mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

NAME OF APPLICANT: **THUNDERFLEX 78 (PTY) LTD**
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FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/1/2/12842 PR**

1. IMPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

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

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

(d) determine the—

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

  (ii) degree to which these impacts—

    (aa) can be reserved;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be avoided, managed or mitigated.

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

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

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

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

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and Correspondence Address

a) Details of:-

i) Details of the EAP who prepared the report:

Name of the Practitioner:	**ROELIEN OOSTHUIZEN**
Tel No.:	**084 208 9088**
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E-mail address:	roosthuizen950@gmail.com
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Postal Address:	**P.O. Box 110823, Hadisonpark, 8306**

ii) Appointed by:

THUNDERFLEX 78 (PTY) LTD

iii) Expertise of the EAP

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

Registered as an Environmental Assessment Practitioner: Number 2019/1467 (EAPASA)
Masters in Environmental Management (UFS)
B-Comm in Human and Industrial- Psychology (NWU)
(with evidence attached as **Appendix 1**)

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

(In carrying out the Environmental Impact Assessment Procedure)

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

b) Description of the property

Farm Name:	FARM KANNIKWA 156 AND FARM KANNIKWA VLAKTE 157 ADMINISTRATIVE DISTRICT OF NAMAQUALAND IN EXTENT: 11 873.5649 HA NORTHERN CAPE PROVINCE, REPUBLIC OF SOUTH AFRICA.
Application area (Ha)	11 873.5649ha (Eleven thousand eight hundred and seventy-three comma five six four nine) hectares in extent
Magisterial district:	NAMAQUALAND, Northern Cape Province
Distance and direction from nearest town	The Kannikwa Prospect is a well-known part of the diamond landscape along the West Coast of South Africa, lying ~10km directly east of the coastal town of Port Nolloth, almost midway between the Orange River to the north and Buffels River to the south. The Prospect consists of two large adjacent farms, namely Kannikwa 156 and Kannikwavlakte 157, with a total surface area of 11872.4243 hectares (118.72km²). Various infrastructure is available at Port Nolloth. The Kannikwa Diamond Prospect lies in the heart of the world-renowned Namaqualand Diamond District, bordered by the De Beers Namaqualand Mines diamond works at Kleinzee to the south, and Alexkor diamond works at Alexander Bay to the north and to the west. The Kannikwa Prospect lies between longitudes 16°57'34.7589"E and 17°06'15.5374"E and between latitudes 29°13'24.6950"S and 29°22'32.6334"S. In the UTM WGS84 grid coordinate system, this translates to between eastings 690466.646mE and 704238.612mE and between northings 6748545.081mN and 6765525.472mN. The total surface area of the Kannikwa Prospect is (118.7 square kilometres).
21-digit Surveyor General Code for each farm portion	Farm Kannikwa 156, Namaqualand District C05300000000015600000 Farm Kannikwa Vlakte 157, Namaqualand District C05300000000015700000

HISTORY

The ~140km stretch of coast between Alexander Bay and Kleinzee with adjacent emerged marine terraces has been the mainstay of the Namaqualand alluvial diamond district for the greatest part of the twentieth century. Although this immense wealth has mainly been mined out by 2008, a considerable proportion of viable deposits remains and is still being mined on a fairly substantial scale. Due to the sheer scale and abundance of viable deposits, the first and foremost focus has for decades been on the central deposits surrounding the Buffels and Orange River mouths.

However, through further study of the drainage patterns, several adjacent deposits which have been known but escaped scrutiny until recently are now regarded as the conduits and main contributors to many of the rich central deposits. The main conduit for the extensively mined Port Nolloth Reserve 155 and Oubeep areas is considered to be the palaeo-Kamma River, which runs across Kannikwa 156. In this regard, the Kannikwa Prospect is considered one of the most promising remaining stretches of diamond land in the Northern Namaqualand diamond province.

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

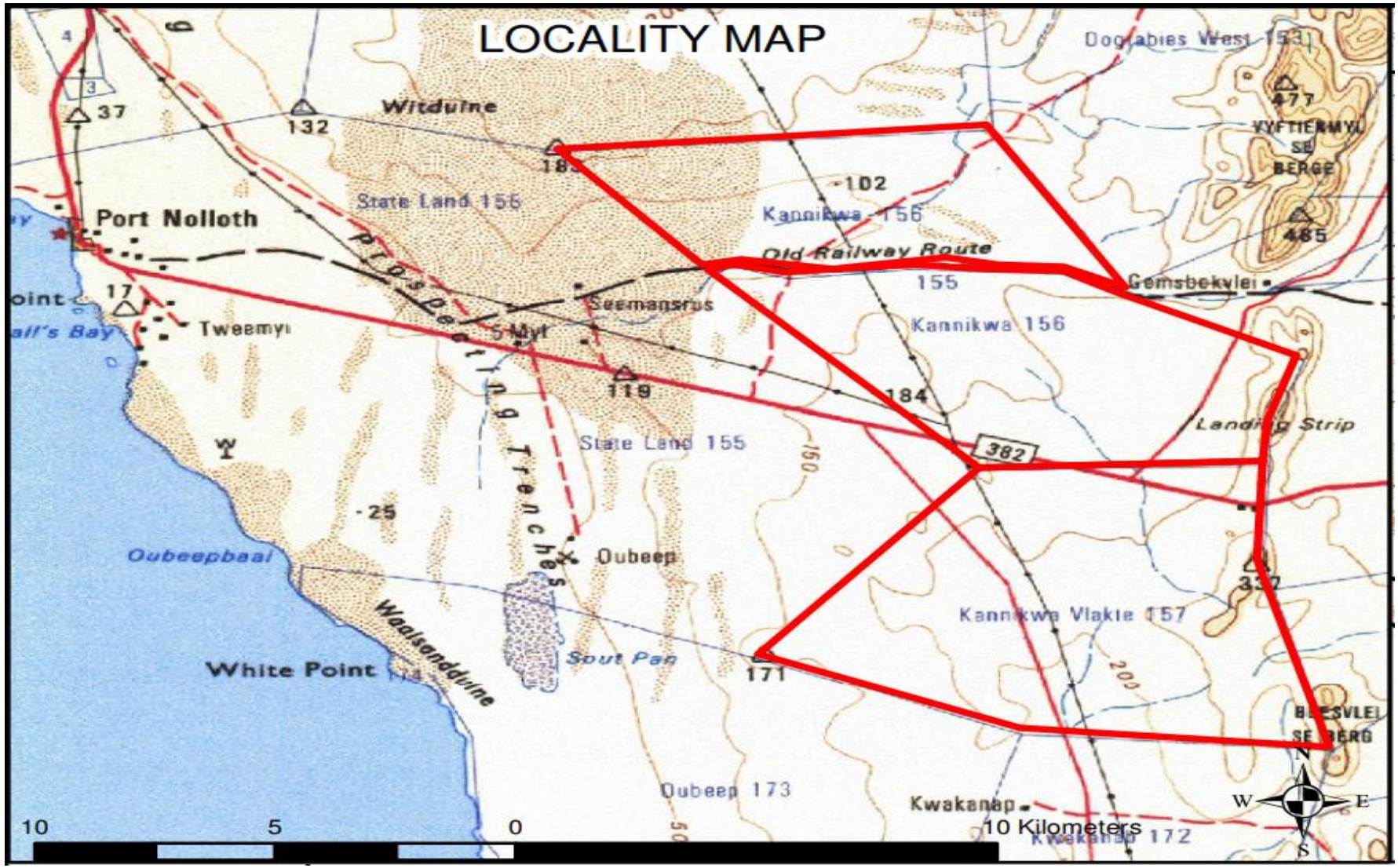

Figure 1. Locality Map 1: 250 000 indicating the application area in RED.

