supply of detritus, including diamonds.

Miocene-age Holpan and Klipdam Channel deposits- these deposits occur at approximately 60 meters above the Vaal river. Younger terraces include the Pliocene-age Proksch Koppie and Wedburg Terraces, which occur at 30-45 and 20-30 meters respectively.

Pliocene - Holocene deposits - these youngest terraces, which include the current Vaal River channel, occur between 0-20 meters and are collectively referred to as the Rietputs Terrace.

Younger deposits - through a process of progressive weathering, deflation and winnowing of the above deposits, 'secondary' deposits know as Rooikoppies developed over large areas of the landscape. Typically these deposits are found to be broadly associated with older terraces and buried channels, these readily accessible deflation deposits were extensively mined by the old timers and Diggers. In many cases the presence of Rooikoppie deposits was useful in respect of highlighting the presence of older buried deposits.

**Lower Vaal and Middle Orange River Alluvial Deposits**

The extensive diamondiferous gravels of the Lower Vaal, Harts, and Middle Orange River ("MOR") valleys are associated with remnants of outwash deposits formed during the retreat of the ancient Ghaap (Kaap) Valley glacial system and subsequent reworking and alluvial deposition by major rivers. These rivers included the proto- Vaal, - Orange, - Harts, and -Riet Rivers and their modem antecedents.

These drainage events in large part utilized the structurally controlled south- west tJ.·ending trough which is today flanked by the prominent Ghaap Plateau Escarpment. The glacial system is identified as a prominent ice lobe emanation from the centml Dwyka (Carboniferous) ice sheet of central Gondwana which utilized the structurally controlled through flanking the Ghaap Escarpment. Subsequently this trough has also been utilized and resun'ected by the erosive action of the Lower Vaal, Harts, Riet and Middle Orange River.

The geological settings of the diamondiferous gravel deposits vary from thick remnant palaeo- river terraces and channels of late- Cretaceous age through to young surface deflation or Rooikoppie deposits o 1-2 meters thick. The river deposits, which in part reworked glacial outwash deposits, all appear to have a common or similar origin as seasonal ephemeral flood deposits. Large elongated channels containing gravel sequences were probably created initially by glacial scoring (as for example on Holpan and Klipdam).

Locally, bedrock features including large boulders (glacial erratics) protruding from and released by the Dwyka diamictites of the floor rocks, and fractures and potholes found on Ventersdorp bedrock played an important role in diamond concentration of the older alluvial deposits. Well developed splays (e.g. Windsorton and Waldecks Plant on the Vaal River), dyked, faults and contrasting rock competencies also lead to grade enhancement in younger deposits. Locally plunge and scour pools lead to high concentration of diamonds.

Through geological time, erosion and deflation of the very extensive primary gravel deposits lead to the formation of extensive lag deposits or Rooikoppie which in places were particularly rich. These deposits are generally associated with underlying primary gravels but mass weathering, material creep and movement of the heavier lag deposits down slopes has resulted in deposits which may be far more extensive than the underlying primary deposits.

In the Lower Vaal and Middle Orange River area dry periods lead to the precipitation of an extensive hard calcrete horizon which effectively defines the "interface" between the surface Rooikoppies and lower primary gravel deposits in many areas, The calcrete prevented old time diggers from mining below the Rooikoppies and consequently large areas of primary gravel are being mined in areas such as the MOR by drilling, blasting and stripping the hard 1 to 2 meter calcrete layer and mining and processing the underlying preserved primary gravels.

**Lower Vaal River and MOR Diamond Populations**

Diamond populations from the various alluvial diamond deposits located across southern Africa show important population characteristics. Among these characteristics are the grade, size range and quality of the diamond population, and average diamond values of run of mine ("ROM") production.

Like kimberlites, each alluvial diamond deposit has a characteristic population of diamonds which relates primarily to the depositional environment, the sorting history during transport and deposition, and the source from which the diamonds have originated. Effectively each deposit has its own 'DNA' signature

which can be represented by size frequency curves ('SFC") based on a statistically valid parcel of stones from individual deposits.

The size characteristics of each diamond population effectively determine the average value (price) of the diamonds recovered from each alluvial deposit. In current market conditions ROM diamond parcels from different deposits yield the following long term (12 month) average prices or values:

- Holpan and Klipdam and Schutsekama (Riet River)- US$900-1 000 per carat
- MOR->US$1500 per carat, (1- Deflation being the removal of fine material by aeolian processes, the remaining residue being termed "lag")
- Lower Vaal River-US$500-600 per carat
- Ventersdorp-US$450-550 per carat

SFC's allow characterization and comparison of individual deposits, provide insight into the overall size distribution and proportion of large stones (hence providing insight into diamond values or prices), and are particularly useful in respect of monitoring metallurgical plant efficiencies and shrinkage.

SFC's from four alluvial deposits are presented in the figure 1 below. This graph shows a series of curves for diamond populations indicated in the key. The flattest curve (orange) is for the Wouterspan deposit in the MaR. This deposit (as well as the surrounding deposits) yields amongst the highest value (expressed as a ROM) diamond in the world and this is reflected by this population having the flattest slop of the four curves plotted.

**The In-land South African Alluvial Diamond Industry**

'High' grade and 'easily' to mine alluvial deposits, primarily Rooikoppie, were extensively though inefficiently mined in the late 1800's and early 1900's. The Great Depression and Government legislation imposed in the early 1900's subsequently restricted the flow of diamonds to world markets.

The repeal of legislation applying to mining of precious stones opened up the industry and saw growing activity from the 1960's. This activity fluctuated in intensity into the early-1990 with South Africa's artificially strong currency ensuring that mining of low grade; dollar based commodities such as alluvial diamonds were expensive to mine.

With the strong decline of the Rand against the Dollar through the 1990's, abundant cheap electrical power, and ample water supply from the Vaal and Orange Rivers, alluvial diamond mining regained its appeal and activity along these large drainage systems, and elsewhere in the hinterland. Small scale mining or digging operations became common in the Kimberley region along the Vaal River and Riet Rivers (including Skutsekama), further into the interior (Christiana, Bloemhof, Schweitzer Reynecke, Lechtenburg and Ventersdorp), downstream on the middle and lower stretches of the Orange River.

In the 1990's main areas of activity in the Kimberley region were again concentrated around Windsorton, Riverview, Riverton, Holpan and Kipdam, Barkly West (including Nooitgedacht, Pniel and the Droogeveldt), Delportshoop (Waldeck's plant gravel splay), the Orange River between Hopetown and Prieska, and the Riet River (Skutsekama).

Revitalized digging and mining activities concentrated on re - exploiting surface deflation deposits known as Rooikoppie, and Vaal River deposits during the 1990's. Even though the Rooikoppie had been mined in the past the old diggers had worked inefficiently and because of the system of mining 15 x 15 meter claims, portions of the Rooikoppie were sterilized (and hence untouched) due to the dispersal of discards and tailings onto portions of the adjacent claims. Re-mining of the Rooikoppie with modem plant on a larger scale thus still proved profitable. Mining of the Vaal River deposits was driven by the presence of soft overburden, and unconsolidated gravel sequences.

Over time, re-exploitation of the Rooikoppie and Vaal River deposits again lead to diminishing returns and a decline in the extent of digging activity. It had however been recognized that there were buried gravel in the diamond fields that contained good diamonds. As noted above hard calcrete and silcrete layers formed an impenetrable capping which prevented small scale diggers from reaching the buried diamond bearing gravel deposits.

This occurs on the lower Orange River at localities such as Octa and Baken, and gravel sequences covered by hard calcretised capping were known of in the MOR (e.g. Brakfontein and Saxendrift), as well as in the lower Vaal River section at Riverview, Holpan and Klipdam, and adjoining properties such as Snake Hill.

Large earth moving plant was needed to uncover and mine these gravels but few of the early attempts in the late 1980's succeeded in establishing sustainable operations on these buried deposits.

In the 1990's renewed efforts were being made to excavate buried diamond bearing gravel deposits which up until this period had remained un-exploited. The Trans Hex Group was by now well established on the lower Orange River and had shown that low grade diamond bearing gravels under thick cover could be lllincd successfully, provided large earth moving equipment was utilized to ensure that high tonnages and economies of scale were achieved.

In 1994 the Van Wyk family began operations on claims on the Holpan property and the Pienaar Brothers (Eddie and Vic) also successfully began exploiting MOR deposits at Saxendrift. The Pienaars achieved success by ripping the calcrete layers overlying buried gravels with large Fiat-Allis bulldozers left over from the engineering works that build several of South Africa's large dams on the Vaal and Orange River.

Aiding the new drive to mine alluvial deposits in the 1990's was the strongly depreciation Rand- Dollar exchange rate, coupled with relatively low costs of electricity and water in South Africa. As a consequence many small scale and larger private operators re-entered the business. (out of the The Southern African Institute of Mining and Metallurgy-Diamonds 2007 by J Bristow, H van Wyk and G Norton).

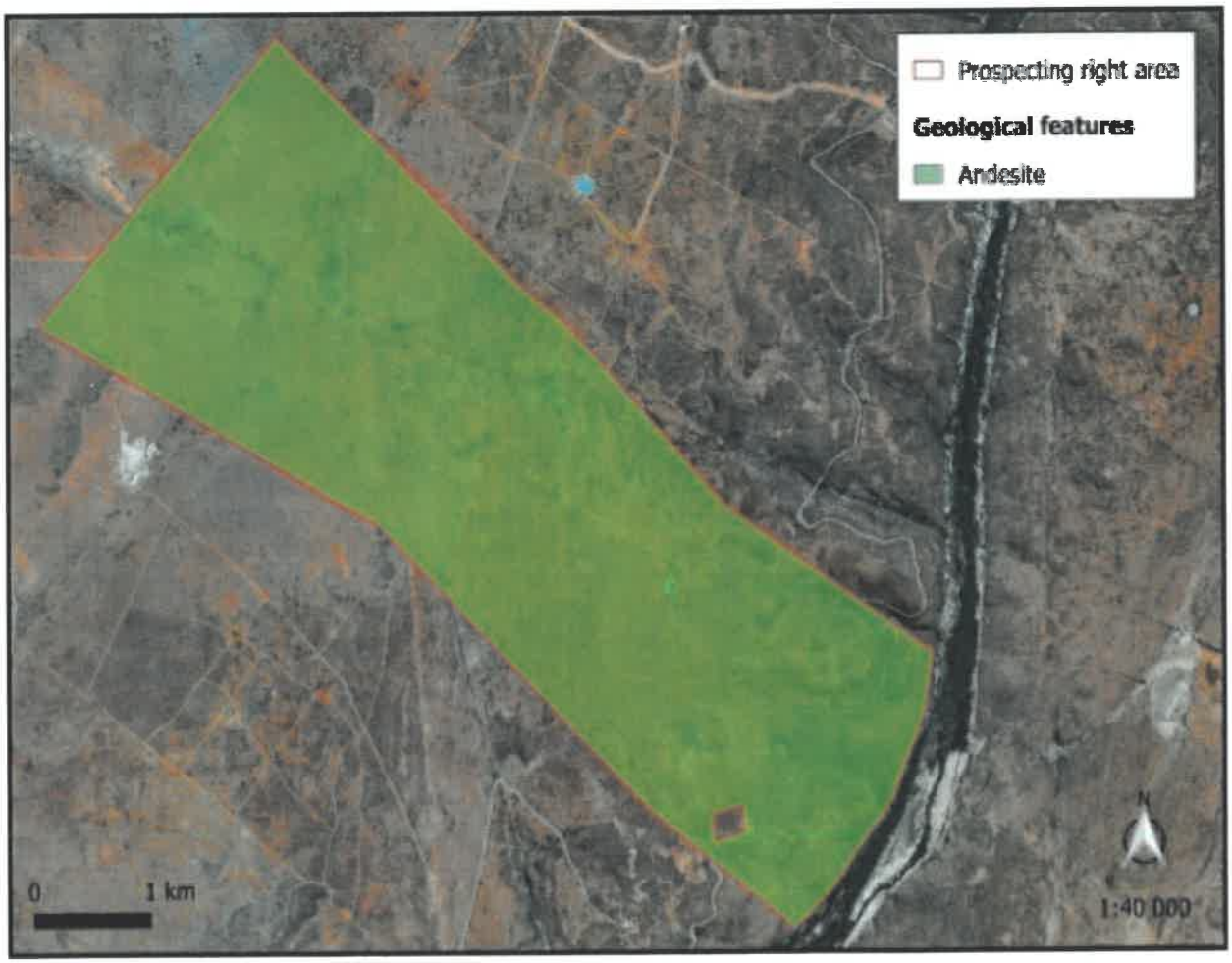


Figure 4. The distribution of geological features in the study area. (Map taken out of the ecological study by Boscia Ecological Consultants by Dr Betsie Milne).

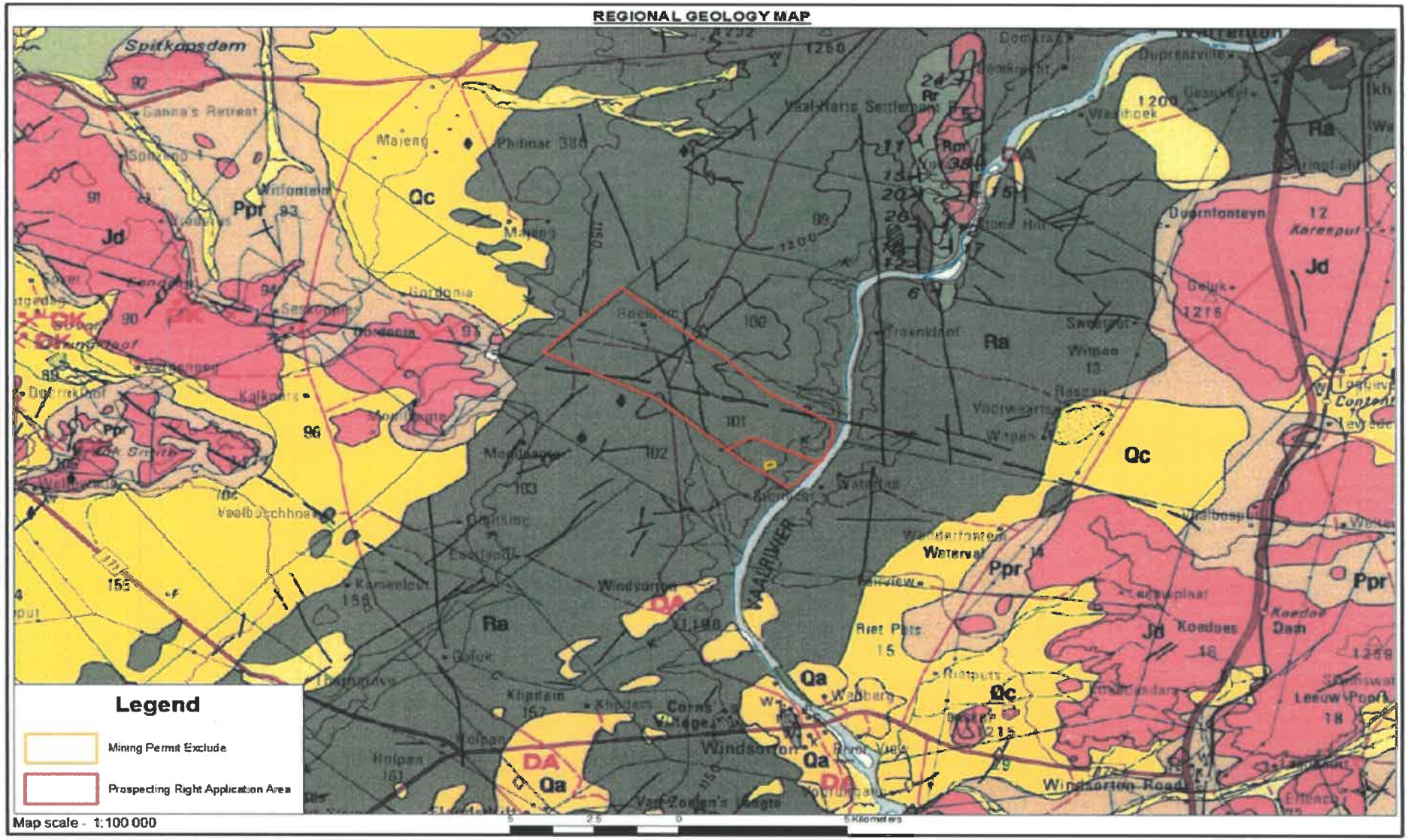


*Figure 4 - Extract from 1:250 000 geological map 2824 Kimberley (Council for Geoscience, Pretoria) showing location of the farms, Hay and Prieska Blue (Vgd) = Campbellrand Subgroup comprises of coarse to fine grained dolomite and limestone, Grey (C-Pd) = Dwyka Group, Yellow (T-Qc) = Neogene calcrete, Pale yellow (Qs) = Quaternary to Recent sands and sandy soil of the Gordonia Formation (Kalahari Group). DK marks Diamond in Kimberlite.*

(2) CLIMATE:

Gys Hoon from Eco Environmental Consultants has been appointed by Rooidam Plaas to provide a Storm Water Management Plan Assessment in order to highlight the stormwater and ecological characteristics of the proposed mining area, and to determine the possible impact of mining on the application area Climate was described and included in this report as part of the Stormwater Assessment.

**Regional Climate**

The site is located in a semi arid region with an average Mean Annual Precipitation of approximately 450 mm per annum which occurs during summer and autumn with very dry winters (Mucina & Rutherford, 2006). Mean annual evaporation of 2 896 mm/annum (South African Weather Bureau, Station 0290468 - Kimberley: 1957 - 1987).