d) Description of the scope of the proposed overall activity

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

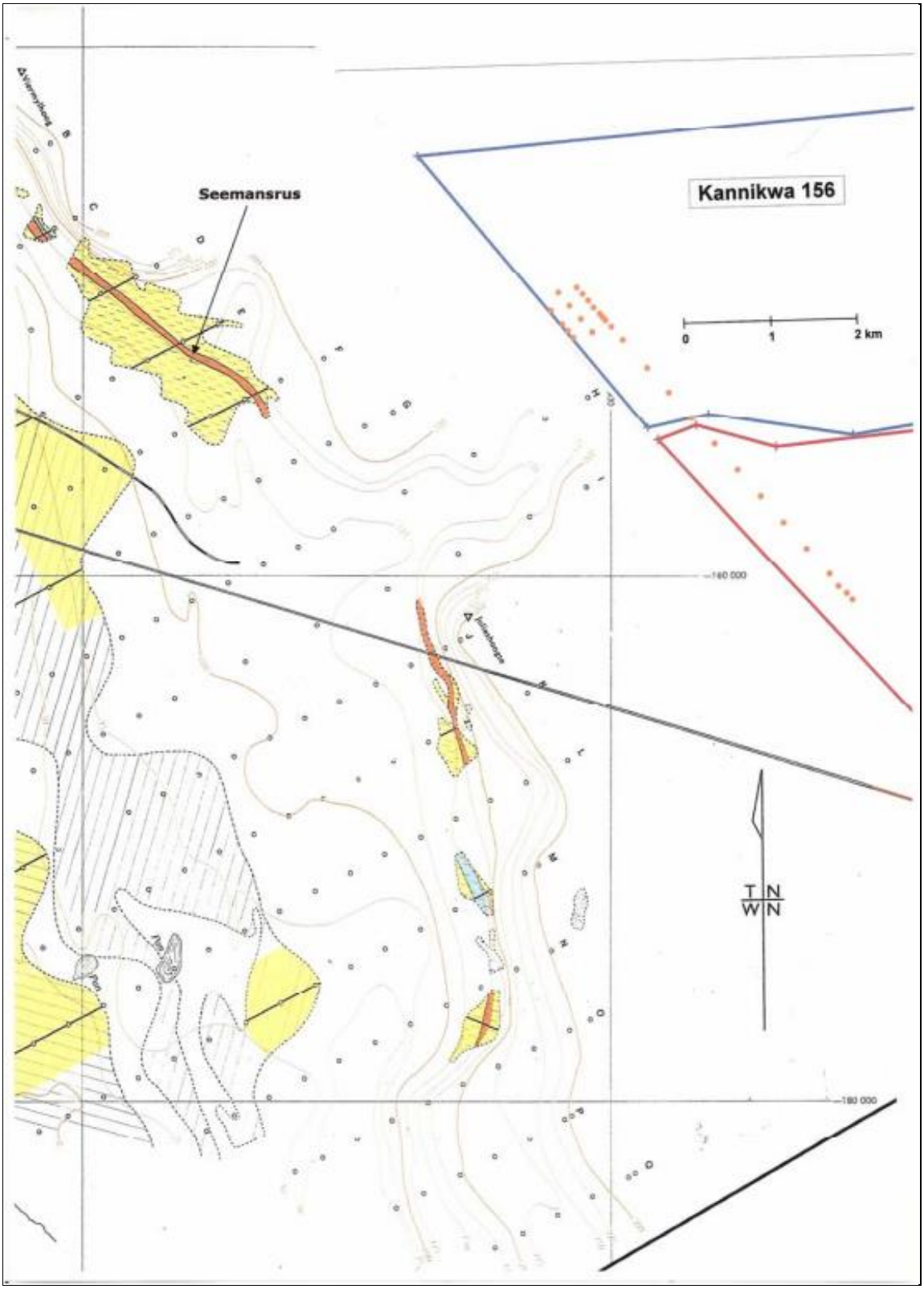

Figure 2. Composite of Keyser map and Kannikwa drill lines at 1 : 50 000 scale out of report by Megalodon Diamond Exploration – Kannikwa Prospect, New prospecting will continue in this area to continue previous work already done.

RC-drilling – Drilling is done in phases, over anomalous target areas, using reconnaissance lines or a grid of 200m X 200m or 100m X 50m depending on the level of confidence in the targets and the level of information required. The holes will be approximately 10 - 20 metres deep depending on local depth to bedrock (It is envisaged that at least 100 - 200 holes will be drilled depending on the depth at least 2000m will be drilled), drilling will cease and bulk sampling will continue on positive areas.

The exact location of the drilling holes will only be determined when the first phases of the prospecting programme have been completed. Kannikwa 156 is at an early stage of exploration where no scientifically recorded grade testing has been done, yet favourable geological indicators point firmly in the direction of a worthwhile investment, which has a significantly above average probability of yielding healthy returns.

It has therefore at this stage been shown to be a prime geological target worth investigating further, and is expected to yield a profitably mineable diamond resource after bulk sampling and gravel processing has been accomplished.

i) Listed and specified activities

Table 1: Listed and Specified Activities

Name of activity (e.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or 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- (vii) with an internal diameter of 0.36 metres or more; or (viii) with a peak throughput of 120 litres per second or more;	Water distribution Pipelines	X	NEMA: LN1 (GNR327)
Activity 12: "The development of— The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or **(ii) infrastructure or structures with a physical footprint of 100 square metres or more;** where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse" 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 It is anticipated that the operation will establish storm water control berms and trenches to separate clean and dirty water on the prospecting 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 metres or more, unless such	Clean water dam or return water dam	X	NEMA: LN1 (GNR327)

storage falls within the ambit of activity 16 in Listing Notice 2 of 2014"			
Activity 14: "The development and related operation of facilities or infrastructure, for the storage and handling, of dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	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 20: Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including – (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, crushing, screening or washing; 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. The Thunderflex operation directly relates to prospecting of a mineral resource (diamonds) and requires a prospecting right.	11 873,5649 ha application lodged Although the total area will never be prospected and the footprint with the drilling and bulk sampling is calculated to be ±60ha. **Invasive Prospecting Pits** 20 Trenches will be excavated with the following dimensions 100m X 200m = 40 ha pits that prove to contain gravels (tested positive). It is estimated that on average 3m of overburden (calcrete and soil) will be removed before accessing the gravel layer (average width 2m) which is host to the diamonds. The 5X bulk samples will be 200m X 200m (20 ha) X 10 – 20m deep.	X	NEMA: LN1 (GNR327)
Activity 24: The development of a road- (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters;	Access and haul roads	X	NEMA: LN1 (GNR 327)

Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	±60 ha	X	NEMA: LN2 (GNR325)
Activity 19: The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including- (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or The primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing. The Thunderflex operation directly relates to prospecting of a mineral resource (diamonds) and requires permission in terms of Section 20 (MPRDA), for the removal and disposal of bulk samples of any minerals.	11 873,5649 ha. Although the total area will never be prospected and the footprint with the bulk sampling is calculated to be ± 60 ha.	X	NEMA: LN2 (GNR325)
Activity 10(g) iii of Listing Notice 3 The development and related operation of facilities or infrastructure for the storage, or storage of and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. **i. Outside urban areas:** (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve	11 873,5649 ha on the total hectares of the area a total of ±60 ha will be disturbed with the drill pads, drill holes and bulk sampling.	X	NEMA LN3 (GNR 324)
Activity 12(g) i & ii of Listing Notice 3	11 873,5649 ha on the total hectares of the area a total of	X	NEMA LN3 (GNR 324)

The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. - ii. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Within critically biodiversity areas identified in bioregional plans;	±60 ha will be disturbed with the drill pads, drill holes and bulk sampling.		
Activity 15: The establishment of residue deposits resulting from activities which require a prospecting right.	0.3ha		NEMWA: Category A (GNR 633)
Office complexes Temporary workshop facilities Storage facilities Concrete bund walls and diesel depots Ablution facilities Topsoil stockpiles Overburden stockpiles Water tanks	± 200 m2 ± 300 m2 ± 2 000 m2 ± 250 m2 ± 30 m2 ± 500 m2 5 000 m2 3m x 3m = 9m² each		Not Listed
Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: • Small amounts of low-level hazardous waste in suitable receptacles. • Domestic waste. • 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)

Prospecting activities described in this Prospecting Work Programme ("PWP") are designed to determining the gravel resource potential of the proposed application area. The prospecting activities will include non-invasive and invasive methods. A suitable level of feasibility study (technical and economic evaluation) will also be undertaken.

The prospecting activities will be invasive. Subsequent phases will be of the invasive-type, typically drilling a proposed drilling programme of 100 - 200 reverse circulation boreholes will be used to further define the ore body. The drilling programme will determine the exact outline, shape and size of the gravel body. The reverse circulation is generally done dry but water is used when large clay bodies are encountered. The samples are passed through a cyclone and collected within one metre plastic bags. These sample bags are placed in goups of 10 to represent ten metres. The holes drilled can vary from 20m to 40m depth; this entirely dependent on bedrock morphology.
Bulk sample test work will be undertaken to test the grade and quality and ultimately the economic viability of the potential deposit.

A standard phased approach to all prospecting activities will be implemented. Each prospecting activity will be undertaken on a scheduled timeline, with some activities being run concurrently, while others sequentially. Specific milestones will be determined and used as a basis for decisions regarding further activities related to the PWP. The total duration of the prospecting and evaluation activities is planned for 5 years

e) Policy and Legislative Context

Table 2:

Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	- Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA	- Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	- Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right	- To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions.	- To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	- Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.	- Control measures are to be implemented upon the approval of the EMPR.

Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Prospecting Right has been applied for (NC) 30/5/1/1/2/12842 PR. - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal)	- Control measures are to be implemented upon the approval of the EMPR.

	- Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)	
National Environmental Management: Air Quality Act (Act 39 of 2004)	- Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM:AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM:AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)	- Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from 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. - Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations.	- A permit application regarding protected plant species need to be lodged with DENC if any protected species is encountered. Control measures are to be implemented upon the approval of the EMPR.

	Commencement of Threatened or Protected Species Regulations 2007: 1 June 2007 GNR 150/GG 29657/23-02-2007 Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. - Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)	
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.	- The proposed prospecting site falls within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological

		Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The area along the Kamma River, including its catchment is classified as Critical Biodiversity Area One. The remaining sections in the north and south is classified as Critical Biodiversity Area Two. A new portion of the Richtersveld National Park (Protected Area) lines the border of the study site in the north.
National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM:WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM:WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of	- To be implemented upon the approval of the EMPR.

	Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)	
National Forest Act (Act 84 of 1998) and Regulations	- Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.	- A permit application regarding protected tree species need to be lodged with DAFF if necessary. - Control measures are to be implemented upon the approval of the EMPR.
National Heritage Resources Act (Act 25 of 1999) and Regulations	- Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority. - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority. - Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process.	- Control measures are to be implemented upon the approval of the EMPR. - Fossil finds procedure will be attached to the PIA.

	- Regulation GN R548 published on 2 June 2000 in terms of NHRA	
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse; (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and; - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j))	- A water use application must be submitted and will be submitted as soon as the EIA EMP had been finalized. - Control measures are to be implemented upon the approval of the EMPR.

	- Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j))	
Nature Conservation Ordinance (Ord 19 of 1974)	- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.	- Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	- Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees.	- Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others	- To be implemented upon the approval of the EMPR.

	- Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR
Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997)) and regulations, more specifically GN R1130	- To control land surveying, beacons etc. and the like; - Agriculture, land survey S10	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998)) and regulations, more specifically GN R1775	- To regulate law on veld and forest fires - (Draft regulations s21)	- To be implemented upon approval of the EMPR

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 Thunderflex 78 (Pty) Ltd Project is in line with the 'Beneficiation Strategy for the Minerals Industry of South Africa' (DMR, 2011) in terms of aiming to beneficiate diamonds for sale/export. The benefits of this will fall directly to the Northern Cape Province and, specifically, the Namaqualand District.

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

Need

Analysis of the Diamond Industry – ALROSA(website)

The Information on the analysis of the diamond industry was obtained from the ALROSA website which is one of the biggest diamond producers in the world.

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

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

Top Countries in the Global Diamond Production 2016: 134.1 mln. Carats

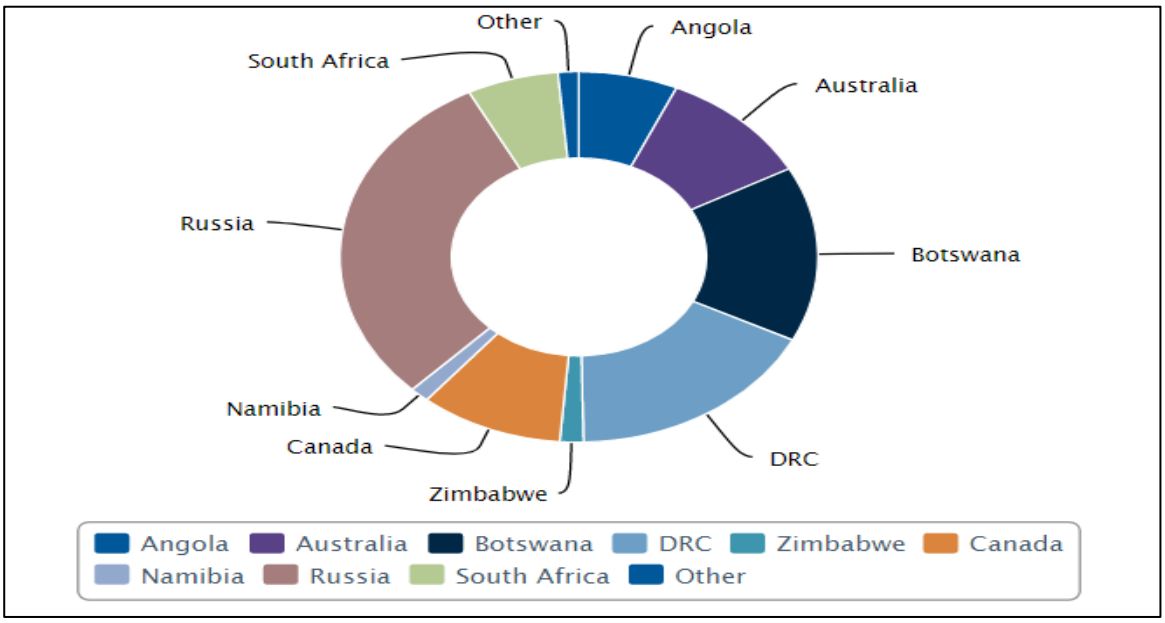

Figure 3. Kimberley Process companies' data Global Diamond Production 2011-16 (thousands of carats)

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

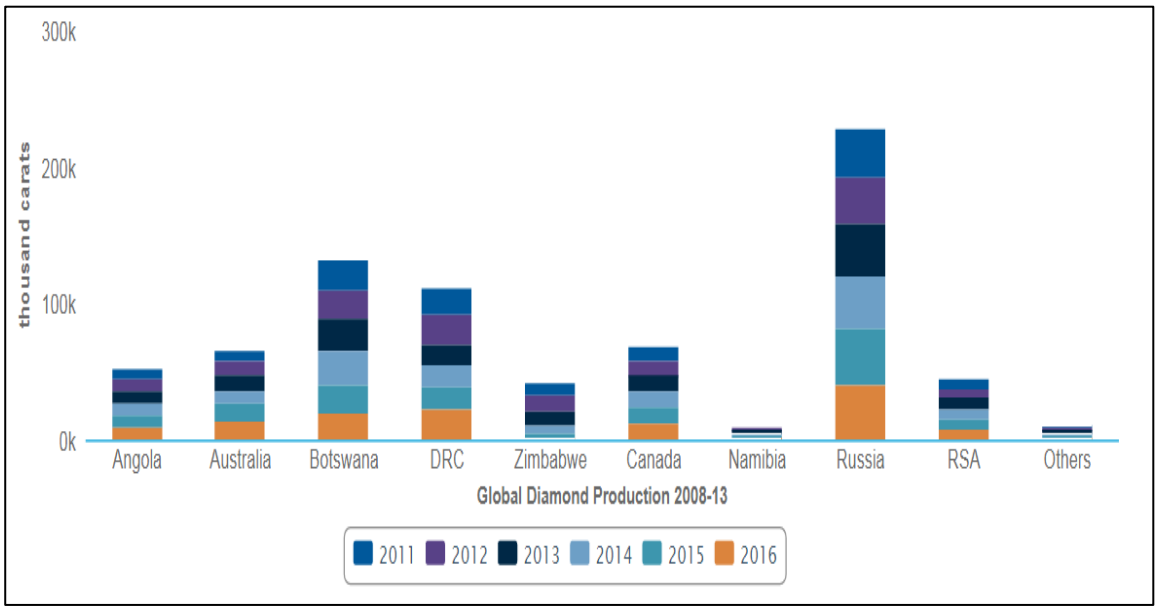

Figure 4. Global Diamond Production 2011-16 (thousands carats) Kimberley Process companies' data