**Rainfall**

Average monthly and annual rainfall for the site and number of days per month with measureable precipitation is presented in the table below:

| MONTH | 60 MINUTES | 24 HOURS | 24 HOURS IN 50 YEARS | 24 HOURS IN 100 YEARS |
|---|---|---|---|---|
| January | 35.8 | 57 | 65.1 | 73.8 |
| February | 70.1 | 82 | 58.9 | 66.5 |
| March | 63.7 | 67.8 | 72.1 | 81.4 |
| April | 25.7 | 51.6 | 65.9 | 75.2 |
| May | 14.6 | 54.6 | 36.8 | 42.4 |
| June | 19.1 | 67.5 | 26 | 30.4 |
| July | 12 | 26.7 | 26.6 | 31 |
| August | 17 | 58.2 | 23.4 | 27.3 |
| September | 16.3 | 26.7 | 24.1 | 28 |
| October | 37.6 | 59.2 | 53.8 | 61.8 |
| November | 25.2 | 60.1 | 41.2 | 46.7 |
| December | 59.9 | 64.5 | 70.7 | 80.9 |

Source: Directorate: Climatology South African Weather Bureau – Station 0290468:- Kimberley 1970 – 2003

**Temperature**

The average monthly maximum and minimum temperatures are presented in the table below:

| MONTH | DAILY MAXIMUM °C | DAILY MINIMUM °C |
|---|---|---|
| January | 32.8 | 17.9 |
| February | 31 | 17.3 |
| March | 28.8 | 15.2 |
| April | 24.8 | 10.9 |
| May | 21.4 | 6.5 |
| June | 18.2 | 3.2 |
| July | 18.8 | 2.8 |

| | | |
|---|---|---|
| August | 21.3 | 4.9 |
| September | 25.5 | 8.9 |
| October | 27.8 | 11.9 |
| November | 30.2 | 14.6 |
| December | 32.1 | 16.6 |
| **YEAR** | **26.1** | **10.9** |

Source: Directorate: Climatology South African Weather Bureau © 2000 – Station 0290468:- Kimberley 1960 – 2000

**Wind**

The prevailing wind direction for the area is north to north-north-west for the months of January to September and changing from north to sometimes westerly winds during October to December averaging 3.5 m/s (Kimberley 01/01/1990 – 31/08/200, Station 0290468).

**Humidity and evaporation**

The average monthly humidity is presented in the table below:

| MONTH | AVERAGE (%) | MAXIMUM (%) | MINIMUM (%) |
|---|---|---|---|
| January | 47 | 91 | 8 |
| February | 54 | 94 | 12 |
| March | 57 | 96 | 15 |
| April | 60 | 96 | 16 |
| May | 56 | 96 | 16 |
| June | 54 | 97 | 15 |
| July | 49 | 97 | 13 |
| August | 42 | 94 | 10 |
| September | 36 | 91 | 8 |
| October | 39 | 89 | 8 |
| November | 42 | 92 | 8 |
| December | 43 | 90 | 7 |
| **YEAR** | **48** | **94** | **11** |

Source: Directorate: Climatology South African Weather Bureau © – Station 0290468:- Kimberley 1960 – 2000

The average monthly evaporation is presented in the table below:

| MONTH | EVAPORATION IN mm |
|---|---|
| SYMONSPAN | |
| January | 365.6 |
| February | 279.1 |
| March | 235.8 |
| April | 169.1 |
| May | 135.1 |
| June | 108.6 |
| July | 130.1 |
| August | 181.2 |
| September | 252.6 |
| October | 314.8 |
| November | 345.5 |
| December | 378.6 |
| **YEAR** | **2896** |

Source: South African Weather Bureau – Station 0290468:- Kimberley 1957 – 1987

**Incidents of Extreme Weather Conditions**

- **Hail**
  Hail is sometimes associated with thunderstorms and mainly occurs in early to late summer (November to February). It occurs on average three times a year and although these storms may sometimes be severe and cause much damage, they usually impact on a relatively small area.
- **Frost**
  The period during which frost can be expected lasts for about 120 days (May to August). With extreme minimum temperatures to below -8°C at night in the winter, frost development can be severe.
- **Droughts**
  Droughts are common and may vary from mild to severe. During these periods dust storms sometimes occur, depending mainly on denudation of the surface.
- **Wind**
  High winds are unusual but when the do occur can uproot trees and take off roofs.

## (3) ***TOPOGRAPHY:***

Gys Hoon from Eco Environmental Consultants has been appointed by Rooidam Plaas to provide a Storm Water Management Plan Assessment in order to highlight the stormwater and ecological characteristics of the proposed mining area, and to determine the possible impact of mining on the application area topography was described and included in this report as part of the Stormwater Assessment.

The topography of the farm in the north western parts is very low (no steep slopes) and is classified as a flat plain that slopes towards the west. There is however a watershed in the centre of the farm which results in a slope from the watershed towards the southeast of the farm towards the Vaal River. This area has a slope of approximately 1:26 and is measured from the mining area to the Vaal River. The area is located between 1220 and 1135 m above sea level. The topography has been altered by historic mining activities/sites which forms part of the study area.

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

**The Scope of Study**

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

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

This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed mining area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

The region is characterized by slightly irregular plains and pans, with altitudes ranging between 1 126 m above sea level in the riverbed and 1 204 m on the higher lying areas. The terrain is divided by a central high-lying area at 1 200 m, with a gentle slope of 2 % running south-east towards the Vaal River, and another gentle slope of 2 % running north-west.

- ***SOILS:***

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

  **The Scope of Study**

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

  - conduct a desktop study and field investigation in order to identify and describe different ecological habitats and

provide an inventory of communities/species/taxa and associated species of conservation concern within the environment that may be affected by the proposed activity;
- identify the relative ecological sensitivity of the project area;
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  - indicates the ecological sensitivity of habitats and conservation values of species,
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This ecological assessment report attached as **Appendix 4** describes the ecological characteristics of the proposed mining area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

According to CDSLI (1993) the geological features on Rooidam comprise randian deposits. The site is underlain with amygdaloidal and porphyritic andesites from the Allen Ridge Formation of the Platberg Group, Ventersdorp Supergroup. The surface comprises a combination of aeolian sand, calcrete, Dwyka tillites and scree, which covers a series of ancient river terraces and alluvial fills. The diamond resources are primarily associated with these terraces.

The region is characterised by slightly irregular plains and pans, with altitudes ranging between 1 126 m above sea level in the riverbed and 1 204 m on the higher lying areas. The terrain is divided by a central high-lying area at 1 200 m, with a gentle slope of 2 % running south-east towards the Vaal River, and another gentle slope of 2 % running north-west.

The site is closely associated with Ae44, Ah21 and Ag10 land types. Soils associated with the Ae44 land type is red-yellow apedal, freely drained with a red, high base status and > 300 mm deep, but no dunes are present. Soils of the Ah21 land type is red-yellow apedal, freely drained with red and yellow, high base status and usually < 15% clay. The Ag10 land type soils are red-yellow apedal, freely drained with red, high base status and < 300 mm deep.

The soils on Rooidam have a low to moderate erodibility against wind and water erosion. (Dr. B Milne, 2019).

To conclude, the destruction of the natural habitats within the study area is inevitable. The significance of the impacts will be affected by the success of the mitigation measures implemented and the rehabilitation programme for the mining area. The majority of the site is in pristine condition, although some portions of the rocky ridges have been transformed by historic mining activities. In my opinion, authorisation can be granted as long as the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.

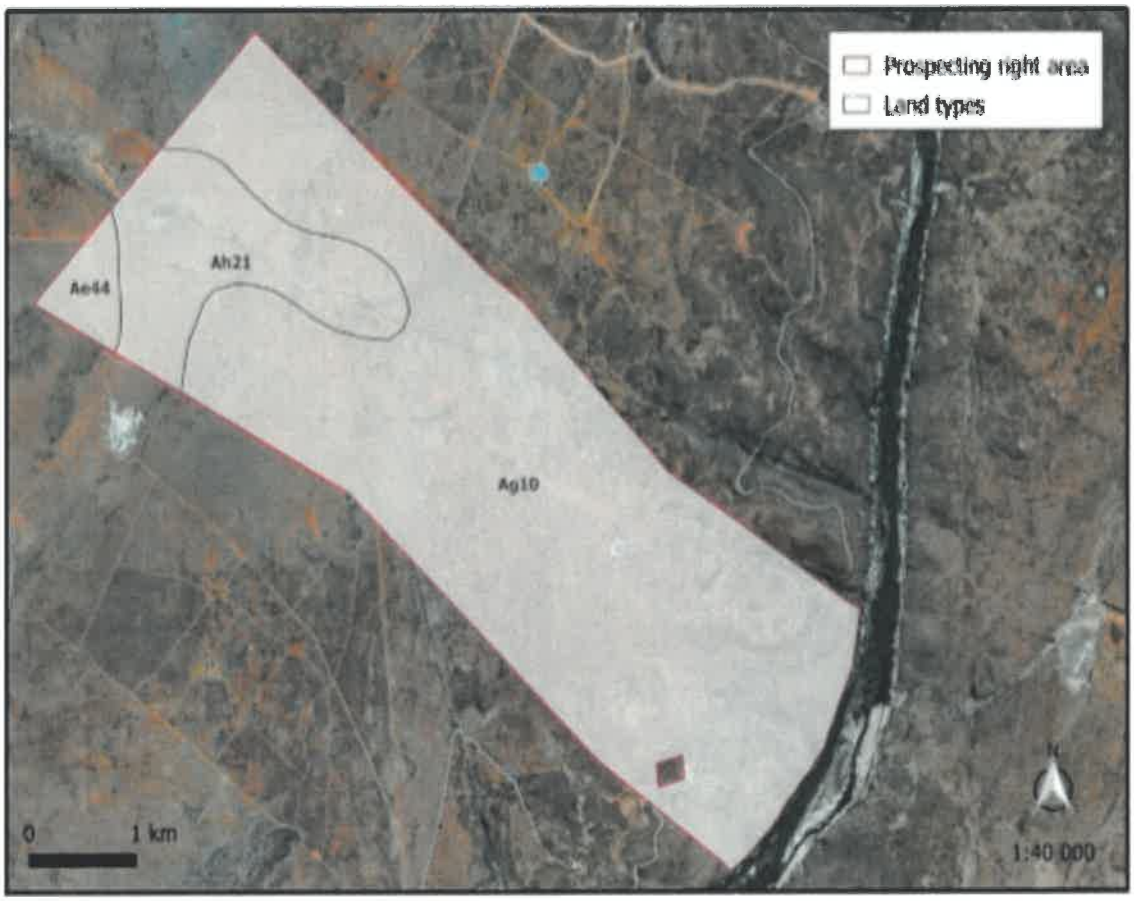


**Figure 6.** The distribution of land types at the study site. (Map taken out of the Ecological study by Dr. B Milne)

## (5) LAND CAPABILITY AND LAND USE:

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area, and to determine the possible impact of mining on the diversity and ecological status of the

application area topography was described and included in this report as part of the ecological study.

**The Scope of Study**

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

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

This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed mining area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

The major land uses in the region are diamond mining, crop irrigation and livestock farming. The site is classified as non-arable land with moderate potential for grazing. The main agricultural enterprise in the region is cattle, with a proposed stocking rate of 9 Ha per large stock unit. According to the Department of Agriculture, Forestry and Fisheries the area has a marginal potential for cotton, groundnut, maize and wheat production.

Apart from the current mining application by Rooidam, activities associated to a mining permit (NC 10377 MP) are also currently taking place in a 5.5 Ha exclusion in the south eastern part of the site. A canal runs through the property in the east and two public gravel roads traverse the property. Evidence of historic diamonds mining activities is also visible on site. The majority of the property is currently used for cattle and game farming.

Darius van Rensberg from Eco Environmental Consultants has been appointed by Rooidam Plaas to provide an Wetland Assessment in order

to highlight the wetland and ecological characteristics of the proposed mining area, and to determine the possible impact of mining on the diversity and ecological status of the application area, Land use was described and included in this report as part of the Wetland Assessment.

The site is located on the western banks of the Vaal River downstream of the town Warrenton. The surrounding area consists predominately of extensive commercial farming, including livestock, game and irrigation operations with water allocations from the Vaal River. There are also numerous other alluvial diamond mining operations located along the Vaal River.

**Land Use before Prospecting**

Prior to any mining activity the land capability correlated directly with the different soil forms. Before any historical mining activity the area would have been suitable for stock grazing and in some places would have had an arable capability.

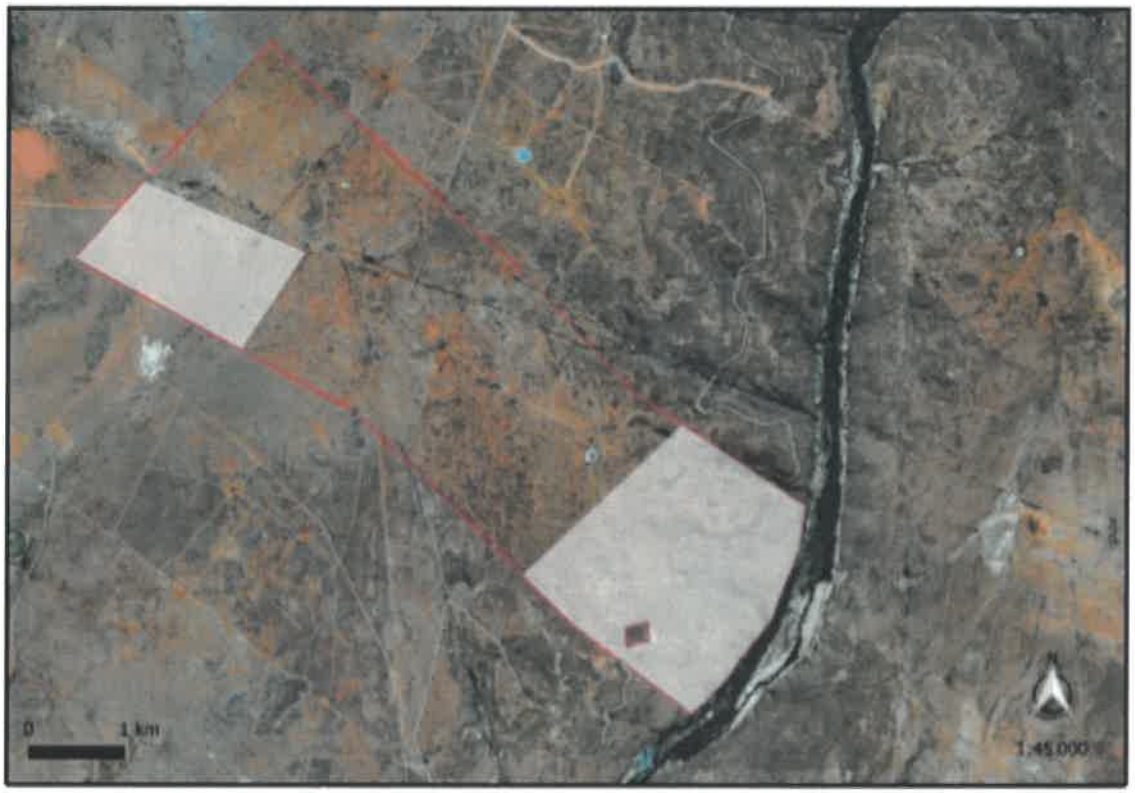

Figure 2. The locality of the core footprint for the mining and prospecting operation is indicated in white, while the border of the proposed prospecting/ mining right area is indicated in red.

**Evidence of Disturbance**

The topography has been altered by historic mining activities/sites which forms part of the study area. Old timers mining activities have caused a degree of disturbance in the area.

**Existing Structures**

The study area does not contain extensive built up areas and only contains a farmstead, surrounding buildings and scattered dilapidated buildings. A water canal is situated within the eastern portion and transects the site from north to south.

(6) ***NATURAL FAUNA:***

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

**The Scope of Study**

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

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

This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed mining area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

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

owner, hunt a wild animal without the written permission from the landowner. The landscape features on Rooidam provide diverse habitat opportunities to faunal communities, and these are discussed in their respective faunal groups below.

**Mammals**

As many as 11 listed terrestrial mammal species and four listed bat species potentially occur in the area. The African Straw-coloured Fruit-bat, Geoffroy's Horseshoe Bat, African Striped Weasel and Honey Badger have a high chance of occurring across the site, given their wide habitat tolerances. The Dent's Horseshoe Bat, Darling's Horseshoe Bat, Bushveld Gerbil and Lesser Dwarf Shrew have a high potential of occurring in the open woodland or shrubland in the east due to their preference for savanna, grassland or woodland habitats. The Cape Clawless Otter and Spotted-necked Otter both have a high
potential to occur in the vicinity of the Vaal River due to their preference for aquatic habitats.

The South African Hedgehog, Black-footed cat and Ground Pangolin may potentially occur on site on account of their preferences for arid areas. They are however rather skittish and therefore they will most likely occur very seldomly. The Sclater's Golden Mole has a low potential of occurring on site due to its preference for higher altitude hills, while the Brown Hyaena might have occurred on site in the past, but has a low potential to be found on site mainly based on the fact that farm fences are restricting their occurrences across their natural distribution range.

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

The core mining activities are associated with the ridges and shrubland directly east of the Vaal River as well as the open woodland in the far south-west of the site. Listed mammals that are most likely to be impacted in the form of species- and/or habitat loss resulting from the mining activities include those associated with these rocky, savanna and woodland habitats.

**Reptiles**

The Rooidam mining area lies within the distribution range of at least 55 reptile species (see Appendix 2), of which none are of international or national conservation concern. Three species are endemic to South

Africa, i.e. Homopus femoralis (Greater Padloper), Pachydactylus mariquensis (Common Banded Gecko) and Agama aculeata distanti (Eastern Ground Agama) and most area are protected either according to Schedule 1, 2 or 3 of NCNCA, except for agamas, geckos and skinks (see Appendix 2). Specially protected species include Karusasaurus polyzonus (Southern Karusa Lizard) and Chamaeleo dilepis dilepis (Namaqua Chamaeleon).

The habitat diversity for reptiles in the study area is high and includes the aquatic and riparian zones, rocky ridges, sandy plains and ephemeral drainage lines. The rocky ridges are considered to be the most important habitat for reptiles at the site and the mining activities will take place on some of these ridges.

**Amphibians**

Fifteen amphibian species are known from the region (Appendix 2). Low amphibian diversity is normal for an arid area, but is likely to increase within the aquatic and wetland ecosystem of the Vaal River as well as in the ephemeral pan once inundated. As a result, a higher amphibian diversity is most likely to be found in the latter, while only those species which are relatively independent of water are likely to be common in the area further east of the river.

Pyxicephalus adspersus (Giant Bull Frog) is the amphibian species of conservation concern that potentially occur in the study area. It is listed as Near Threatened in terms of the Red Data Book of Frogs and is protected according to Schedule 1 of the NCNCA. All other amphibians of the study area are protected according to Schedule 2 of NCNCA (see Appendix 2). No mining activities are planned near the river or within the ephemeral pan, but impacts on amphibians at Rooidam are likely to be associated with the riparian habitats of the drainage lines and streams.

**Avifauna**

The study site does not fall within any of the Important Bird Areas (IBA) defined by Birdlife South Africa, but lies near (< 50 km) three IBAs (Figure 7); i.e. Spitskop Dam (17 km), Dronfield (40 km) and Kamfers Dam (50 km).

Spitskop Dam is one of the largest wetlands in the Northern Cape region and holds water permanently, providing a vital habitat when many temporary wetlands have dried up. It is an important habitat for the Greater- and Lesser Flamingo, Chestnut-banded Plover, Caspian Tern, Pink-backed Pelican and Yellow-billed Stork. One of the most important threats is the poor water quality of the dam fed by the Hart River. The water quality of the latter deteriorates due to irrigation return flows with

increasing concentrations of sodium, magnesium, chloride, sulphate and nutrients. Releases from Spitskop Dam could also impact on the quality of the Vaal River. Other important threats to Spitskop Dam include the hunting or poaching of water birds, fishing activities and livestock grazing and trampling. The dam edges are threatened by the common reed, the dominance of which reduces the foraging area for flamingos and waders that prefer open shoreline.

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

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

A total number of 295 bird species have been recorded from the region and all of these species are protected either according to Schedule 1, 2 or 3 of NCNCA (see Appendix 2) of the ecological study.
Twenty-four listed bird species are known from the region, all of which are classified as Vulnerable, Near Threatened or Endangered.

In general, bird species of the study area are likely to experience some disturbances as a result of the Rooidam mining activities. The most significant impacts are however expected to be in the form of riparian habitat destruction if any of the drainage lines are to be excavated. Not only will the birds that rely on these habitats for breeding, nesting and foraging be displaced, but the subsequent loss of ecological corridors and connectivity will occur. None of the protected species directly associated with the ephemeral wetland and aquatic habitats of the Vaal River are however expected to be affected.

Terrestrial birds are likely to experience local disturbances, where habitat loss will be confined to the footprint of core sites and their activities will cause disturbances in the form of noise and movement. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary. Therefore, the Rooidam activities would not constitute a significant loss that would compromise the available habitat for any of the terrestrial resident bird species. Apart from general disturbances and habitat loss, other potential impacts would come from accidental or intentional killing of birds.

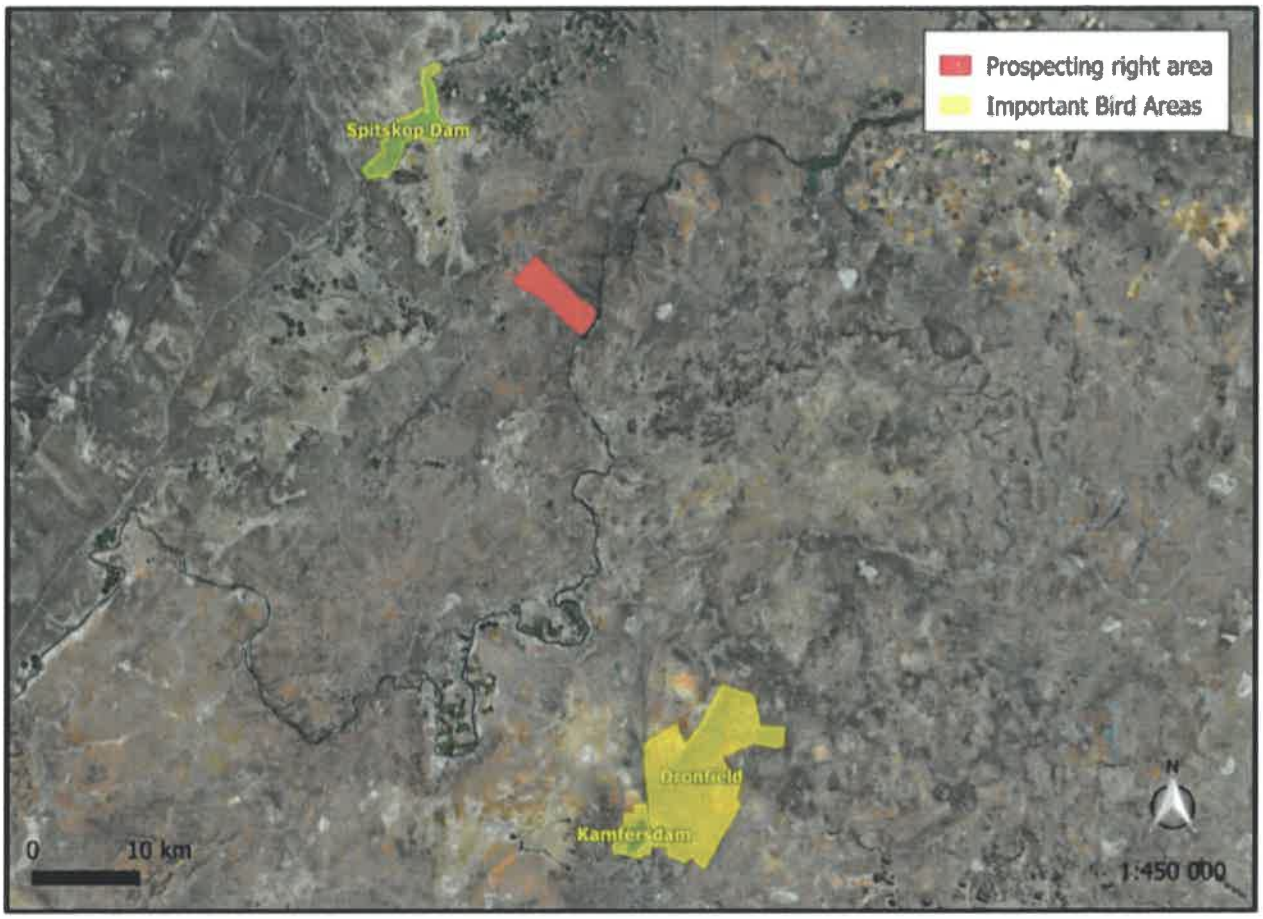


**Figure 7.** Riet Puts (indicated in red) lies in the vicinity of three Important Bird Areas (BirdLifeSA 2015), i.e. Spitskop Dam, Kamfers Dam and the Dronfield Nature Reserve (indicated in yellow).

**Fish**

Fish species expected to occur in the active channel of the Vaal River is listed in Table 10 of the ecological study, along with their IUCN status and sensitivity to physico-chemical and no-flow conditions. No mining activities are however planned near the river and therefore the Rooidam operation is not expected to have any impacts on the fish communities of the region.

**Invertebrates**

Invertebrates dominate inland habitats and play a significant role in the overall function of the ecosystem (Kremen et al. 1993; Weisser and Siemann 2004). Their immense species diversity makes it almost impossible to list all species that may possibly occur on site. Nevertheless, key morphospecies as well as species of conservation concern are discussed here.

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed in Table 11 of the ecological study, along with species that are specially protected according to Schedule 1 of the NCNCA. All other invertebrates from the class Insecta and Arachnida are protected either according to Schedule 2 or 3 of the NCNCA.
Three major habitats delimit possible invertebrate communities on site, i.e. the aquatic habitat of the perennial Vaal River channel, the ephemeral pan and variety of terrestrial habitats collectively classified as Bushveld vegetation for insect preference, according to Picker et al. (2004).

**i. Perennial Vaal River**

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

**ii. Ephemeral pan**

Ephemeral pans host species specifically adapted to ephemerality. Crustaceans in particular are specialists of these pans and dominate them. Their eggs lie dormant in the soil until the pans are inundated. Not much is known about the species distribution or conservation status of species in the Northern Cape, but typical taxa to be expected in the ephemeral pan on Rooidam include Notostraca, Anostraca, Cladocera, Copepoda, Ostracoda and Conchostraca. Within a few days after the pan is wet these species will hatch out and attract a number of wetland birds. Therefore, these pans also act as important breeding and feeding links to birds in terms of connectivity, by providing stepping-stone corridors in an arid landscape. The disturbance or destruction of these pans will not only impact the specialised pan invertebrate communities locally, but is expected to also have a regional and landscape-level effect. However, no mining activities are expected to take place near the pan.

**iii. Terrestrial Bushveld vegetation**

The majority of the study site is included in the bushveld vegetation for insect preference. Invertebrate communities associated with this habitat are widely distributed and extremely diverse. Therefore, it is not possible to list specialised communities that occur here. However, those species of conservation concern listed are most likely to be associated with this habitat. Those invertebrates that occur in this habitat will be most affected, because the core activities will take place here. Key impacts will be in the form of habitat loss and the inevitable death of those that occur in the direct path of project activities.

**The sensitivity map** for the Rooidam mining operation is illustrated in Figure 18a. The riparian woodland and ephemeral pan are considered to be of very high sensitivity due to their vital ecological and hydrological functionality and significance. They are also a unique habitat protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially no-go areas.

The open woodland on deep red sand and the shrubland on rocky ridges are considered to be of high sensitivity based on the species of conservation concern encountered in these units. Both these units are earmarked for mining activities. Although activities within these units are undesirable, they should only proceed with caution as it may not be possible to mitigate all impacts appropriately.

The open shrubland on red soil is considered to be of medium sensitivity. No significant plant species of conservation was encountered here, but it still comprises pristine habitat. This unit is also earmarked for mining activities, but impacts are likely to be largely local and the risk of secondary impact such as erosion low. Activities within this unit can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.

7) **Flora:**

The vegetation types within the study area consists of Scmidtsdrif Thornveld (SVk 6), Kimberley Thornveld (SVk 4) and Upper Gariep Alluvial Vegetation (AZa 4). According to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) these vegetation types are considered to be of least Concern (LC) (Map 3). They are not currently subjected to any pronounced transformation or development pressures.

South Africa contains 19 known centres of endemism. These areas contain a high number of species endemic to this specific area. Due to the limited range of most of these species many are rare, protected or endangered. The mining area is situated within the Griqualand West Centre of Endemism. Many species occurring within this centre is unique and localised to this area. As a result the study area may contain such species which are of conservational importance.

The Beeskloutjie (Lithops leslei subsp. leslei) is known to occur in the vicinity of the site and it is highly likely that it occurs on the site. It is of conservational concern and must be considered sensitive. Due to the drought the species will likely hide underground and will not currently be visible within the study area.

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

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

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

This ecological assessment report attached as Appendix 4 describes the ecological characteristics of the proposed mining area, identifies the source of impacts from prospecting, and assesses the impacts, as well as the residual impacts after closure.

**Broad-scale vegetation patterns**
The study area falls within the Savanna and Azonal Vegetation biomes (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), three broad-scale vegetation units are present on site, i.e. Kimberley Thornveld, Schmidtsdrif Thornveld and Highveld Alluvial Vegetation. This vegetation map however does not

reflect the true character of the site, because it has not been mapped at a very fine scale and therefore it is necessary to survey plant communities on site to delineate the vegetation at a finer scale.

**Kimberley Thornveld** is distributed in the North-West, Free State and Northern Cape Provinces at altitudes between 1 050 and 1 400 m. It is found in the Kimberley, Hartswater, Bloemhof and Hoopstad Districts, but is also within the Warrenton, Christiana, Taung, Boshof and Barkly West Districts. The unit is typically presented as slightly undulating sandy plains with a well-developed tree and shrub layer and an open grass layer. Andesitic lavas of the Allanridge Formation occur in the north and west, while fine-grained sediments of the Karoo Supergroup are found in the south and east. Soils are deep, sandy to loamy, and of the Hutton form. The most common land types are Ae and Ah. The unit is classified as being least threatened, but 18 % has already been transformed, predominantly by cultivation. Only 2 % is currently conserved in statutory reserves and no endemic species are known from this unit. It is specifically prone to Acacia mellifera encroachment following overgrazing, but the occurrence and risk of erosion is very low.

**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 Rooidam diamond mining operation 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 well drained, stony and shallow (< 0.3 m), with large angular rocks found on the surface. A soil rock complex with Mispah soil form is typical, while the unit is mainly associated with the Ae and Dc land types. The unit is classified as being 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 not currently known to be statutorily conserved. Erosion is very low to low. No endemic species are known from this unit and Prosopis spp. is significant alien invaders.

**Highveld Alluvial Vegetation** falls within the Azonal Vegetation Biome and is mainly distributed in the Free State, North-West, Mpumalanga and Gauteng Provinces, but is also found in alluvial drainage lines and floodplains along marginal (eastern) units of the Savanna Biome in Northern Cape. Altitude ranges between 1 000 and 1 500 m. The unit is typically presented with flat topography supporting riparian thickets, mostly dominated by Vachellia karroo. It is accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants. The geology comprises of deep sandy to clayey (but mostly coarse sand) alluvial soils that developed over Quaternary alluvial sediments.

Oakleaf, Dundee, Shortlands, Glenrosa and Mispah soil forms were identified in the Vaal River floodplain. Rivers are perennial and often flood in summer. Erosion of the banks and deposition of new fine soil on alluvium can be of considerable extent. Some smaller anastomosing channels of major rivers can dry out in winter. The unit is classified as being least threatened, with 10% being conserved within formal conservation areas, e.g. Bloemhof Dam, Christiana, Baberspan, Wolwespruit, Sandvlei, Schoonspruit, Faan Meintjes and Soetdoring Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams. The unit is highly prone to invasion by alien weeds, while the undergrowth suffers from overgrazing. No endemic species are known from this unit.

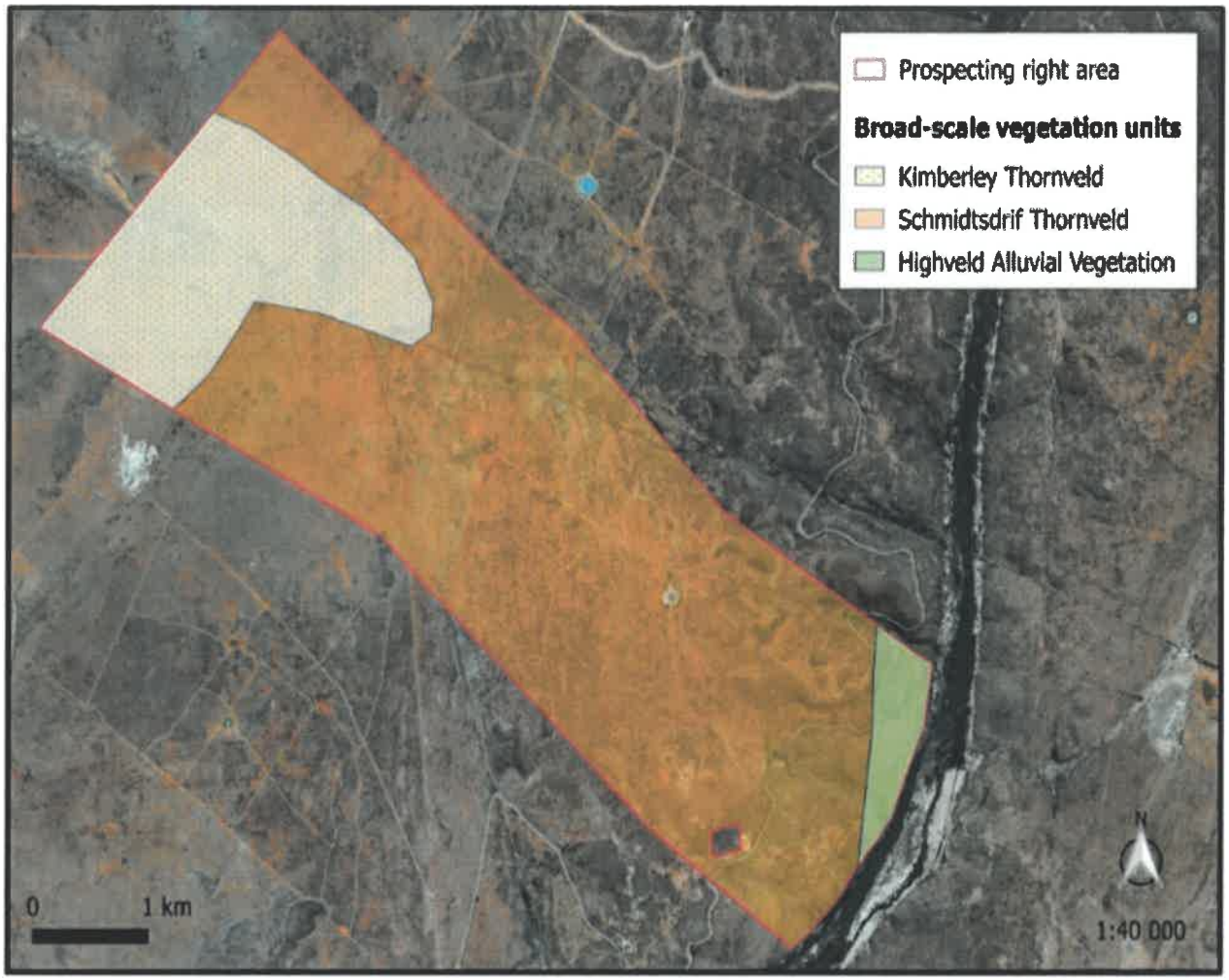


**Figure 8.** The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area. (Map taken out of the Ecological study by Dr. B Milne, 2019)

**Fine-scale vegetation patterns**

The plant communities within the study area are delineated according to plant species correspondences, change in soil structure, topographical changes and disturbance regimes. The vegetation on site can be divided into five distinct units and are described below. A complete plant species list, including those species likely to occur in the area is presented in Appendix 1.

**i) Senegalia mellifera – Grewia flava open shrubland on shallow red soil**

This community comprises the majority of the study area. It is found on shallow red soil, which constitutes about 10 % of the ground cover. It is typically represented as an open shrubland with Senegalia mellifera being the most dominant shrub, followed by Grewia flava. Other tall shrubs found here include Tarchonanthus camphoratus, Vachellia tortilis, Ziziphus mucronata, Ehretia rigida and Opuntia ficus-indica. Low shrubs include Pentzia incana, Monechma incanum, Hermannia affinis, Lycium sp. and Solanum sp. The grass layer was very dry during the survey, but common grasses that were identifiable include Eragrostis lehmanniana, E. rigidior and Aristida congesta subsp. barbicollis.

**ii) Senegalia mellifera – Tarchonanthus camphoratus shrubland on rocky ridges**
This community is found in the east of the study area on red andesitic rocky outcrops and ridges, where rock constitutes approximately 30 % of the ground cover. Unfortunately, the majority of this community was destroyed in a fire, but small isolated outcrops west of the canal were used as proxies to describe the vegetation for this unit.