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

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

The world's diamond mining is concentrated in the major primary deposits accounting for about 60% of the global diamond production. The remaining production is concentrated in placer deposits, the principal of them located in the DRC (Mbiji-Mayii) and Zimbabwe (Marange).

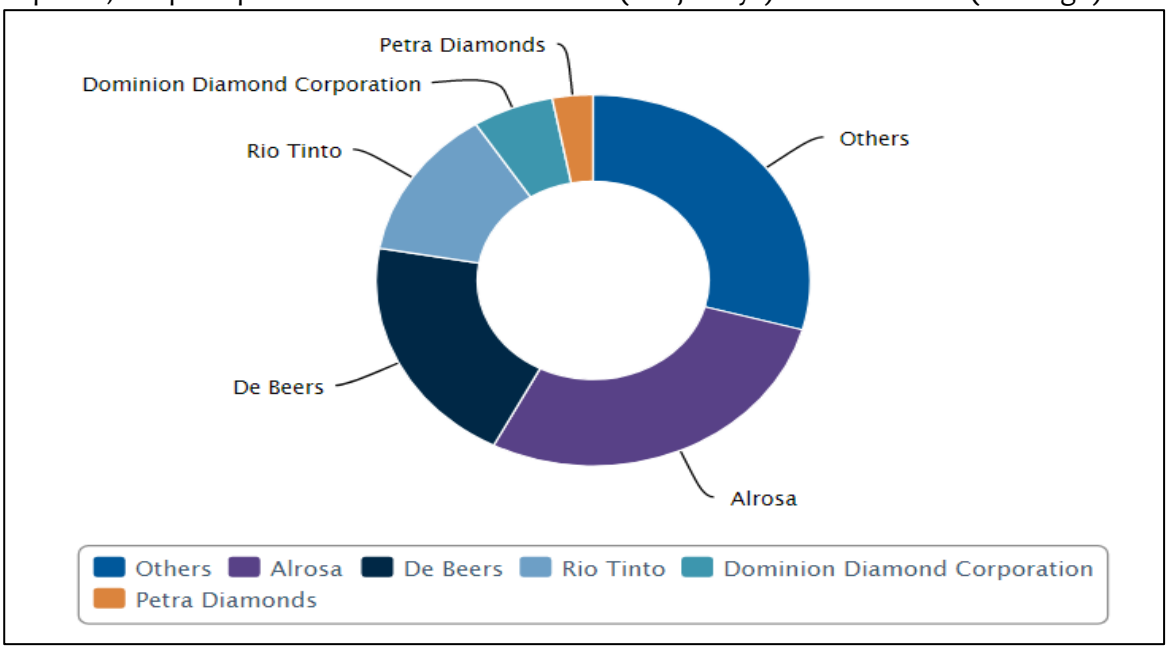

Figure 5. Diamond Production by Leading Companies, 2016(* - *including Ekati; Companies' data*)

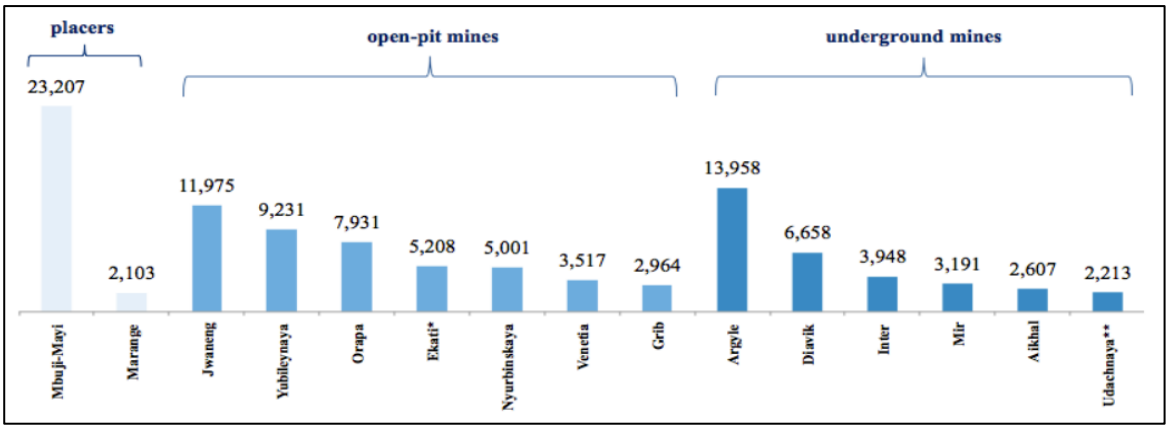

Figure 6. Production Output of the World's Major Diamond Deposits, 2016 (thousand carats) Kimberley Process and compnies' data; * - Ekati includes open-pit and undergroung mining; ** - output, including further development of the open-pit

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

The world's largest trading centers, which concentrate the bulk of trade in natural rough diamonds, are India, Belgium, the UAE, the USA, Hong Kong and Israel. Being sold from mines,

natural rough diamonds arrive at cutting and polishing plants to become polished diamonds that will be used in jewellery making.

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

The Diamond Pipeline

The Diamond Pipeline can be defined as the route the diamond takes from mine to end consumer. The diamond pipeline, typically, comprises (**Fig. 4).**

Figure 7. The Diamond Pipeline

Exploration/Prospecting; involves geologists finding diamond deposits in different areas. Prospecting is vital to the future survival of any diamond business as there is a predicted supply-demand gap.
Mining and Recovery; once diamonds have been discovered and surveys shown that it is financially viable to mine them; they are now recovered from the ground. The manner in which they are mined and recovered depends on their source, thus, where they are found.
Sorting and valuing; process of sorting and valuing of diamonds, categorizing them according to size, quality, model and colour.
Cutting and polishing; refers to manufacturing of diamonds; the process of turning rough diamonds into polished.
Polished Market; this is referred to as the 'diamond exchange bourse', a place where diamonds are traded. These are located in some of the world's major diamond manufacturing centres, e.g. Belgium.
Retailing; polished diamonds find their way to Jewellers and Consumers through Wholesalers and Retailers.