It is typically represented as a shrubland with Senegalia mellifera being the most dominant shrub. Other tall shrubs found here include Tarchonanthus camphoratus, Vachellia luederitzii var. luederitzii, Boscia albitrunca, Grewia flava and Ehretia rigida. Low shrubs include Kalanchoe paniculata and Asparagus sp. The grass layer includes species such as Aristida vestita, Enneapogon scoparius, Heteropogon contortus and Cenchrus ciliaris.

**iii) Vachellia tortilis – Stipagrostis uniplumis open woodland on deep red sand**
This community is found in the west of the study area on deep red sand that constitutes approximately 10 % of the ground cover. It is typically represented as an open woodland, where tall trees are scattered in a grassy matrix.

The tree layer is dominated by Vachellia tortilis, but Vachellia erioloba is also conspicuous. Tall shrubs found here include Grewia flava, Senegalia mellifera, Tarchonanthus camphoratus and Ehretia rigida. Low shrubs include Vachellia hebeclada, Searsia tridactyla, Chrysocoma ciliata, Aptosimum marlothii and the hemiparasite Viscum rotundifolium.

The grass layer is dominated by Stipagrostis uniplumis, but other species such as Aristida congesta subsp. barbicollis and Eragrostis rigidior are also common. Herbs include Senna italica, Chamaecrista capensis and Cucumis africanus.

**iv) Searsia lancea – Ziziphus mucronata riparian woodland**
This community is found along the Vaal River that lines the study area in the east, its tributaries, as well as drainage ways in the west of the study area. It is typically represented as a woodland, where tall trees form a dense canopy over a well-developed undergrowth.
The tree layer is dominated by Searsia lancea and Ziziphus mucronata, but other trees include Salix mucronata, Acacia karroo and Diospyros lycioides. The undergrowth is primarily dominated by graminoids such as Panicum coloratum, Paspalum distichum and Cyperus denudatus as well as weedy forbs such as Cirsium vulgare and Tagetes minuta.

**v) Leptochloa fusca grassland in ephemeral pan**
One ephemeral pan is situated in the eastern half of the study area. The pan is densely vegetated by grassland, which is densely dominated by Leptochloa fusca. The periphery of the pan is lined with trees such as Ziziphus mucronata, Searsia lancea, Grewia flava, Tarchonanthus camphoratus and Vachellia tortilis.

## (8) *SURFACE WATER*

Gys Hoon from Eco Environmental Consultants has been appointed by Rooidam Plaas to provide a Storm Water Management Plan Assessment in order to highlight the stormwater and ecological characteristics of the proposed mining area, and to determine the possible impact of mining on the application area surface water was described and included in this report as part of the Stormwater Assessment.

The farm (i.e. Rooidam 101) is located within the quaternary catchments of C91D and C33B, (Figure 1) which forms part of the Lower Vaal River Catchment in the Northern Cape. The site is located on the western banks of the Vaal River downstream of the town Warrenton. The surrounding area consists predominately of extensive commercial farming, including livestock, game and irrigation operations with water allocations from the Vaal River. There are also numerous other alluvial diamond mining operations located along the Vaal River.

The surface water runoff in the area is therefore typically restricted to very high rainfall events.
The average storm water runoff volumes are thus relative low but it would be necessary to manage storm water during high rainfall events.

There are very few clearly defined waterways outside the flood plain. Closer to the river in the flood plain area, drainage features has developed where storm water is collected and discharges along defined waterways into the Vaal River. Due to the low rainfall, these waterways are mainly seasonal
The surface water flow patterns are a function of the local topography and indicated in Figure 2 below:

**Stream flow**
There are a number of non-perennial drainage lines and non-perennial pans on the farm outside the flood plain that can flood their banks to cover large areas. Storm water occurs as sheet flow that converges in more definable water-ways closer to the Vaal River.

***Wetlands***

There are a number of non-perennial drainage lines and non-perennial pans on the farm that occur within the mining area.

**STORMWATER FLOW PATTERNS OVER THE FARM ROOIDAM 101, WINSERTON, NORTHERN CAPE**

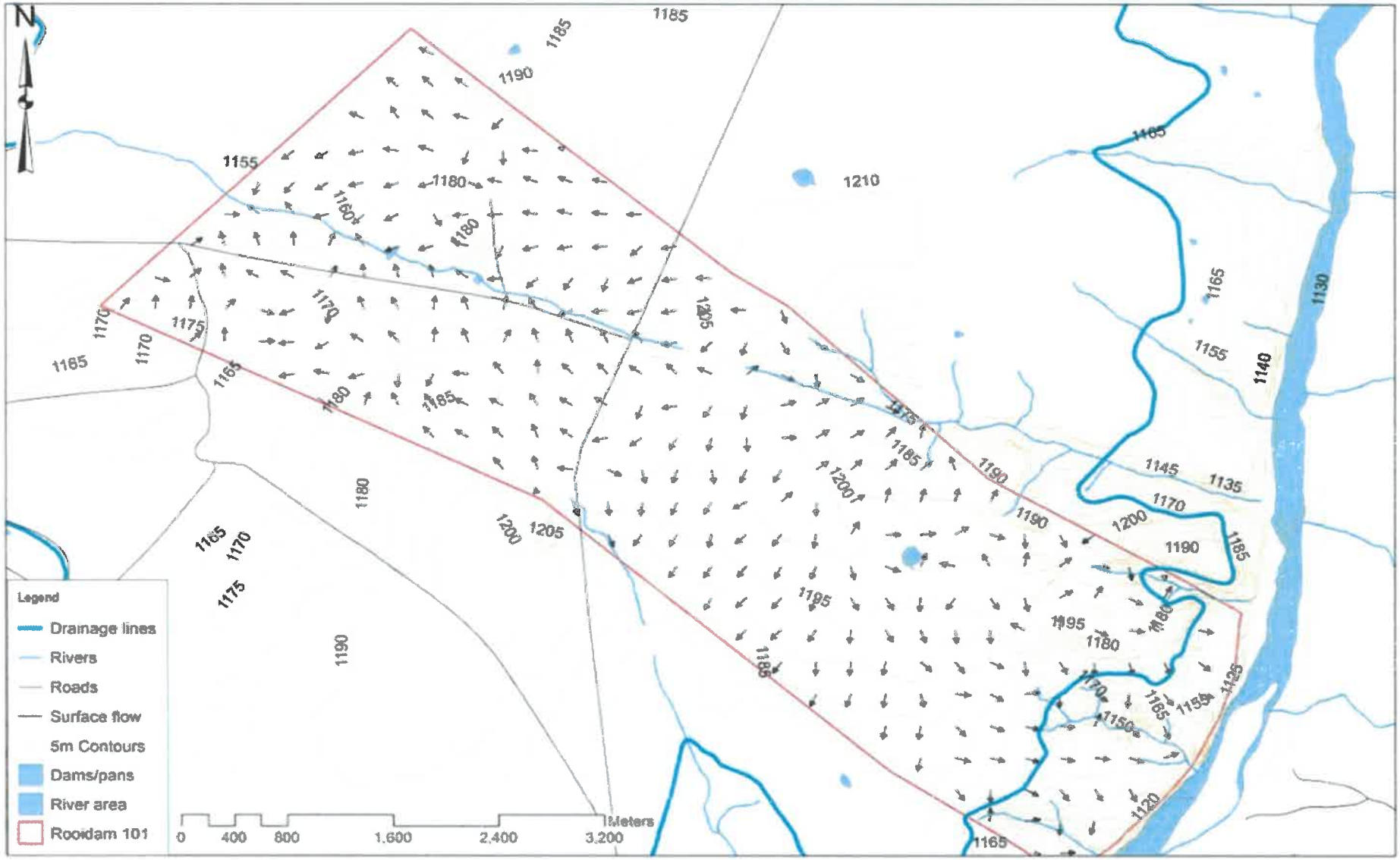


**Figure .** Stormwater Flow patterns over the Farm Rooidam 101, Windsorton

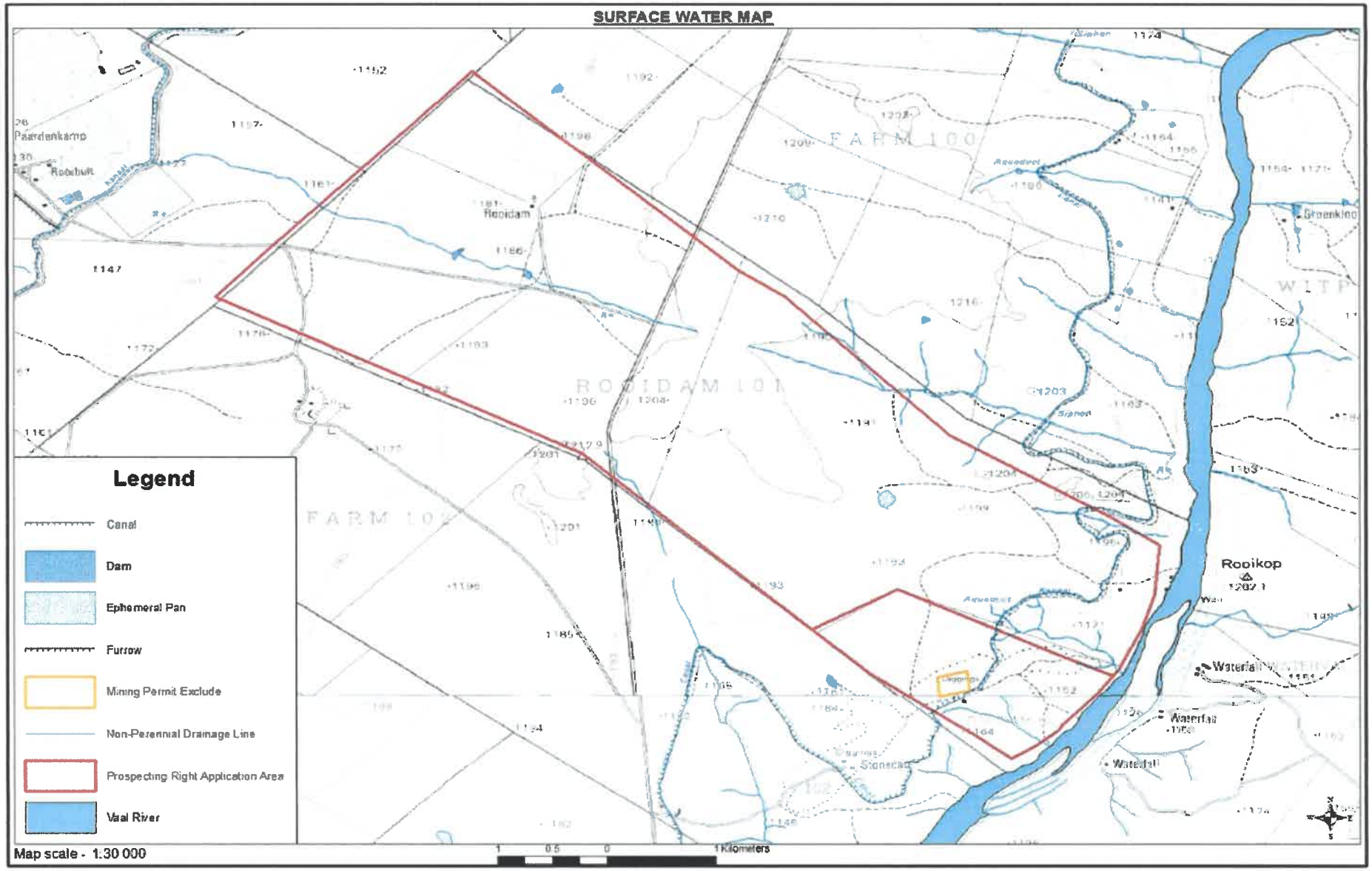


**Figure 6:** See dry Non- Perrennial Drainage channels indicated in blue on the proposed Mining area.

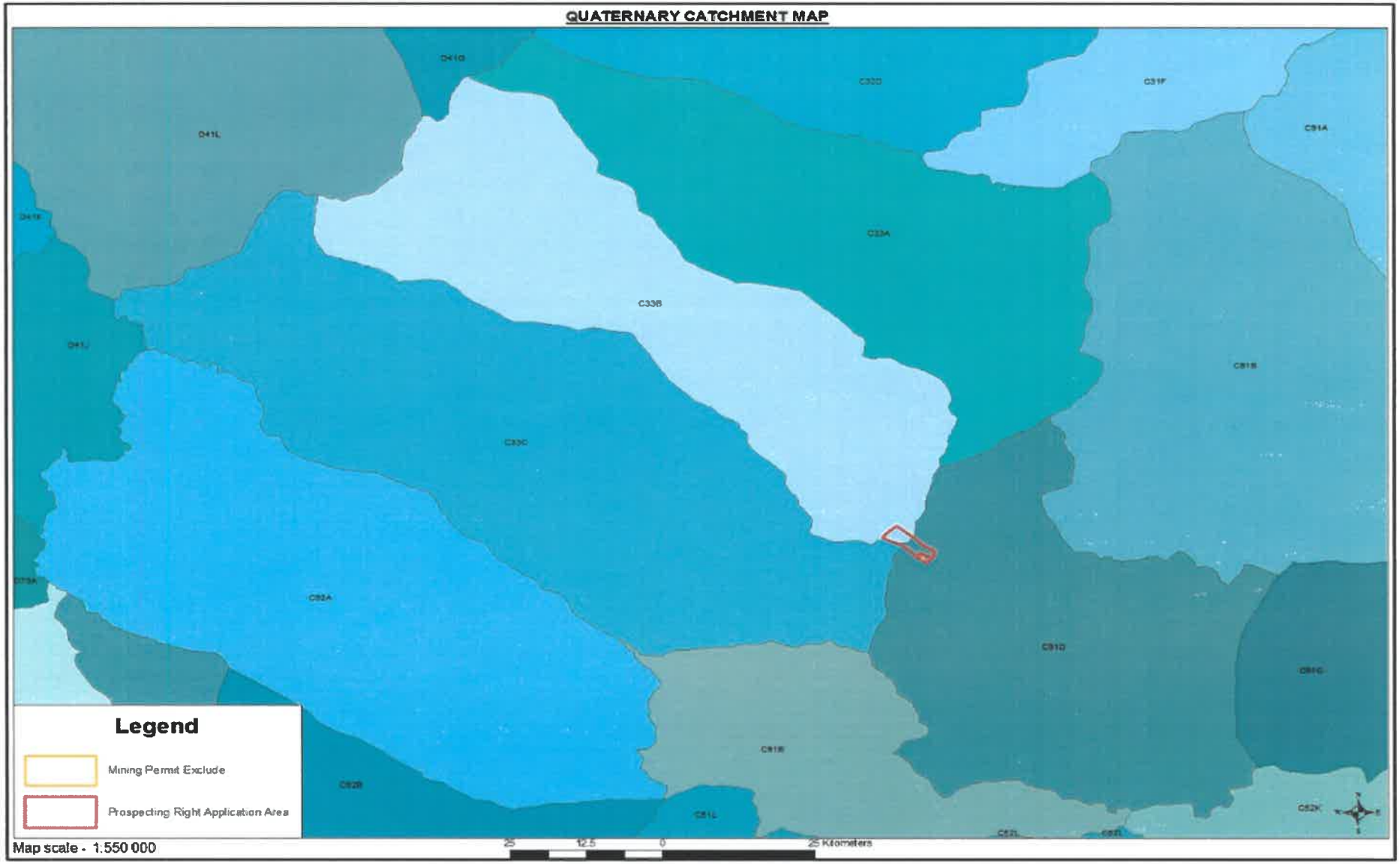


**Figure 7:** Catchment area

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

**Depth of water-table(s):**
The combination of a relative deep ground water table, geology and low relief make the area not conducive for the formation of any fountains or the recharge of surface water features from ground water.

**Ground-water zone:**
The 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.

(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.

Existing Sources
The current source of air pollution in the area stems from numerous mining operations along the Vaal River and from vehicles travelling on the gravel roads of the area. Farming activity, especially ploughing of the irrigation fields, may generate dust during certain periods of the year.

The general air quality on the area is expected to be good.

New source
The source of air pollution on the farm 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 within legal limits.

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

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

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

***Noise***

**Existing sources:**

Noise on site will come from the large vehicles (tip trucks, front-end loader, back actor), from the working pan.

There are mining operations on both sides of the proposed mining operation. 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 will be monitored on the mining area and where necessary, protective equipment is used in certain areas where machinery is used.

## (11) *VISUAL ASPECTS:*

The mining site would possibly be visible form the secondary gravel road that travels to Windsorton. The negative visual impacts associated with mining and the washing pan will however have a low negative impact since it will be visible to the landowners and can be visible from the secondary gravel road. 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 pits as mining progress.

## (12) AREAS OF CULTURAL-HISTORICAL OR ARCHAEOLOGICAL INTEREST

A Phase 1 Heritage Impact Assessment was carried out on the farm Rooidam 101 near Windsorton in the Northern Cape Province by L Rossouw. The assessment pertains to the application for mining rights in two different areas on the farm, designated Area 1 and Area 2.

Area 1 is underlain by Ventersdorp andesites that is largely capped by a dark red sandy overburden laced with a veneer of polymict gravels. One isolated LSA core was mapped during the pedestrian survey of the terrain. A foot survey of Area 1 revealed no evidence of Quaternary fossil remains or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of settlement structures, graves, rock art or historical buildings older than 60 years within the Area 1 footprint. The site is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 1 may proceed with no further assessments required. It is also advised that the graves and structural remains of the Koranna mission station previously identified by Morris (2012) is fenced off and avoided. Area 2 is underlain by a cobble grade conglomerate with granular to pebbly clasts made up of quartz, quartzite, agate, chert or banded ironstone and set within a matrix of dark red, fine to medium sand. The terrain has been severely degraded following decades of mining activities in the region. A large rectangular stone – walled structure is located on the riverbank while the remains of a circular stone-walled structure are situated higher up and about 650 m west of the river bank. A foot survey of Area 2 revealed no evidence of in situ fossil exposures or Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of graves, rock art or historical buildings older than 60 years within the Area 2 footprint. Area 2 is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 2 may proceed provided that the two stone – walled structures identified during the survey are protected by a 10 m-wide buffer zone.

(13) ***TOPOGRAPHY, SOIL EROSION AND ASSOCIATED DEGRADATION OF ECOSYSTEMS:***

The study area also falls within a zone where one of South Africa's largest economically most important alluvial diamond deposits are found. The primary secondary source of alluvial diamond deposits in the Northern Cape extends along the Orange and Vaal Rivers (Gresse 2003), while the most significant crop irrigation in the Northern Cape also stretches along these rivers (Durand 2006). According to Mucina and Rutherford (2006), more than a quarter of the Highveld Alluvial Vegetation type has already been transformed for cultivation and dams, while Kimberley Thornveld is primarily being transformed by cultivation and mining.

According to the Wetland Freshwater Priority Areas project, half of the wetlands (50%) which occur in the Eastern Kalahari Bushveld Group 3

vegetation have been classified to have a Present Ecological State (PES) of critically transformed. Another 40 % is in natural or good condition, while 10 % have been moderately transformed. Within the direct vicinity of the proposed mining operation almost all wetlands have been transformed in some way. The only potential sensitive feature is the natural drainage channels within the possible mining area. The bulk sampling activities will not go into any drainage channel it is thus not foreseen that mining can have a possible influence on this water features.

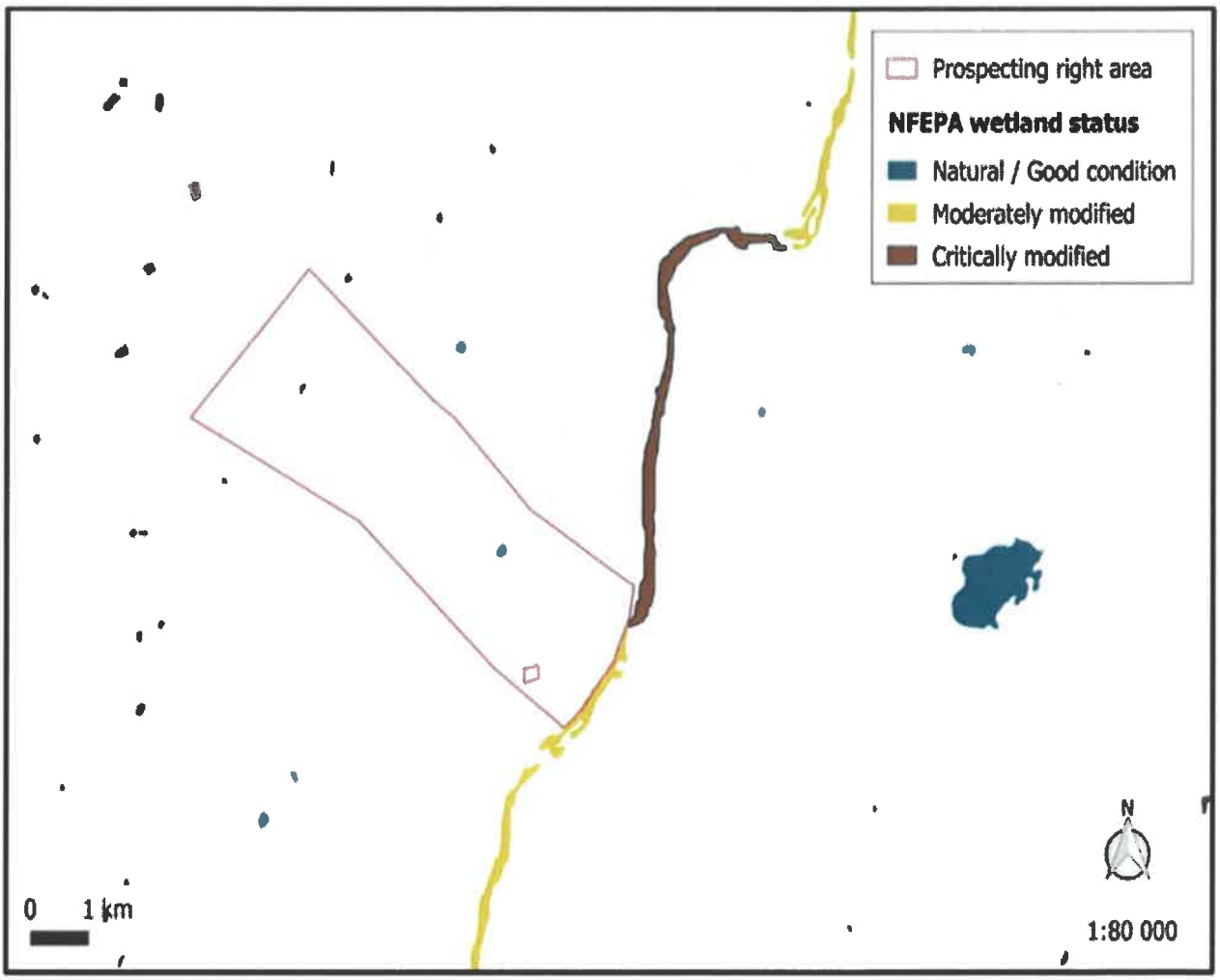


**Figure 12.** The status of wetlands occurring in the vicinity of the proposed mining right area.

The mining operation itself is expected to cause habitat transformation, in most part of the vegetation resembling Kimberley Thornveld and might also transform some of the riparian woodlands found along the ephemeral drainage lines. Due to the vast transformation of habitat in the region it is expected that the proposed mining right will contribute to cumulative habitat loss and the disruption of the broad-scale landscape connectivity in the region.

## (14) *BROAD-SCALE ECOLOGICAL PROCESSES:*

**Critical biodiversity areas and broad-scale processes**

The proposed mining site does not fall within any formally protected area or within a National Protected Areas Expansion Strategy Focus Area. Furthermore, the broad-scale vegetation units of the study area are all classified as least threatened and therefore no formal fine-scale conservation planning has been conducted.

The mining site does however fall within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. The majority of the study site is regarded as Ecological Support Areas, while the north-eastern portion along the Vaal River and main drainage ways is classified as Critical Biodiversity Area Two.

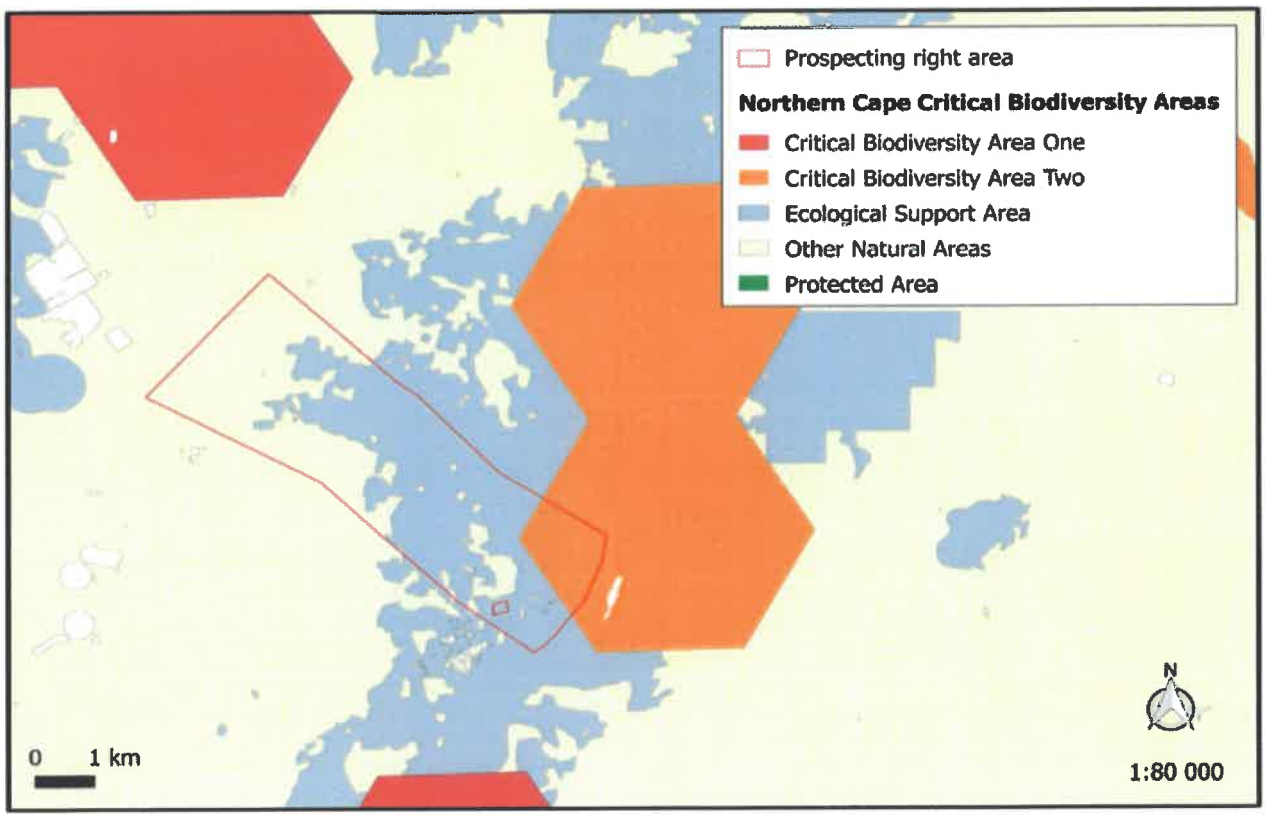


**Figure 13.** The study area in relation to the Northern Cape Critical Biodiversity areas.

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) also classifies the north eastern portion of the study area to have High Biodiversity Importance, which constitute a high risk for mining. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the

impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector.

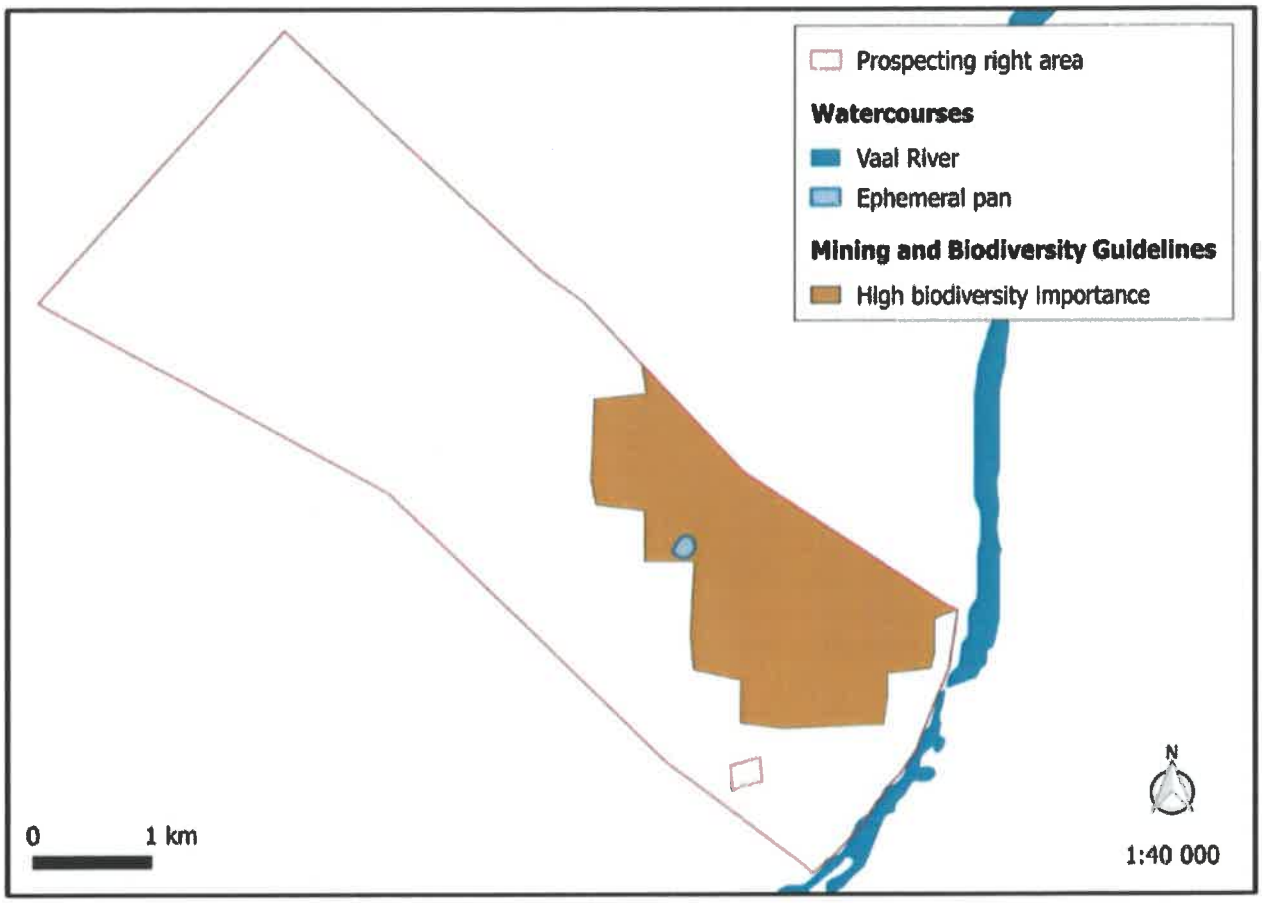


**Figure 14.** The study area in relation to the Mining and Biodiversity Guidelines.

Moreover, the riparian vegetation along the Vaal River has been identified for long-term maintenance of broad-scale ecological processes. The Magareng Spatial Development Framework (MLM 2014) proposed these to be maintained as ecological corridors in order to create an open space system throughout the municipal areas that promotes ecological ecosystems within the region.

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

**Basic Municipal Profile – Dikgatlong Municipality**
[Information obtained from the Draft Dikgatlong IDP 26 March 2013]

**Population**
The Dikgatlong Municipality has a total population of 46 841, with 50.76% female and 49.24% male (Census 2011). This indicates that the population has increased, as the population was 35 773 in 2001. Between 1996 and 2001 the population decreased by 0.65% however there was population growth of 2.02% between 2001 and 2011. 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 least represented.

The number of households increased from 9 733 households (2001) to 11 969 households (2011) in the Dikgatlong Local Municipality. This has led to a slight increase in the household size; which has increased from 3.7 to 3.9 (2001 to 2011).

**Age Groups**
The population of Dikgatlong Local Municipality consist mainly of young people, the biggest age group is thos between 0 – 4 years, while 66.31% of the population are those between the ages of 0 – 34 years. The population consists mainly of young people and the municipal area has a low percentage in elderly people. The dependency rate increased from 58.1% (2001) to 58.5% (2011).

**Spatial Development Rationale**
The municipality derives its name Dikgatlong from a Setswana word meaning "confluence" as the Harts and Vaal river flow into each other in Delportshoop.

The Dikgatlong Local Municipality which covers a geographical area of 237 749.2 ha and covers the following areas: Barkly West, Mataleng, Delportshoop, Ulco, Longlands, Gong Gong, Holpan, Smuts Myn, Pniel, Vaal Gama Gara, Stilwater, Morrisdraai and the former District Municipal Area (Koopmansfontein, Blikfontein, Klipfontein and Dancarl).

The administrative head office of the municipality is located in Barkly West. The municipality falls under the Frances Baard District Municipality (FBDM) and it is 32km from Kimberley. The municipality serves as a connector route for those travelling from Kimberley to Kuruman (or vise versa). The municipality is bordered by the Sol Plaatje Local Municipality on the south, Kgatelopele Local Municipality on the

west, Ga-Segonyana Local Municipality on the north and Greater Taung Local Municipality on the east.

**Connection**

Movement systems such as road and pedestrian route are often used to indicate accessibility. Movement systems thus affect the range of choices and opportunity available to inhabitants. "The municipality has various structuring elements such as the primary corridor along the N12 and a secondary corridor along the R31 towards Sishen and Danielskuil through Dikgatlong" which transports goods and people (Dikgaltong SDF, 2008: 79). The major economic activities occur on the R31 road this had led to linear development along the main road. The N12 serves mainly as a transport corridor.

**Space**

"Public spaces provide a meeting place for people residing in those settlements. At the heart of settlement-making lies the creation of a continuum, or hieracrchy, of public spaces and movements systems, which attract, and give order to, activities, events and elements in accordance with their need for publicness or privacy." (Redbook, 2000:6) "Dikgatlong shows a settlement hierarchy and structure where the population is distributed in the towns along the movement corridors with Barkly West enjoying the greatest concentration of people. This place Barkly West is the more dominant position when considering the other settlements in the municipality." (Dikgatlong SDF, 2008: 90)

The surrounding areas (in the Dikgatlong Local Municipality) come to Barkly West for most of their shopping needs, access to government institutions and other services. The principle of the NSDP which emphasises the importance of investing in people rather then infrastructure in places of low economic potential is of particularly relevant to Dikgatlong Local Municipality.

The Vaal and Harts river corridor has been a major structuring element for the municipal area. The municipality also has an alluvial mining and agricultural development corridor between Barkly West and Ulco (FBDM SDF, 2009).

**Water Sources**

The municipal area is serviced by the two rivers, Harts and Vaal River, which meets in the municipal area. The municipality has a wetland which covers 5.7% of the municipal area. The boreholes on the south eastern areas of the municipality are tapping into the underground water supplies. However, "the presence of significanct groundwater to the south does allow an opportunity for irrigation farming from a source

that is not directly linked to the major water systems." (Dikgatlong SDF, 2009: 42). Long terms sustainability remains a concern when it comes to the irrigation systems and with groundwater resources.

**Social-Economic and Social Analysis**

1) **Education Levels**

Education prepares individuals so that they are able to play an active role in the labour market, which directly affects their quality of life as well as the economy of a country and the area they live in. through the education level, one can then understand the skills that an area has and its potential to contribute positively to the economy. (Stats SA) Dikgatlong Local Municipality has a large number of people whith some secondary school followed by those with some primary levels. Those with Grade 12 constitute 12.83% while those higher than Grade 12 only constitute 1.64%. There are a limited number of skilled people from which the labour market can draw skills/expertise from.

2) **Official Employment Status**

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 5 924 people (2001) to 7 841 (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 discourage work seekers. Additionally, the economical not active femal population is also higher than their male counterparts.

3) **Income Distribution**

The majority of people in Dikgatlong Local Municipality do not get an income, followed by those who get below R400 per month. Approximately 63% of the population live below the poverty line (R500). "Income variable is one of the variables that measure individual and household welfare. It is important variable that assists in generating indicators relating to poverty and development." (Statistics SA, 2012) Such information is important, as it assist in facilitating planning and the allocation of resources.

4) **Social Infrastructure**

"Good urban environments are, by definition, convenient. They allow inhabitants to conduct daily activities quickly and easily.