International Diamond Market Trends

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

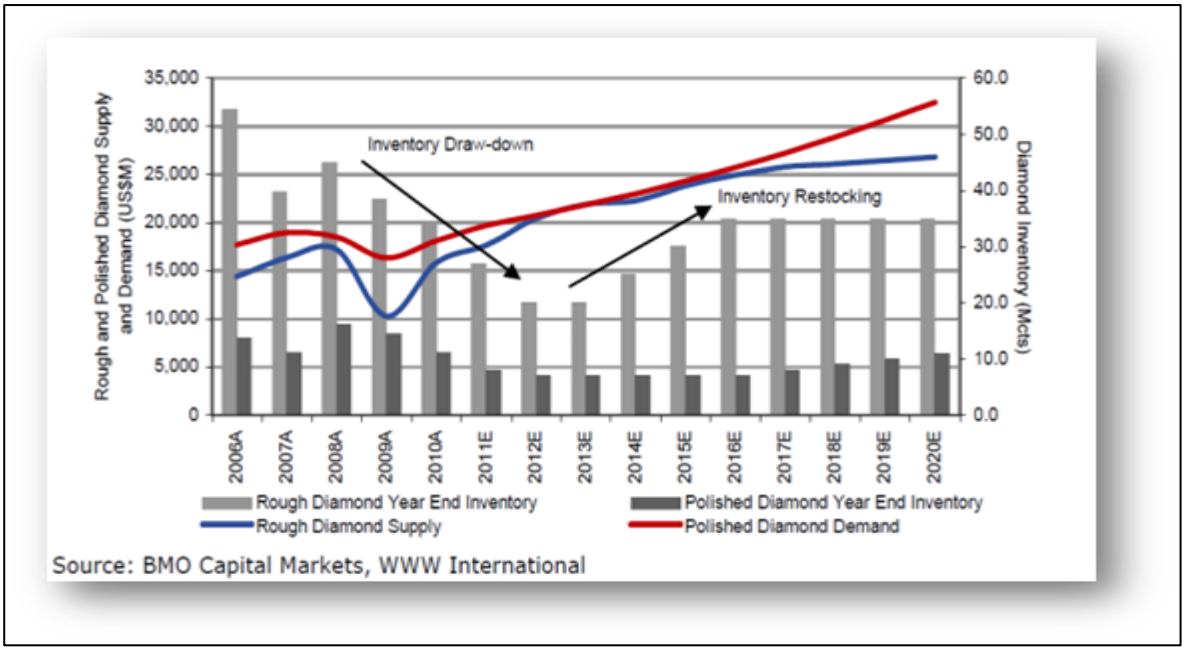

Figure 8. Inventory movements support diamond prices (USDM, Mct)

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

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

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

Desirability:

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

Benefits:

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

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

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

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 prospecting operation (i.e. excavations) will not be provided here, as the location of the prospecting is determined by the possible geological location of the mineral resource (as discussed in section f).

A Prospecting Right application was lodged to identify the preferred areas on the property. The prospecting will be done with pitting, trenches and bulk sampling which will indicated if there are areas on the property that can be viably mined with grade and quality determined with the bulk samples taken off the property.

Prospecting Site Location

A Prospecting Right application was lodged to identify the preferred areas on the property. The prospecting will be done with pitting, trenches and bulk sampling which will indicated if there are areas on the property that can be viably mined with grade and quality determined with the bulk samples taken off the property.

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

The prospecting method of pitting and open trenches 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 prospecting method.

i) Details of the development footprint alternatives considered

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

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

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

FARM KANNIKWA 156 AND FARM KANNIKWA VLAKTE 157
ADMINISTRATIVE DISTRICT OF NAMAQUALAND
IN EXTENT: 11 873.5649 HA

Alternatives considered: -

No planned alternative to proposed prospecting is envisaged. Should prospecting not proceed the current agricultural land use will continue. Proposed site layout and opencast mining with concurrent rehabilitation where possible will minimise footprint and impact. Any alternative methodology may have greater impact. Alternatives may be looked at in more detail within the EIA EMP Report.

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

(b) The type of activity to be undertaken:

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

Land Use

No specialist comparative land use assessments were conducted, but the prospecting areas has 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 prospecting can also generate income for the property owner that can be used for further development of the property.

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

Project Infrastructure

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

Prospecting Method

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

Proceed without the Mine (no go)

Land Use

Limited sheep farming is the only feasible form of agriculture here.

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

Heritage and Cultural Resources

In the event that the prospecting operation does not proceed, the heritage resources will remain as is. The protection and preservation of these

resources are therefore not guaranteed. However, if the prospecting operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off if any of these resources are encountered.

(c) The design or layout of the activity:

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

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

- Processing Plant: 2 X 16 feet
- Ablution Facilities: In terms of sewage the decision was made to use chemical toilets which can be serviced regularly by the service provider.
- Clean & Dirty water system: Berms
  It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the prospecting site.
- Fuel Storage facility (Concrete Bund walls and Diesel tanks):
  It is anticipated that the operation will utilize 2 x 23 000 litre diesel tank. This tank must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tank. A concrete floor must be established where the re-fuelling will take place.
- Prospecting Area: Area applied for to pit and trench for diamonds (bulk sampling).
- 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 prospecting operation will create an additional 1.5 km of roads, with a width of 5 meters. The current access road is deemed adequate for a service road into the prospecting site.
- Salvage yard (Storage and laydown area).
- 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 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 prospecting operations.

In terms of water use alternatives; the operation is not located near any perennial River systems and therefore the only water which can be used will be ground water or sea water. A decision will be made after specialist studies have been conducted. Plastic pipelines are considered to be the best long-term option for transferring water, due to their temporary nature which causes minimum environmental disturbances.

If prospecting proves positive a diamond rotary plant will be established which uses (2 X 16 feet rotary pan). Water use for a 16 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 per pan. Total cubic metres tested will be 81206.25 m^3 a 16 feet pan can on capacity work about 65 tons per hour which constitutes about 117m^3 per hour. With new methods developed this use can be much less than mentioned above.

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

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

- The locality is already disturbed or mined out.
- It is within reach of (1 000m) of the treatment plant.
- It is situated near the access road to the prospecting activities.
- No underlying ore bodies or geological discontinuities.
- No geomorphological impacts.
- No structures, dwellings or other points of risk on down-stream side.
- Convenient material nearby for construction of dam.
- Top soil from the treatment process will be available for final rehabilitation.

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

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

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

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

- Technique

The area will be excavated (opencast method) with an excavator up to bedrock, stockpiled next to an open area and loaded onto the trucks by a frond end loader. The trucks will transport the gravel via a newly constructed road, which will be constructed to the required safety standard. No provincial roads will be used.
At the processing plant the run of mine tailings will be fed onto a grizzly for the screening out oversize material. The gravel will be processed through a screening 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 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 prospecting activities include (bulk sampling) with an excavator up to bedrock. The operation is also associated with processing techniques that make use of modern technologies. These are the most economic viable method currently being used by the diamond fraternity. There is no other feasible, alternative prospecting method for the bulk sampling of possible alluvial and kimberlite diamonds.

(e) The operational aspects of the activity:

The gravels will be loaded with an excavator on to dump trucks for conveyance to the Processing Plant. At the Processing Plant the bulk sample gravels will be fed onto a grizzly for screening out oversize material. The tailings will be processed through a screening 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.

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

Alternatives considered: -

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

(f) The option of not implementing the activity:

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

Socio-Economy

The operation will make provision for 12 - 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 Kannikwa Prospect lies between 6km and 19km from the West Coast of South Africa, and as such forms part of the coastal lowlands, which are bounded on the eastern side by the northsouth trending quartzitic mountain ranges of the Gariep Group and the gneissic mountain land of the Namaqualand Metamorphic Complex.

The coastal lowlands are characterized by pervasive arid windblown sand cover, supporting a sparsely distributed low shrub and bush vegetation. Rainfall is low and vegetation is mainly dependent on coastal fog for moisture intake. Limited sheep farming is the only feasible form of agriculture here.
Closer to the coast, where the prevailing southerly coastal winds are strongest and most of the sand accumulates, large stretches of dune-land are found. The dunes can become higher than ten metres and quite steep, and can therefore not easily be traversed by vehicle. Except for the north-western corner of Kannikwa 156A, the sand on the Kannikwa Prospect is generally 1-3m thick and relatively flat.

Heritage and Cultural Resources

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 3 for the identification of Interested and Affected Parties to be consulted with. The landowners were consulted with a registered letter informing them that the application had been accepted and the scoping report were attached in which all activities were explained.

An Advert (Notice) was placed in the GEMSBOK on 23 July 2021 to notify all other interested and affected parties.

Notices were placed at the Police station in Port Nolloth and at the USave. Notices were also placed at the gravel road entering onto the property.

Registered consultation letters were send on 12 July 2021 to all identified parties and government departments with the Scoping Report on disc included.

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

The document can also be viewed at the EAP address with prior arrangement to view the document.