Inconvenient environments, on the other hand, impose on lifestyles, reduce choices and increase costs. Access lies at the heart of convenience." (Redbook, 2000: 3) Settlements that perform well are settlements that are convenient and give people access to faciliteis (Redbook). The presence of social facilities to the residents of Dikgatlong Local Municipality gives them a sense of place, a sense of belonging and makes life convenient for them. Some wards share facilities with those who do not have. Below is an overview of the facilities that each ward has:

| Ward | Educational | Library | Health | Recreational | Safety | Community |
|---|---|---|---|---|---|---|
| 1 Mataleng | 3 Schools | 1 | Clinic | Sport complex | - | Community Hall |
| 2 Debeers hoogte | 3 Schools, 3 ECDs | 1 | Clinic | Swimming pool | Magistrate court | Community Hall |
| 3 | 2 Schools, 1 ECD | - | Hospital | Resort | Police Station | - |
| 4 Windsorton | 3 Schools | 1 | Clinic, Mobile Clinic | Park Sport Complex | Police Station | 2 Community Halls |
| 5 Longlands | 2 Schools, 1 ECD | - | Clinic | - | - | - |
| 6 Rooikoppies | 2 Schools, 3 ECDs | 1 | - | - | Police Station | Community Hall |
| 7 Tidimalo | 2 Schools, 3 ECDs | - | Clinic | Sport Complex | - | Community Hall |

5) **Dwellings**

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.

6) **Transport Networks**

"Convenient public transport means that fewer people use private motorcars, so less petrol is used and there is less pollution from car exhausts. Access to affordable public transport also makes looking for jobs easier." (DENC Information Brochure) The Dikgatlong LM is serviced by taxis, which take people from Barkly West to the other townships and to areas as Kimberley. Transport networks do not just transport people but they transport goods and services. The issue of access is a key issue in the Dikgatlong SDF, that social facilities must be accessible to people.

**Sectors Contributing to the Economy**

17.73% of employment people are employed in the formal sector while the informal economy has employed 4.29%. The role of the

informal economy cannot be underestimated, as it provided those who are unskilled an opportunity to create livelihood for themselves. Dikgatlong Local Municipality acknowledges and appreciated the positive contribution that the informal economy plays in its municipal area and local economic growth. 3.32% of employment people are in private households; these are people who work as domestic workers, gardeners, drivers and child minders for individual homes.

**Tourism and SMMEs**

Tourism is one of the key area that drives growth in the Province. There is currently a proposed alluvial diamond hiking trail. There is also a need for SAHRA to work with the municipality to see how best to utilise the heritage sites, so that they can make a contribution to the economy of the municipality.

**Access to Water**

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

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

The majority of households (5 935) in Dikgatlong have access to piped water inside their yard, followed by those who have access to piped water inside their dwelling (3 670). 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 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.

The municipality is the water service authority for Rooikoppies, Tidimalo and a portion of Longlands. The rest of the municipal area is supplied with water by Sedibeng Water.

**Sanitation**

The Millenium 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 than the Provincial one which is 8.04% of households with not access to basic sanitation.

From the table below it is clear that Ward 3 and Ward 5 have the highest number of households with no access to sanitation, while Ward 2 and Ward 7 have the highest number of households who still use the bucket system, so priority must be given to these wards in terms of addressing access to basic sanitation.

| Ward | None | Bucket Toilet |
|---|---|---|
| Ward 1 Mataleng | 78 | 4 |
| Ward 2 Debeershoogte | 87 | 58 |
| Ward 3 Rooirand | 533 | 27 |
| Ward 4 Windsorton | 202 | 3 |
| Ward 5 Longlands | 484 | 22 |
| Ward 6 | 158 | 18 |
| Ward 7 | 99 | 86 |

**Waste Management (Removal and Disposal)**

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.

Rooirand has the highest number of household that are without a rubbish disposal and those with other forms of refuse disposal. The other challenge confronting waste management is that all the landfill sites are not licensed and they are often vandalised.

**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 use gas and paraffin. However there seems to be no visible efforts of using solar energy, to decrease the dependency of electricity.

**Roads**

Roads form the backbone of any economy, as it transports; goods, services and people. It is vital that the roads are in good conditions so that they can perform the services which they are meant for. The municipality has pedestrian sidewalks in the main town, to avoid people walking on the road and being in danger of oncoming traffic. 80% of the wards are provided with sidewalks, road and storm water drainage.

**Storm Water**

80% of MIG has been spent on roads and storm water. It was one of the main priorities in the 2012/13 financial year.

**Household access to basic services and the lack of:**

| Ward | Energy – Lighting | | Source of Water | Refuse Removal | | Access to Toilets | | Areas of concern |
|---|---|---|---|---|---|---|---|---|
| | None | Electricty | Water Scheme | Removed by municipality once a week | No rubbish disposal | None | Flush Toilet | |
| 1 Mataleng | 3 | 1177 | 1108 | 624 | 70 | 78 | 759 | Energy |
| 2 Debeers hoogte | 4 | 1290 | 1326 | 1230 | 135 | 87 | 1143 | |
| 3 Rooirand | 10 | 1013 | 1880 | 522 | 808 | 533 | 1058 | Toilets |
| 4 Windsorton | 3 | 1552 | 1373 | 1190 | 53 | 202 | 1209 | Energy |
| 5 Longlands | 8 | 1409 | 1417 | 229 | 98 | 484 | 772 | Toilets |
| 6 Rooikoppies | 5 | 1200 | 931 | 838 | 155 | 158 | 931 | |
| 7 Tidimalo | 5 | 1439 | 1583 | 1298 | 91 | 99 | 1306 | |

(15) ***SENSITIVE LANDSCAPES:***

"Sensitive Environments" that have statutory protection are the following:-

1. Limited development areas (Section 23 of the Environmental Conservation Act, 1989 (Act 73 of 1989).
2. Protected natural environments and national heritage sites.
3. National, provincial, municipal and private nature reserves.
4. Conservation areas and sites of conservation significance.

5. National monuments and gardens of rememberance.
6. Archaeological and palaeontolocial sites.
7. Graves and burial sites.
8. Lake areas, offshore islands and the admirality reserve.
9. Estuaries, lagoons, wetlands and lakes.
10. Streams and river channels and their banks.
11. Dunes and beaches.
12. Caves and sites of geological significance.
13. Battle and burial sites.
14. Habitat and/or breeding sites of Red Data Book species.
15. Areas or sites of outstanding natural beauty.
16. Areas or sites of special scientific interest.
17. Areas or sites of special social, cultural or historical interest.
18. Declared national heritage sites.
19. Mountain catchment areas.
20. Areas with eco-tourism potential.

The relevant specialists will be appointed to assess whether there are any sensitive landscapes within the applicationa area.

## (b) Description of the Current Land Use

### (1) ***Land Use before Prospecting / Mining:***

The current land use on this property is for grazing and limited agriculture, the soil on the property does not provide for any other land use on the property or alternative uses.

If the mining operation proves positive the only other use in this area will be for mining.

### (2) **Evidence of Disturbance:-**

Historical mining is also evident on the site. The impact is considered high since no rehabilitation was undertaken in those days. The two seasonal streams in the southern portion near the Vaal River has especially been degraded by this where the mining took place within the main channel of the streams end left un-rehabilitated. Extensive historical mining had also occurred in the main channel of the Vaal River itself and its banks. This has altered the bed and bank morphology to some extent and will undoubtedly also have had an effect on sediment and flow dynamics. The construction of large containment dams such as the Vaalharts Dam, Bloemhof Dam and Vaal Dam has influenced the frequency and magnitude of flooding which is part of the natural system. As a result thereof the flooding of the floodplain within the

upper zone does no longer take place at the same regular intervals and magnitude. The floodplain within the upper zone of the river is now more dependent on surface runoff.

(3) **Existing Structures:-**

The study area does not contain extensive built up areas and only contains a farmstead, surrounding buildings and scattered dilapidated buildings. A water canal is situated within the eastern portion and transects the site from north to south.

## (c) Description of Specific Environmental Features and Infrastructure on Site

The infrastructure on site 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 (i) as part of the baseline report.

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

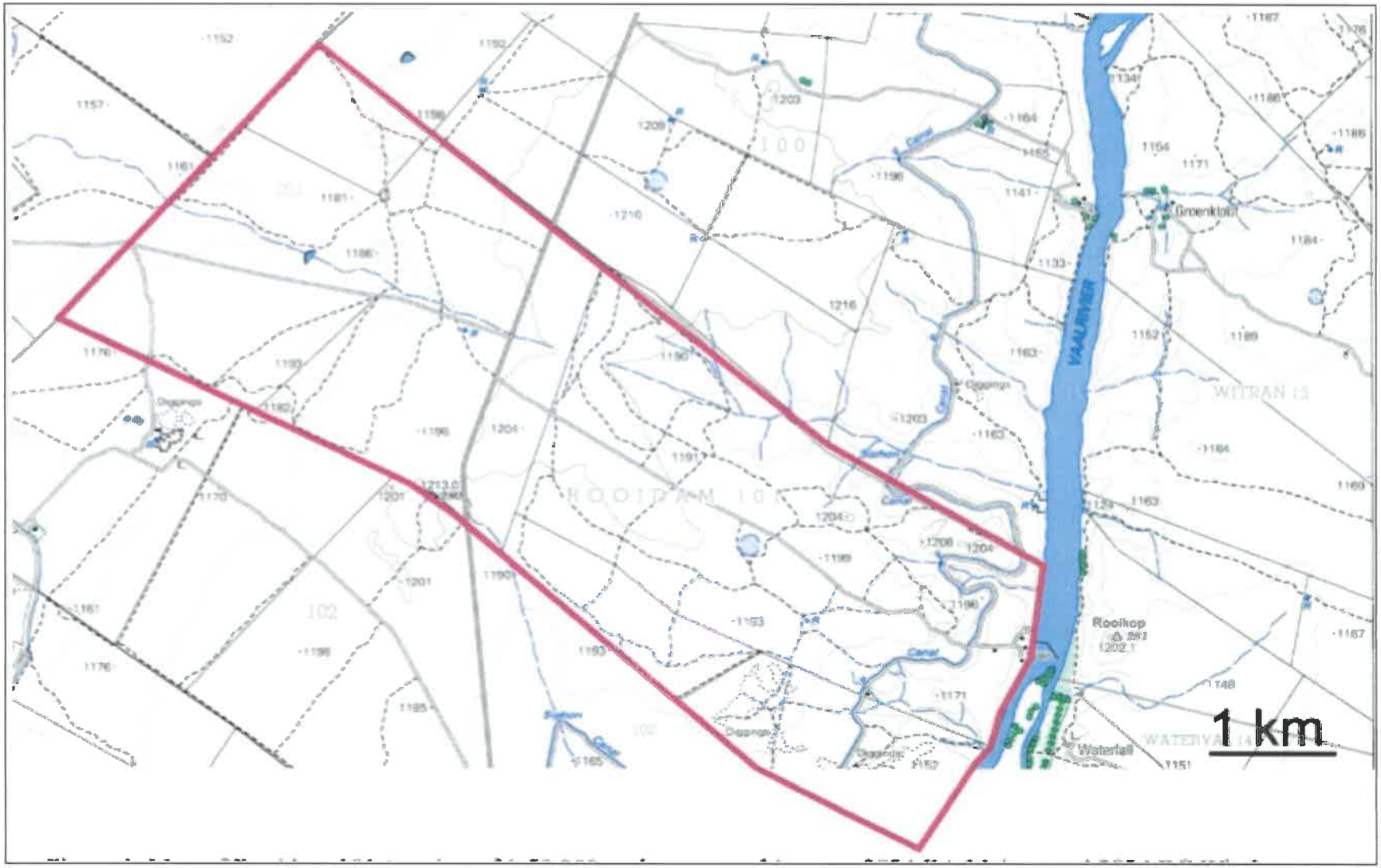


***Figure 17: Environmental and current land use map of Rooidam 101 (portion of 1:*50 000 scale topgraphical maps 2824 BA Majeng and 2824 BC Windsorton**

## v) Impacts identified

(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.)

| Nature of Impact | Significance | Probability | Duration |
|---|---|---|---|
| Sterilisation of mineral resources. | Very low | Highly unlikely | Decommissioning |
| Changes to surface topography due to topsoil removal, mining, placement of infrastructure and development of residue deposits. | Medium High | Certain | Permanent Post-closure |
| Soil erosion by water and wind on disturbed and exposed soils; potential for dust production and soil microbial degradation; potential contamination of soils due to spillages. | Medium High | Possible | Permanent Life of mining operation |
| Loss of land capability through topsoil removal, disturbances and loss of soil fertility. | Low | Possible | Short term |
| Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation of mining. | Low | Possible | Short term |
| Pollution of underground water sources. | Low | Possible | Long Term Life of operation |
| Deterioration of water resources through mining. | Low | Possible | Long Term Life of operation |
| Deterioration in water quality through spillages and runoff from site. | Low | Possible | Long Term Life of operation |
| The clearance of vegetation; potential loss of floral species with conservation value; potential loss of ecosystem function when mining. | Low Medium | Certain | Long Term Life of operation |
| Proliferation of alien invasive plants species. | Low Medium | Possible | Long Term Residual |
| Displacement of faunal species. | Low Medium | Certain frequently | Long Term Life of operation |
| The loss, damage and fragmentation of floral and faunal habitats; potential loss of ecosystem function. (Ecological processes) | High | Certain for life of operation | Long Term life of mining operation |
| Sources of atmospheric emission associated with the mining operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles and vehicle entrainment of road dust. | Low | Certain | Life of Operation Decommissioning |
| Increase in continuous noise levels; the disruption of current ambient noise levels; and the disruption of sensitive | Low to medium | Certain | Long Term Life of Operation |

| | | | |
|---|---|---|---|
| receptors by means of increased noise and vibration. | | | |
| Visual impact of the mine infrastructure, slimes dams and stockpile; visibility of dust. | Low to Medium | Certain | Life of Operation Decommissioning |
| Potential negative impacts on traffic safety and deterioration of the existing road networks. | Low to Medium | Possible | Life of Operation Decommissioning |
| The deterioration of sites of cultural and heritage importance. | Low | Possible | Life of Operation |
| Loss of agricultural potential; influx of workers to the area increases health risks and loitering (resulting in lack of security and safety); negative impact of employment loss during site closure. | Low to Medium | Certain | Short-term and Closure |
| Loss of trust and a good standing relationship with the IAPs. | Low to medium | Possible | Life of Operation Decommissioning |
| Positive socio-economic impacts during operation, upliftment of previously disadvantaged communities. | Low to Medium | Certain | Life of Operation Decommissioning to residual |

## 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)

The limits were defined in relation to the Mining Characteristics. Those for probability, significance and duration are subjective, based on rule of thumb and experience. The significance of the impacts is defined as follows:

The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

**Nature of impact**
This is an appraisal of the type of effect the activity would have on the affected environmental component. Its description should include what is being affected, and how.

**Extent**
The physical and spatial size of the impact. This is classified as follows:

- **Local**
  The impacted area extends only as far as the activity, e.g. a footprint.
- **Site**
  The impact could affect the whole, or a measurable portion of the property.
- **Regional**
  The impact could affect the area including the neighbouring farms, transport routes and the adjoining towns.

**Duration**
The lifetime of the impact which is measured in the context of the lifetime of the proposed phase (i.e. construction or operation).

- **Short term**
  The impact will either disappear with mitigation or will be mitigated through natural process in a short time period.
- **Medium term**
  The impact will last up to the end of the mining period, where after it will be entirely negated.
- **Long term (Residual)**
  The impact will continue or last for the entire operational life of the mine, but will be mitigated by direct human action or by natural processes thereafter.
- **Permanent**
  The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

**Intensity**
This describes how destructive, or benign, the impact is. Does it destroy the impacted environment, alter its functioning, or slightly alter it. These are rated as:

- **Low**
  This alters the affected environment in such a way that the natural processes or functions are not affected.
- **Medium**
  The affected environment is altered, but function and process continue, albeit in a modified way.
- **High**
  Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

  This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

**Probability**
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

- **Improbable**
  The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
- **Probable**
  There is a possibility that the impact will occur to the extent that provisions must be made therefore.
- **Highly probable**
  It is most likely that the impacts will occur at some or other stage of the development.
- **Definite**
  The impact will take place regardless of any preventative plans, and mitigation measures or contingency plans will have to be implemented to contain the impact.

**Determination of significance**

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

- **No significance**
  The impact is not likely to be substantial and does not require any mitigatory action.
- **Low**
  The impact is of little importance, but may require limited mitigation.
- **Medium**
  The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
- **High**
  The impact is of great importance. Failure to mitigate, with the objective to reduce the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

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

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

During construction and operation of the mining, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and slimes dam will alter the topography by adding features to the landscape. Topsoil removal and mining will unearth 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 where present will be stripped in preparation for placement of temporary mining infrastructure, 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 declared areas will be rehabilitated, but full restoration of soil might only occur over some time, 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.

During the construction and mining operation, there is a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil unusual 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. The site has a land capability for grazing and limited agriculture, but grazing activities can still be performed in areas not earmarked for prospecting, and with proper rehabilitation the land capabilities and land use potential can be restored.

If oil and fuel spillages occur, then it 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.

Construction and mining activities on site will reduce the natural habitat for ecological systems to continue their operation. Vehicle traffic generates lots of dust which can reduce the growth success and seed dispersal of many small plant species. It is expected that protected species if present can be destroyed during the mining 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 plant 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 mining 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. The construction of the mining and associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat. Fragmentation of habitat will lead 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 site. Pockets of fragmental natural habitats hinder the growth and development of populations.

During the mining 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 mine will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by mining activities are low.

The impact of site generated trips on the traffic of the existing roads is experienced to be low. Nevertheless, if road safety is not administered it can have a high impact on the safety of fellow road users.

The mining operation, especially during construction, will create a number of new employment opportunities. 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 will possibly impact on safety and security of local residents. During the decommissioning and at closure of the mine, staff will most likely be retrenched. This can potentially flood the job market, resulting in people being unable to find new employment for a long period of time. It is normally more difficult for people with highly specialised skills to find employment immediately. Those with fewer skills have more flexibility in the job market.

Economic slump of the local towns after mine closure is an associated potential impact, although small due to the small scale of the operation. 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 mine-related businesses. People who have derived income directly or indirectly from the project may be inclined to leave the region in search of employment or business opportunities. This could result in further decline of the economy of the region as well as the abandonment of infrastructure. The loss of the mining workforce income will also impact upon non-mine related industries within the local and regional areas, particularly the rental property market and retail and service industries who would have received income during the life of mine from the salaried workforce.