The EIA EMP document was also sent out per registered post to all interested and affected parties on 12 July 2022.

Consultation process:

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

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:*

Geological Overview

Namaqualand forms the north-western flank of the Namaqua-Natal Mobile Belt, a zone of intensified tectonic activity surrounding the relatively stable Kaapvaal Craton on its south-western side. As such, the Namaqualand Metamorphic Complex forms the fundamental basement of all rock successions in Namaqualand.

In the north-western parts of Namaqualand, a eugeoclinal phase ensued 700-590 million years (Ma) ago, producing a series of deep basins into which the thick sedimentary successions of the Gariep Supergroup were laid down. Quartzites and schists of the Vredefontein Formation as part of the Stinkfontein Subgroup as part of the Port Nolloth Group are the predominant bedrock types on Kannikwa 156.

During the period 510-350 Ma ago, folding took place and faulting continued in Namaqualand, and the rivers of a more humid climate carved deeply incised valleys into the displaced landscape. This relief was prominently deepened and widened by the gigantic glaciers of the Carboniferous period, which laid down the Dwyka Formation in huge valleys and over vast stretches of the Cargonian Highlands between 350 and 290 million years ago (see Figure 9).

The Dwyka glaciation marked the end of large-scale basinal sedimentation in Namaqualand, and during the ensuing 290 million years up to present, the balance of the scale was on the erosional side. This is the time during which the bulk of the diamondiferous deposits of Namaqualand were released from their glacial sources and laid down in river basins (Maree, 1987).

The oldest known unmetamorphosed sediments in this area are the Cretaceous silcretes and remaining patches of silicified diamond conglomerate of Late Cretaceous age (~70 Ma), found

on Annex-Kleinsee. Coastal river palaeo-channel deposits are mainly of Tertiary age, while raised beach terraces mined on the coastal farms, were formed during sea level stillstands since early Miocene and throughout the Quaternary period (Kensley & Pether, 1986).

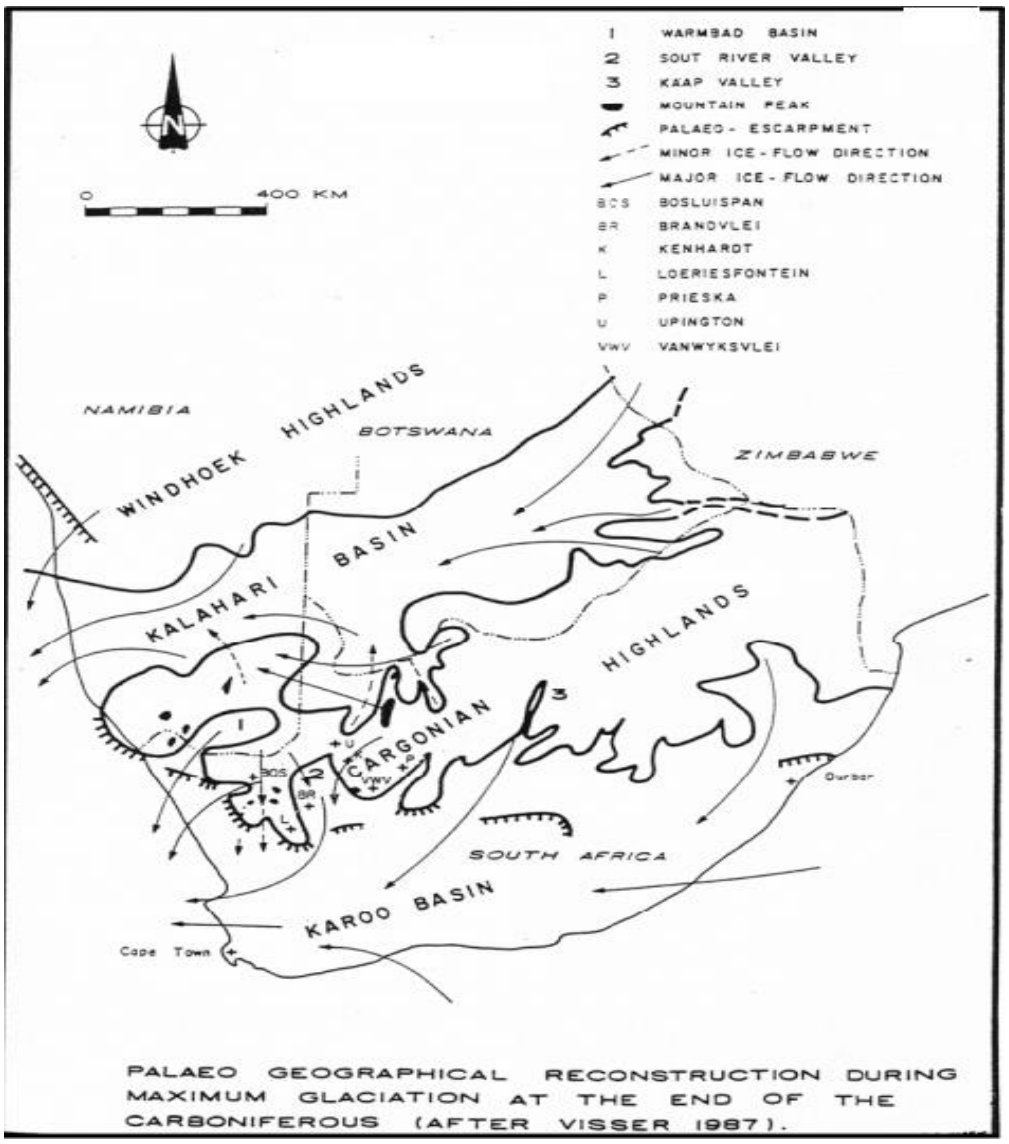

Figure 9. The Cargonian Highlands (after Visser, 1987).

Regional Structure

After Carboniferous and Mesozoic deposition of the Karoo sediments, the break-up of Gondwanaland ensued with a series of tension fracture faults, mostly north-south trending in this part of the subcontinent. It was during this period (~180–120 Ma ago), that most of the faults on Kannikwa 156 and surrounds were born. Although folding and faulting on Kannikwa 156 is mostly obscured by sand cover, it is assumed that they are more or less coast-parallel as are the faults in Fyftienmyl se Berge toward the east, the most prominent of which is the Gemsbokvlei Fault.

The displacement and extent of these faults are unknown, except for the observation that the fault bisecting the excavated proto-gravel on the southern slope of the palaeo-Kamma River valley at KA1_002 displays a vertical displacement of at least 14 metres.

Large boulders of silicified / ferrugenized fault breccia occur against the side of a hill in the middle of Kannikwa 156, directly south of the old commonage where the old railway line once crossed. Similar breccia is found about 1.5km south-southwest, which shows that approximately northsouth trending faults are fairly common on Kannikwa 156. Most of them are presumed to have relatively small displacements.

Folding in the area seems to be very gentle and on a large (geosynclinal) scale in the region as a whole. Folding seems to be mainly coast-parallel and syngenetic with the Gariep. Other trends, though less likely, is also possible. Later Triassic folding seems not to have influenced this region significantly.

The Kannikwa Diamond Prospect lies in the heart of the world-renowned Namaqualand Diamond District, bordered by the colossal De Beers Namaqualand Mines diamond works at Kleinzee to the south, and the enormous Alexkor diamond works at Alexander Bay to the north and to the west. Farther afield Trans Hex have mined diamonds on a massive scale along the Lower Orange River and Namdeb (De Beers) have produced millions of carats from the Southern Namibian beaches.

The Kannikwa Prospect is a well-known part of the diamond landscape along the West Coast of South Africa, lying ~10km directly east of the coastal town of Port Nolloth, almost midway between the Orange River to the north and Buffels River to the south. The Prospect consists of two large adjacent farms, namely Kannikwa 156 and Kannikwavlakte 157, with a total surface area of 11872.4243 hectares (118.72km^2). Various infrastructure is available at Port Nolloth.