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

It is difficult to predict the actual impact of the mine closure in advance, but it is acceptable to assume that the mine closure will have a negative impact on the local and regional economy with a high probability of occurrence, a medium severity due to small scale and a medium significance.

Positive impacts include employment and training opportunities for people in the local community and local contractors; social upliftment and community development programmes; economic benefits.

### 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 mining oppertunity to gain access to a mineral resource through proper planning .
- The mine area should be delineated first 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 the mine manager.

**Topography**

**Level of risk:** Medium High

**Mitigation measures**

- Mining with open cast methods and rehabilitate material back up to natural ground level.
- Do controlled dumping.
- Employ effective rehabilitation strategies to restore surface topography of the area and plant site.
- Stabilise the pits and mine residue deposits.
- All temporary infrastructures will be demolished during closure.

**Soil Erosion**

**Level of risk:** Medium High

**Mitigation measures**

- At no point may plant cover be removed within no-development zones.
- All attempts must be made to avoid exposure of dispersive soils.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased.
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible.
- The mining operation must co-ordinate different mining activities in order to optimise the utilisation of the invasive mining and thereby prevent repeated and unnecessary activities.
- The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers.

- The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.
- Excavated and stockpiled soil material are to be stored and bermed on the higher laying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
- Stockpiles susceptible to wind erosion are to be covered during windy periods.
- Audits must be carried out at regular intervals to identify areas where erosion is occurring.
- Appropriate remedial action, including the rehabilitation of the eroded areas, must occur.
- Rehabilitation of the erosion channels and gullies.
- Dust suppression must take place, without compromising the water balance of the area.
- 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.

**Soil Pollution**

**Level of risk:** Medium

**Mitigation measures**

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

**Land Capability and Land Use**

**Level of risk: Low Medium**

**Mitigation measures**

- Ensure that optimal use is made of the available land through consultation with land owner and proper planning of mining activities.
- Surface agreement to be signed with land owners.
- Employ effective rehabilitation strategies to restore land capability and land use potential of the area.

- ❖ All activities to be restricted within the demarcated areas.
- ❖ Ensure that land which is not used during construction is made available for grazing if possible.

**Groundwater**

**Level of risk:** Low

**Mitigation measures**

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

**Surface Water**

**Level of risk:** Low

**Mitigation measures**

- ❖ Sufficient care must be taken when handling hazardous materials to prevent pollution.
- ❖ Under no circumstances may ablutions occur outside the provided facilities.
- ❖ If servicing and washing of the vehicls 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.
- ❖ Store all litter carefully to prevent it from washing away or blown into any of the drainage channels.
- ❖ Provide bins for staff at appropriate locations, particularly where food is consumed.
- ❖ The mining area should be cleared daily and litter removed.
- ❖ Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which contributes to surface water pollution.

**Indigenous Flora**

**Level of risk:** Low to medium

**Mitigation measures**

- Minimise the footprint of transformation.
- Encourage proper rehabilitaiton of mined areas.
- Encourage the growth of natural plant species.
- Ensure measures for the adherence to the speed limit.
- Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining.
- It is recommended that these plants are identified and marked prior to mining.
- These plants should, where possible, be incorporated into the design layout of bulk samples and left in situ.
- However, if threatened of destruction by prospecting, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.
- A management plan should be implemented to ensure proper establishment of ex situ individuals, and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.

**All Invasive Plants**

**Level of risk:** Low Medium

**Mitigation measures**

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

**Fauna**

**Level of risk:** Low Medium

**Mitigation measures**

- Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint.
- The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance.

- The extent of the mining areas should be demarcated on site layout plans, and no construction personnel or vehicles may leave the demarcated area except those authorised to do so. Those areas surrounding the mining site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The ECO 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.
- 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.

**Habitat**

**Level of risk:** High

**Mitigation measures**

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

**Air Quality**

**Level of risk:** Low

**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 mining areas are exposed should be restricted. Mining should not be delayed after vegetation has been cleared and topsoil removed where possible.
- Dust suppression methods should, where logistically possible, must 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.

**Noise and Vibration**

**Level of risk:** Low

**Mitigation measures**

- Restrict mining activities to daytime unless agreements obtained to do 24hr operations.
- Systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.
- Where possible material stockpiles should be placed so as to protect the boundaries from noise to individual operations.
- Standardised noise measurements should be carried out on individual equipment at the delivery to site to construct a reference data-base and regular checks carried out to ensure that equipment is not deteriorating and to detect increases which could lead to increase in the noise impact over time and increased complaints.
- Environmental noise monitoring should be carried out at regularly to detect deviations from predicted noise levels and enable corrective measures to be taken where warranted.

**Visual Impacts**

**Level of risk:** Low to Medium

**Mitigation measures**

- Infrastructure should be placed to optimise the natural screening capacity of the vegetation.
- Where practical, protect existing vegetation clumps during in order to facilitate screening during the mining operations.
- Remove rubble and other building rubbish off site as soon as possible or place it in a container in order to keep the mining site free from additional unsightly elements.
- Dust suppression procedures should be implemented especially on windy days during earth works.

- ❖ Rehabilitation should aim to establish a diverse and self-sustaining surface cover that is visually and ecologically representative of naturally occurring vegetation species.
- ❖ Implement a management plan for the post-mining site in order to control the invasion of alien vegetation and to manage erosion, until the site is fully rehabilitated.

**Traffic and Road Safety**

**Level of risk:** Low to Medium

**Mitigation measures**

- ❖ Implement measures that ensure the adherence to traffic rules.

**Heritage Resources**

**Level of risk:** Low

**Mitigation measures**

- ❖ It is also advised that the graves and structural remains of the Koranna mission station previously identified by Morris (2012) is fenced off and avoided. Area 2 is underlain by a cobble grade conglomerate with granular to pebbly clasts made up of quartz, quartzite, agate, chert or banded ironstone and set within a matrix of dark red, fine to medium sand. The terrain has been severely degraded following decades of mining activities in the region. A large rectangular stone – walled structure is located on the riverbank while the remains of a circular stone-walled structure are situated higher up and about 650 m west of the river bank. A foot survey of Area 2 revealed no evidence of in situ fossil exposures or Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of graves, rock art or historical buildings older than 60 years within the Area 2 footprint. Area 2 is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 2 may proceed provided that the two stone – walled structures identified during the survey are protected by a 10 m-wide buffer zone.
- ❖ The heritage if any is encountered and cultural resources (e.g. graveyards, ruins, historic structures, etc.) must be protected and preserved by the delination of no go zones.
- ❖ Stone tools should be avoided where possible and fresh exposure should be recorded before destruction. All stone tool artefacts should be recorded, mapped and collected before destruction.
- ❖ Should development necessitate impact on any building structures, the developer should apply for a SAHRA Site Destruction Permit prior to commencement of construction.

**Socio-Economic**

**Level of risk:** Low

**Mitigation measures**

- The mine must ensure that false expectations are not created regarding job creation.
- Jobs must be allocated as advertised and in so far as is possible to local inhabitants.
- Contractors and employees should not be permitted to wander outside the mining area.
- Uncontrolled settlement of contractors and workers outside of the site will be prevented.
- The expectations of what benefits can accrue to the community must be managed from the initiation of the project.

**Interested and Affected Parties**

**Level of risk:** Low

**Mitigation measures**

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

## ix) The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

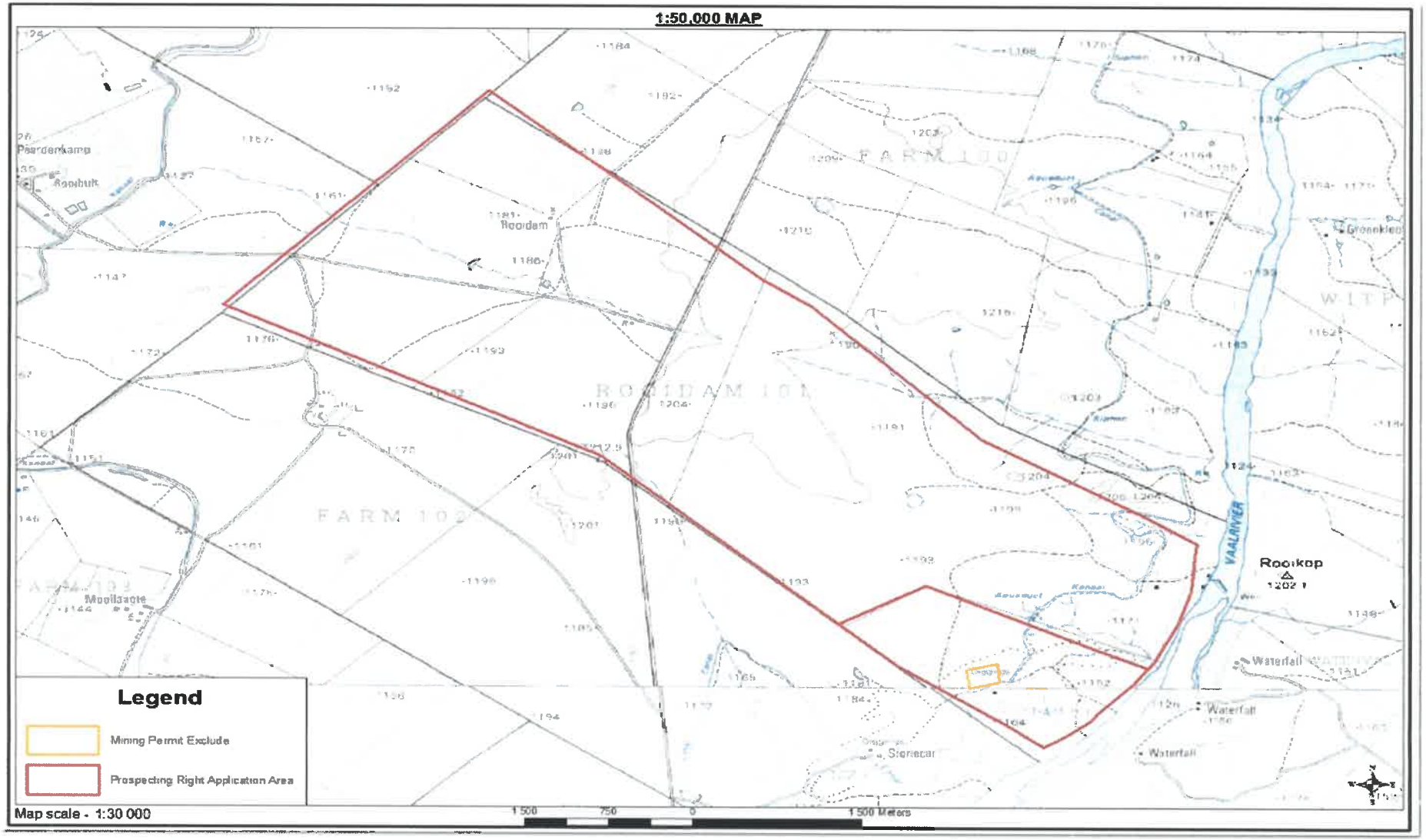


***Figure 18: Final site layout plan***

### x) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the proposed alluvial diamond deposits occur in this area. There is therefore no other alternative with regard to the overall operation footprint.

### xi) Statement motivating the preferred 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 possible mineral resource.

## i) Plan of study for the Environmental Impact Assessment Process

### i) Description of alternatives to be considered including the option of not going ahead with the activity

- Land use development alternatives:
  The site layout may vary, depending on the operational requirements. However the final design and layout of the infrastructure have been planned and decided upon by the developer on the grounds of reserves, and placement of infrastructure based on hauling distance, environmental features such as wind direction, heritage findings, protected species, and stormwater management on the mine.

- No-go option:
  The following positive impacts will be lost if the proposed mining project is not developed:
  - TAX and VAT obligations to SARS as well as Royalties;
  - CAPEX spent locally and regionally;
  - Employment opportunities;
  - Payroll income;
  - Operating expenditure and maintenance (OPEX);
  - Revenue.

Mining activities are believed to be the most economically beneficial option for the area.

If the operation does not continue it would hold back any potential employment for Douglas / Prieska and the families who are likely to benefit from the positive employment opportunities. Substantial tax benefits to the State and Local Government will also be inhibited.

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

## ii) Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, dicard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control berms, roads, pipelines, powerlines, conveyers, etc..etc...)

1. The clearing of vegetation for:
   - Access roads and haul roads
   - Surface infrastructure
   - Product Stockpile area
   - Waste disposal site (domestic and industrial waste)

2. The stripping and stockpiling of topsoil.

3. Load and Haul Operation for the mining operation.
   - Loading, hauling.

4. Altering the characteristics of surface water features.

5. The development of temporary stockpiles:
   - Topsoil storage area;
   - Mine Residue Stockpile for slime.

6. The rehabilitation of footprint areas where the mining excavations have been excavated.

7. The construction of Processing plant.

8. Loading, hauling and transporting of mined material.

9. Water holding facilities, pipeline and stormwater control:
   - Clean & Dirty water system: Stormwaterdam / Water storage facility;
   - Water distribution Pipeline;
   - Water tank.

10. Fuel storage and refuelling bays;
    - Fuel Storage facility (Diesel tanks);
    - Concrete bund walls and diesel depots.

11. Supporting infrastructure:
    - Temporary Offices;
    - Office Parking Bay;
    - Temporary Workshop and Wash bay;
    - Salvage yard (Storage and laydown area);
    - Ablution facilities/ Sewage facilities;

- Generators;
- Pipelines transporting water;

**(ii) Description of aspects to be assessed by specialists:**

An Archaeologist has already done a survey on the farm for archaeologically sensitive areas on the farm. All information will be used to identify areas that can be sensitive and to make the necessary provision to avoid these areas. A ecological, wetland and stormwater management assessment will also be done and any other Specific specialist reports will be done when specifically requested by any Department or in interested and affected party consultation referred to.

**(iii) Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives:**

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

The identification of potential impacts of the mining activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process. Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could potentially result from the mining activities include impacts on air quality, noise, fauna, flora, terrestrial ecology, heritage resources, socio-economy, visuals, storm water and erosion.

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed project enables sustainable prospecting, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, method and proceeding without the mining operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality of the mining operation will however not form part of this consideration, as the location of the mining site is determined by the possible geological location of the mineral resource.

**(iv) The proposed method of assessing duration significance:**

The lifetime of the impact will be measured in the context of the lifetime of the proposed phase or activity.

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

- **Short term**
  The impact will either disappear with mitigation or will be mitigated through natural process in a short time period.
- **Medium term**
  The impact will last up to the end of the mining period, where after it will be entirely negated.
- **Long term**
  The impact will continue or last for the entire operational life of the mining, but will be mitigated by direct human action or by natural processes thereafter.
- **Permanent**
  The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

**(v) The stages at which the Competent Authority will be consulted:**

Consultation with the Competent Authority will take place throughout the application process, however more specifically; consultation will take place before submission of the Scoping Report and again before submission of the EIA/EMPR Report.

**(vi) Particulars of the public participation process with regard to the Impact Assessment process that will conducted:**

1. **Steps to be taken to notify interested and affected parties:**
   (These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h)(ii) herein.)

   The process as described by NEMA for Environmental Authorisation was followed. See table 2 below for the identification of Interested and Affected Parties to be consulted with. The landowner, and or occupants and direct neighbours were consulted.

   An Advert (Notice) will be placed in the DFA on 10 July 2020 to notify all other interested and affected parties to come forward and register.

   Registered consultation letters will be send on 07 July 2020 to all identified parties and government departments with a Scoping Report document on disc in the envelope.

Notices were placed at the gate to the mining site.

2. **Details of the engagement process to be followed:**
(Describe the process to be 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 and record of such consultation will be required in the EIA at a later stage.)

The following procedures will be followed:

- The Scoping Report has been distrubited to all registered parites via registered mail in July 2019.
- All other documentation (Scoping, EMP and EMPR) will be made available in public libraries.
- Records will be kept of the complaints and the mitigation measures implemented.

3. **Description of the information to be provided to Interested and Affected Parties:**
(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land.)

The following information will be provided to IAPs:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised;
- The duration of the activity.

The following information will be requested from the IAPs:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied. They will be requested to make written proposals;
- To mitigate the potential impacts on their socio economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied).

**(vii) Description of the tasks that will be undertaken during the environmental impact assessment process:**

**Determining environmental attributes**

The receiving environment will be determined using a combination of on-site observations, spatial information, project description, site layout and previous studies currently available to the EAP. Based on the EAPs knowledge and experience, the receiving environment will include geological features, topography, land use, archaeological and historical sites, surface water, groundwater, terrestrial ecology, air quality, noise, etc.

**Identification of impacts and risks**

The identification of potential impacts of the mining activity will be based on the legal requirements; the nature of the proposed activity; the nature of the receiving environment; and issues raised during the public participation process.

Considering the factors listed above and based on the EAPs knowledge and experience, environmental impacts that could potentially result from the mining activities include impacts on air quality, noise, fauna, flora, ground water, surface water, terrestrial ecology, heritage resources, socio-economy, visuals, stormwater and erosion.

### Consideration of alternatives

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the mining project. In order to ensure that the proposed project enables sustainable mining, a number of feasible options will be explored. The various alternatives in terms of land use, project infrastructure, mining method and proceeding without the mining operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility.

Alternatives for the locality of the mining operation will however not form part of this consideration, as the location of the mining site is determined by the geological location of the mineral resource.

### Process to assess and rank impacts

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

*Table 9: Explanation of PROBABILITY of impact occurrence*

| Weight | Probability of Impact Occurrence | Explanation of Probability |
|---|---|---|
| 1 | Very Low | <20% sure of particular fact or likelihood of impact occurring |
| 2 | Low | 20 – 39% sure of particular fact or likelihood of impact occurring |
| 3 | Moderate | 40 – 59% sure of particular fact or likelihood of impact occurring |
| 4 | High | 60 – 79% sure of particular fact or likelihood of impact occurring |
| 5 | Very High | 80 – 99% sure of particular fact or likelihood of impact occurring |
| 6 | Definite | 100% sure of particular fact or likelihood of impact occurring |

*Table 10: Explanation of EXTENT of impact*

| Weight | Extent of Impact | Explanation of Extent |
|---|---|---|
| 1 | Site Specific | Direct and Indirect impacts limited to **site** of impact only |
| 2 | Surrounding Area | Direct and Indirect impacts affecting environmental elements within **2 km of site** |
| 3 | Local Municipality | Direct and Indirect impacts affecting environmental elements within the **Barkly-Wes / Kimberley area** |

| | | |
|---|---|---|
| 4 | Regional/District | Direct and Indirect impacts affecting environmental elements within **Frances Baard District**) |
| 5 | Provincial | Direct and Indirect impacts affecting environmental elements in the **Northern Cape Province** |

***Table 11: Explanation of DURATION of impact***

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

***Table 12: Explanation of SEVERITY of the impact***

| Weight | Impact Severity | Explanation of Severity |
|---|---|---|
| 1 | No Impact | There will be no impact at all – not even a very low impact on the system or any of its parts. |
| 2 | Very Low | Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit. |
| 3 | Low | Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these. |
| 4 | Moderately Severe | Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort. |
| 5 | High Severance | Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these. |
| 6 | Very High Severity | Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit. |

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

The criteria used to assess the significance of the impacts are shown in the table below. 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 21***

| SIGNIFICANCE | | | | |
|---|---|---|---|---|
| **Colour Code** | **Significance rating** | **Rating** | **Negative Impact** | **Positive Impact** |
| | Very low | 3 -16 | Acceptable/Not serious | Marginally Positive |
| | Low | 17 - 22 | Acceptable/Not serious | Marginally Positive |
| | Medium-Low | 23 -33 | Acceptable/Not desirable | Moderately Positive |
| | Medium | 34 - 48 | Generally undesirable | Beneficial |
| | Medium-High | 49 - 56 | Generally unacceptable | Important |
| | High | 57 - 70 | Not Acceptable | Important |
| | Very High | 90 - 102 | Totally unacceptable | Critically Important |

**Significance of impacts is defined as follows:**

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

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

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

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

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

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

**Very High** - Of the highest order possible within the bounds of impacts which could occur. There would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted.

**(viii) Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored:**

| ACTIVITY<br>Whether listed or not listed<br>(e.g. excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water suppy dams and boreholes, accommodation, offices, ablution, stores, workshops, processing lant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc...) | POTENTIAL IMPACT<br>(e.g. dust, noise, drainage, surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc...) | MITIGATION TYPE<br>modify, remedy, control or stop<br>(e.g. noise control measures, stormwater control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc...)<br>(e.g. modify through alternative method. Control through management and monitoring through rehabilitation.) | POTENTIAL FOR RESIDUAL RISK |
|---|---|---|---|
| Ablution facilities Chemical toilets | • Soil contamination<br>• Groundwater contamination<br>• Odours | • Maintenance of chemical toilets on regular basis.<br>• Removal of containers upon closure. | Very low |
| Clean & Dirty water system | • Surface disturbance<br>• Groundwater contamination<br>• Soil contamination<br>• Surface water contamination | • Maintenance of berms and trenches.<br>• Oil traps used in relevant areas.<br>• Drip trays used.<br>• Immediately clean hydrocarbon spill. | Low |
| Diesel tanks | • Groundwater contamination<br>• Surfacewater contamination<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance | • Maintenance of diesel tanks and bund walls.<br>• Oil traps.<br>• Groundwater quality monitoring.<br>• Drip tray at re-fuelling point.<br>• Immediately clean hydrocarbon spill. | Low |
| Mining | • Dust<br>• Possible Groundwater contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance<br>• Surface water contamination | • Access control<br>• Dust control and monitoring<br>• Groundwater quality monitoring<br>• Noise control and monitoring<br>• Continuous rehabilitation<br>• Stormwater run-off control<br>• Immediately clean hydrocarbon spill<br>• Drip trays<br>• Erosion control | Low |

| | | | |
|---|---|---|---|
| Generators | • Groundwater contamination<br>• Surface water contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance | • Access control<br>• Maintenance of generator and bund walls<br>• Noise control and monitoring<br>• Oil traps<br>• Groundwater quality monitoring<br>• Immediately clean hydrocarbon spill | Low |
| Office – Pre-fabricated office blocks on concrete | • Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance | • Immediately clean hydrocarbon spill<br>• Rip disturbed areas to allow re-growth of vegetation cover | Very low |
| Parking bay | • Dust<br>• Groundwater contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Surface disturbance | • Dust control and monitoring<br>• Noise control and monitoring<br>• Drip trays<br>• Stormwater run-off control.<br>• Immediately clean hydrocarbon spills<br>• Rip disturbed areas to allow re-growth of vegetation cover | Low |
| Processing plant | • Dust<br>• Noise<br>• Groundwater contamination<br>• Surface Water contamination<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance | • Access control<br>• Maintenance of processing plant<br>• Dust control and monitoring<br>• Groundwater quality and level monitoring<br>• Noise control and monitoring<br>• Drip trays<br>• Stormwater run-off control.<br>• Immediately clean hydrocarbon spills<br>• Rip disturbed areas to allow re-growth of vegetation cover | Medium |
| Water distribution Pipeline | • Surface disturbance<br>• Possible Groundwater contamination | • Maintenance of pipes. | Low |

| | | | |
|---|---|---|---|
| | • Soil contamination<br>• Surface water contamination | | |
| Roads | • Dust<br>• Possible Groundwater contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Surface disturbance | • Maintenance of roads<br>• Dust control and monitoring<br>• Noise control and monitoring<br>• Speed limits<br>• Stormwater run-off control.<br>• Erosion control<br>• Immediately clean hydrocarbon spills<br>• Rip disturbed areas to allow re-growth of vegetation cover | Low |
| Salvage yard | • Possible Groundwater contamination<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination<br>• Surface disturbance<br>• Surface water contamination | • Access control<br>• Maintenance of fence.<br>• Stormwater run-off control<br>• Immediately clean hydrocarbon spill | Low |
| Stockpile area | • Dust<br>• Possible Groundwater contamination<br>• Surfacewater contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Surface disturbance | • Dust control and monitoring<br>• Noise control and monitoring<br>• Drip trays<br>• Stormwater run-off control.<br>• Immediately clean hydrocarbon spills<br>• Rip disturbed areas to allow re-growth of vegetation cover | Low |
| Topsoil storage area | • Dust<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil disturbance<br>• Surface disturbance | • Dust control and monitoring<br>• Stormwater run-off control.<br>• Continuous rehabilitation<br>• Rip disturbed areas to allow re-growth of vegetation cover | Low |

| | | | |
|---|---|---|---|
| | | • Backfilling of topsoil during rehabilitation | |
| Waste disposal site | • Groundwater contamination<br>• Surface water contamination | • Storage of waste within receptacles<br>• Storage of hazardous waste on concrete floor with bund wall<br>• Removal of waste on regular intervals. | Low |
| Mine Residue Deposit – Slimes | • Dust<br>• Possible Groundwater contamination<br>• Noise<br>• Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Surface disturbance | • Dust control and monitoring<br>• Groundwater quality monitoring<br>• Noise control and monitoring<br>• Stormwater run-off control.<br>• Rip disturbed areas to allow re-growth of vegetation cover | Low |
| Washbay | • Possible Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna<br>• Soil contamination | • Groundwater quality and level monitoring<br>• Concrete floor with oil/water separator<br>• Stormwater run-off control<br>• Immediately clean hydrocarbon spills | Low |
| Water tank with filter system:<br>It is anticipated that the operation will establish 1 x 10 000 litre water tanks for potable water. | • Vaal River water and usage<br>• Surface disturbance | • Monitor water quality and quantity<br>• Maintenance of tanks (check for leaks). | Low |

**(ix) Other information required by the Competent Authority:**

**1. 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:-**

**a. 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 parson including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix '7' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

The socio-economic conditions of the local community could be affected in two ways:

- Negative impacts to the welfare of the residents and workers through general nuisance, dust generation, damages to properties and any associated potential safety risks.
- Positive impacts through job creation and local business opportunities.
- The consultation with interested and affected parties is on-going and any issues, concerns or comments will be considered and included in the EIA report and control measures will be presented in the EMP report.

**b. Impact on any national estate referred to in Section 3(2) of the National Heritage Resources Act:**
(Provide the results of investigation, assessment and 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 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 '8' and confirm that the applicable mitigation is reflected in 2.5.3, 2.11.6 and 2.12 herein.)

A Phase 1 Heritage Impact Assessment was carried out on the farm Rooidam 101 near Windsorton in the Northern Cape Province by L Rossouw. The assessment pertains to the application for mining rights in two different areas on the farm, designated Area 1 and Area 2.
Area 1 is underlain by Ventersdorp andesites that is largely capped by a dark red sandy overburden laced with a veneer of polymict gravels. One isolated LSA core was mapped during the pedestrian survey of the terrain. A foot survey of Area 1 revealed no evidence of Quaternary fossil remains or in situ Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of settlement structures, graves, rock art or historical buildings older than 60 years within the Area 1 footprint. The site is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned, development in Area 1 may proceed with no further assessments required. It is also advised that the graves and structural remains of the Koranna mission station previously identified by Morris (2012) is fenced off and avoided. Area 2 is underlain by a cobble grade conglomerate with granular to pebbly clasts made up of quartz, quartzite, agate, chert or banded ironstone and set within a matrix of dark red, fine to medium sand. The terrain has been severely degraded following decades of prospecting activities in the region. A large rectangular stone – walled structure is located on the riverbank while the remains of a circular stone-walled structure are situated higher up and about 650 m west of the river bank. A foot survey of Area 2 revealed no evidence of in situ fossil exposures or Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of graves, rock art or historical buildings older than 60 years within the Area 2 footprint. Area 2 is assigned an overall site rating of Generally Protected A (GP.A). As far as the archaeological and palaeontological heritage is concerned,

development in Area 2 may proceed provided that the two stone – walled structures identified during the survey are protected by a 10 m-wide buffer zone.

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. This is true for graves and cemeteries as well.

**(x) 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 details, 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 '9'.)

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

The mining operation will provide ±15 - 25 jobs and will also add to the increased economic activity and the area surrounding the farm.

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

**(xi) Undertaking regarding correctness of information:**

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report.

**Signature of EAP**
**Date: 23 April 2020**

**(xii) Undertaking regarding level of agreement:**

I, RH Oosthuizen, ID number 7004180037082, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

**Signature of EAP**
**Date: 23 April 2020**

**- END –**

# APPENDIX 1

DIE UNIVERSITEIT VAN DIE ORANJE-VRYSTAAT

THE UNIVERSITY OF THE ORANGE FREE STATE

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

## Magister in Omgewingsbestuur
## Master in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

**ROELINA HENRIËTTE OOSTHUIZEN**

NADAT AAN DIE STATUTE EN REGULASIES VAN DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS DAARVAN PLAAS ONS ONS ONDERSKEIE HANDTEKENINGE EN DIE SEëL VAN DIE UNIVERSITEIT HIERONDER.

IN ACCORDANCE WITH THE STATUTES AND REGULATIONS OF THE UNIVERSITY, AS WITNESS OUR RESPECTIVE SIGNATURES AND THE SEAL OF THE UNIVERSITY BELOW.

VISEKANSELIER/VICE-CHANCELLOR

DEKAAN/DEAN

REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2000 09 16

# Appendix 2

## CURRICULUM VITAE

**Roelina Henriette Oosthuizen**

**Cell: 084 208 9088**

**E-Mail: roosthuizen950@gmail.com**

### 1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

## 2. SYNOPSIS OF PROFESSIONAL CAREER

Roelina Henriette Oosthuizen has 22 years of experience in the environmental management field. She started her career in the area of Environmental Management and Environmental Impact Assessment (EIA) evaluation in 1997 at the Department of Minerals and Energy. After moving to industry in 2005, Roelien became involved in the practical aspects of environmental management. A major project during her early years outside of government was that of the EIA for a Game Reserve and Lodge development near Barkly-Wes, she did this project together with a consultancy firm from Kimberley AWS water solutions (Mr. Adriaan du Toit). In 2007 the Company she worked for was bought by a Canadian Group of Companies and she became more involved in practical aspects of the operations and worked closely with operations personnel in dealing with ongoing management of environmental impacts at the Mine (e.g. monitoring, auditing, operating procedures). She was also centrally involved in liaison with the authorities and with stakeholders in neighbouring areas.

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

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

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

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

## 3. QUALIFICATIONS

MEM (Master in Environmental Management) University of the Orange Free State (2000)
B – Comm NWU (1991)

## 4. TRAINING COURSES

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

| | |
|---|---|
| **October 1997** | Mineral Laws Administration & Environmental Management (University of Pretoria) |
| **July 2002** | Project Management for Environmental Systems (University of the Orange Free State) |
| **August 2004** | Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI) |
| **September 2005** | Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg) |
| **November 2006** | Mine waste disposal and Achievement of Mine Closure |
| **February 2007** | Introduction to ArcGis 1 |
| **April 2010** | Mining Law Update Conference (IIR BV South Africa) |
| **November 2010** | Social Labour Plans for Mining Workshop (Melrose Training) |
| **August 2011** | Mineral Resources Compliance and Reporting (ITC) |
| **May 2012** | Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences) |
| **August 2012** | Mineral Resources Compliance and Reporting 4th Annual (ITC) |
| **March 2013** | 1st EnviroMining-Ensuring Environmental Compliance and reporting |
| **March 2014** | 4th Annual EnviroMining Conference |
| **March 2015** | 5th Annual EnviroMining Conference |
| **February 2018** | Seminar by the Department of Environmental Affairs on knowledge sharing workshops on the Screening Tool |

## 5. PROFESSIONAL REGISTRATION

Registered as a professional at IAIAsa (International Association for Impact Assessment South Africa). IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.
Registered Environmental Assessment Practitioner: Number 2019/1467 at EAPASA

## 6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

*Environmental Management Systems (EMS) and Environmental Auditing*

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

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

Performance Assessment reports for a mining company with various infrastructure and mining operations near Barkly-West and Windsorton.

Performance Assessment reports for a mining company near Douglas.

Preparation of an environmental auditing checklist / protocol for a Community project with restitution ground in assisting the community to determine environmental legal compliance at their operations.

Environmental audit as part of a closure with Dr. Betsie Milne another specialist. This Annual Rehabilitation Plan has been developed to match the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).This project had the objective of ensuring that this company are accounting for environmental liabilities and risks adequately. The plan distinguishes between (a) those environmental rehabilitation liabilities pertaining to drilling, for which the Company was legally responsible and (b) those environmental rehabilitation liabilities pertaining to historic mining activities, for which the Company is not legally responsible, but consider performing as part of their best practice environmental principals. Three costing scenarios were explored in order to evaluate the most feasible rehabilitation plan, i.e. (1) Total cost (worst-case scenario) including risks, (2) legally required cost and (3) features currently available that do not involve any risks.

*Sustainability projects: policies, guidelines, strategies and performance reporting*

Involved in the compilation of 43-101 technical documents for listed companies which included information on sustainability and performance in rehabilitation and sustainable mining.

Alien species eradication project guideline and strategy near Barkly-Wes in terms of Regulations that have been promulgated in terms of the Conservation of Agricultural Resources Act, No. 43 of 1983 further make it unlawful to allow various species of weeds and invader plants to grow. The target species was Wild tobacco (declared weed), Pink Tamarisk (declared weed) and Mexican poppy, it also involved the community for job creation and training (2008).

Investigations for a Company near Prieska on Development of a biodiversity offsets policy for the applications for forestry tree licences for protected tree species.

*Strategic Environmental Studies and Environmental Impact Assessment (EIA)*

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (½m²) OF SOIL WITHIN 100M OF THE HIGH WATER MARK OF THE SEA. A Positive Record of Decision (ROD) Granted (2010).

Undertaking of an ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PROGRAMME SUBMITTED FOR AN APPLICATION FOR A MINING RIGHT IN TERMS OF SECTION 39 & OF REGULATION 50 & 51 OF THE MPRDA, 2002 (ACT NO. 28 OF 2002) near Boshof for a kimberlite Diamond Mining Company (2015)

Undertaking of a strategic environmental review and amendment for a Chinese group of Companies near Postmasburg. The study provided baseline environmental information and a high-level review of the potential impacts of various components of the development (2014 – 2016). Roelien worked as a member (EAP) of a large team consisting of a project Coordinator, attorneys, water specialists, other specialist and an engineer.

Environmental Impact Assessments for various developments including the proposed mining project for the former retrenchees of De Beers in Kimberley. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialist with contributions of specialist reports to compile the EIA EMP report (2017). Roelien worked as a member (EAP) of a team consisting of De Beers (attorneys and environmentalists), the retrenchees, the appointed contractor, EKAPA, and specialist appointed for the studies.

Environmental Impact Assessments for a Salt operation near Upington. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as part of a team with the Company and another consultant that started with the Water Use Licence application. The public participation was done to include the water use activities.

Environmental Impact Assessment for a change in scope of a prospecting right application consisting of the sole and exclusive right to prospect for iron, silver, zinc, copper and sulphur ore. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as a member (EAP) of a team consisting of the directors of the company and specialists appointed for the studies

## 7. CAREER PATH

*01 April 1997 to 28 February 2005*
***DEPT OF MINERALS & ENERGY***
*Senior Environmentalist - Assistant Director Environment*

*MAIN JOB FUNCTIONS*

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the rehabilitation of land surfaces.

- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.
- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.
- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.
- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

**01 March 2005 – 30 September 2012**
Appointed as professional Mineral Law Administration and Environmental Manager for HC van Wyk Diamonds which was bought over in 2007 by a **Canadian group of Companies.**

**MAIN JOB FUNCTIONS**

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans:
Formulation of an environmental policy and guidelines for the Group.
Participation in the development of the budget for environmental expenditure.
Co-ordination of technical studies (e.g. monitoring of groundwater quality).
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).
Development of environmental guidelines for contractors on sites.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaint's procedure.

**01 October 2012 to 29 February 2020**
Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

***MAIN JOB FUNCTIONS***

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.

Undertaking of environmental reviews, audits and management plans.
Formulation of an environmental policy and guidelines for the Mine.
Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).
Development of environmental guidelines for contractors.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaint's procedure.

***01 October 2012 to part time 29 February 2020 full time***
*Appointed as EAP on some projects for* ***Wadala Mining and Consulting Pty Ltd***

*Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.*
*Undertaking of environmental reviews, audits and management plans.*
*Liaison with regulatory authorities on compliance with environmental legislation.*
*Environmental awareness and training.*

# *APPENDIX 3 PUBLIC PARTICIPATION*