The ~140km stretch of coast between Alexander Bay and Kleinzee with adjacent emerged marine terraces has been the mainstay of the Namaqualand alluvial diamond district for the greatest part of the twentieth century. Although this immense wealth has mainly been mined out by 2008, a considerable proportion of viable deposits remains and is still being mined on a fairly substantial scale. Due to the sheer scale and abundance of viable deposits, the first and foremost focus has for decades been on the central deposits surrounding the Buffels and Orange River mouths.

However, through further study of the drainage patterns, several adjacent deposits which have been known but escaped scrutiny until recently are now regarded as the conduits and main contributors to many of the rich central deposits. The main conduit for the extensively mined Port Nolloth Reserve 155 and Oubeep areas is considered to be the palaeo-Kamma River, which runs across Kannikwa 156. In this regard, the

Kannikwa Prospect is considered one of the most promising remaining stretches of diamond land in the Northern Namaqualand diamond province.

Regional Structure

After Carboniferous and Mesozoic deposition of the Karoo sediments, the break-up of Gondwanaland ensued with a series of tension fracture faults, mostly north-south trending in this part of the subcontinent. It was during this period (~180–120 Ma ago), that most of the faults on Kannikwa 156 and surrounds were born. Although folding and faulting on Kannikwa 156 is mostly obscured by sand cover, it is assumed that they are more or less coast-parallel as are the faults in Fyftienmyl se Berge toward the east, the most prominent of which is the Gemsbokvlei Fault.

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Large boulders of silicified / ferrugenized fault breccia occur against the side of a hill in the middle of Kannikwa 156, directly south of the old commonage where the old railway line once crossed.

Similar breccia is found about 1.5km south-southwest, which shows that approximately northsouth trending faults are fairly common on Kannikwa 156. Most of them are presumed to have relatively small displacements.

Folding in the area seems to be very gentle and on a large (geosynclinal) scale in the region as a whole. Folding seems to be mainly coast-parallel and syngenetic with the Gariep. Other trends, though less likely, is also possible. Later Triassic folding seems not to have influenced this region significantly. Information taken out of the First Phase drilling report on the prospecting of the Kannikwa alluvial diamond prospect east of Port Nolloth, Northern Cape prepared for Magalodon Diamond Exploration by Creo Design (Pty) Ltd, August 2008.

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area, geology was described and included in this report as part of the Ecological study (Appendix 4).

According to the 1:250 000 Geological Map of 2916 Springbok, published by the Council for Geoscience in 2001, the geological features on Kannikwa comprise Quaternary, Namibian and Kheisian deposits. Most of the site comprise sand, with white to light pink sand in the west, transitioning to red wind-blown sand and semi consolidated piedmont deposits eastwards (Figure 10). The hills in the north-east and some rocky outcrops in the centre of the study area

are associated with feldspathic quartzite, arkose and intermediate to felsic lava and tuff (Vredefontein Formation) of the Stinkfontein subgroup (Port Nolloth Group - Gariep Supergroup). The hills in the south-east comprise Lekkersing quartzite and flagstone of the Stinkfontein subgroup, surrounding a very small portion of pinkish Nonoemaasberg Gneiss of the Gladkop suite. The earmarked diamondiferous gravels lie beneath the sandy deposits of the study area.

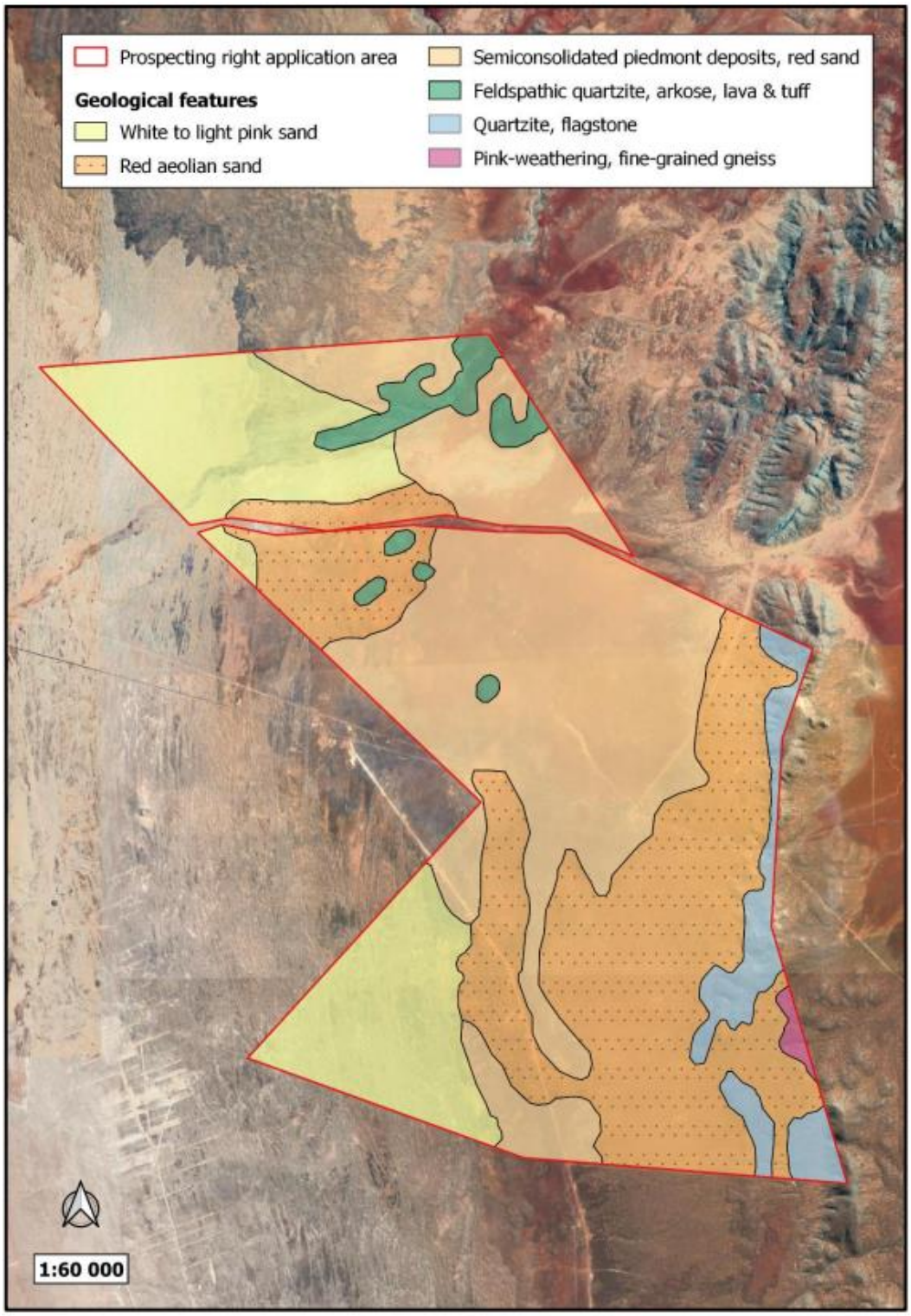


Figure 10. The distribution of geological features in the study area.

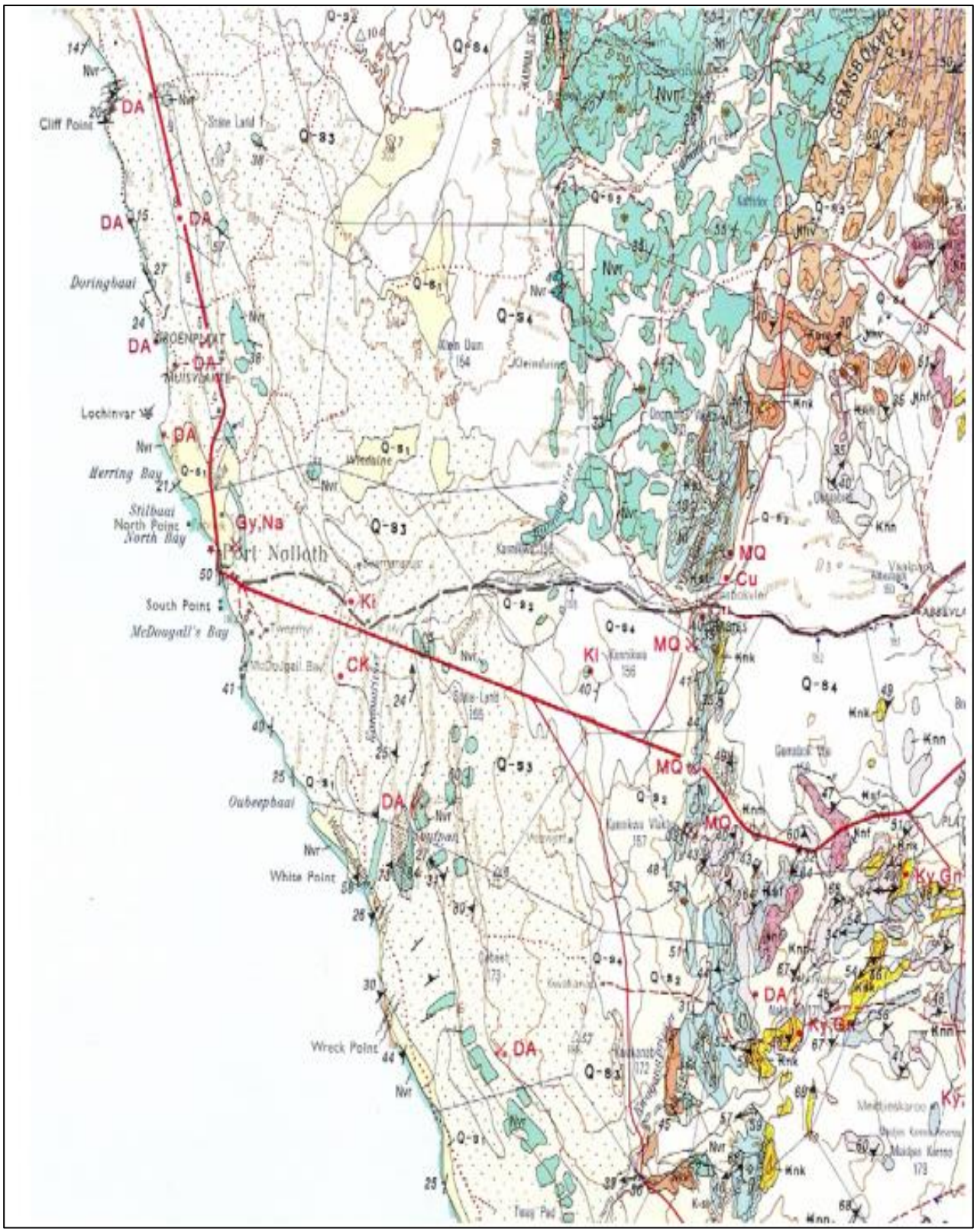


Figure 11. - ***Extract from 1:250 000 geological map (Council for Geoscience, Pretoria) showing location of the farms Kannikwa Blue (Vgd) = Campbellrand Subgroup comprises of coarse to fine grained dolomite and limestone, Grey (C-Pd) = Dwyka Group, Yellow (T-Qc) = Neogene calcrete, Pale yellow (Qs) = Quaternary to Recent sands and sandy soil of the Gordonia Formation (Kalahari Group). DK marks Diamond in Kimberlite.***

- ***CLIMATE:***

The site falls within the west coast desert climatic zone of Southern Africa, which is typified by hot dry summers and cooler winters with little rain. The nearest town to the mining site is Springbok. Springbok lies on 982m above sea level Springbok's climate is a local steppe climate. There is not much rainfall in Springbok all year long. According to Köppen and Geiger, this climate is classified as BSk.

Rainfall is less than 200mm a year and falls during the autumn and winter months (ie from May to August). Coastal fogs occur year-round but are more frequent during the winter period. Temperatures are relatively cool but increase markedly during berg wind conditions. The predominant wind direction is southerly.

Average temperatures measured for Springbok ranges from 22.3 °C the hottest month, February, to 11.4 °C for the coldest month, July. The average temperatures measured for all of the months can be seen in the table below.

Table 4: Average temperatures and rainfall measured for every month.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	22	22.3	21.4	18.1	14.6	11.9	11.4	12	14.3	16.7	19.3	20.8
Min. Temperature (°C)	14.7	15.1	14.6	11.6	8.4	6.4	5.8	5.9	7.6	9.7	12	13.5
Max. Temperature (°C)	29.4	29.6	28.3	24.7	20.8	17.4	17	18.1	21.1	23.7	26.7	28.2
Avg. Temperature (°F)	71.6	72.1	70.5	64.6	58.3	53.4	52.5	53.6	57.7	62.1	66.7	69.4
Min. Temperature (°F)	58.5	59.2	58.3	52.9	47.1	43.5	42.4	42.6	45.7	49.5	53.6	56.3
Max. Temperature (°F)	84.9	85.3	82.9	76.5	69.4	63.3	62.6	64.6	70.0	74.7	80.1	82.8
Precipitation / Rainfall (mm)	4	6	11	19	25	32	30	27	12	12	5	6

Rainfall

The rainfall in the area is low. The two closest station is in Springbok which is 50km away. The annual rainfall in Springbok is around 189 mm. The daily rainfall data for Springbok have been summarized to represent the average monthly rainfall, which is graphically presented in Figure 12 below.

Precipitation for the region is the lowest in January with an average rainfall of 4 mm during this month. During the month of June, the precipitation reaches a peak with an average of 32 mm. The difference in precipitation between the driest and wettest months is thus 28 mm.

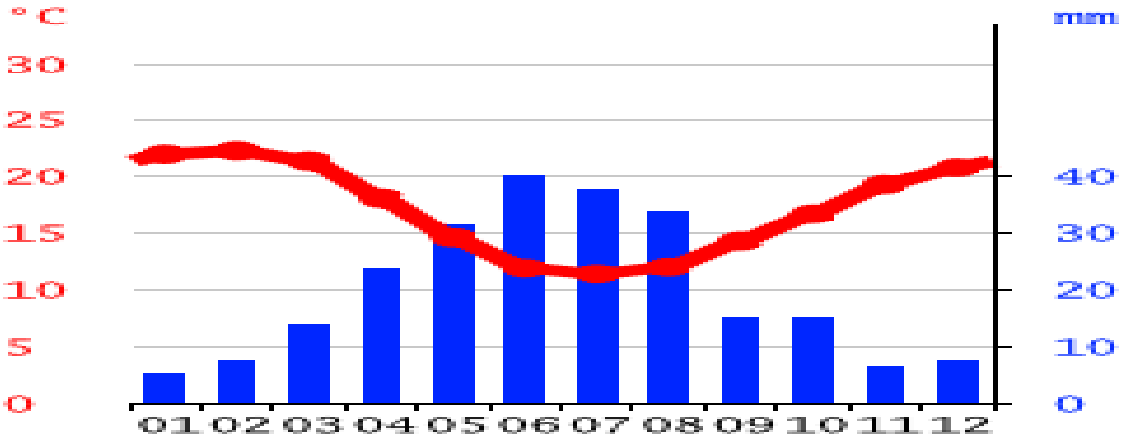


Figure 12. Average rainfall and temperature per month at the nearest rainfall station (Springbok).

Evaporation

Evaporation far exceeds rainfall at the site. Although no records are available from the mine site the gross annual evaporation rate at Springbok is on average 3254 mm.

Wind

Prevailing winds are determined by the South Atlantic high pressure system, the atmospheric pressure over the subcontinent and east-moving low pressure systems associated with the west-wind belt south Africa.

The anticlockwise airfow around the South Atlantic high tends to be guided by the coast, so that near the coast the wind is predominantly from the south (onshore). In winter the winds decrease considerably and blow more frequently from the north. Berg winds are a feature of the entire Benguela region and may occur throughout the year, but are more frequent in winter. The wind is hot and dry and usually blows from the east or north east.

Incidents of Extreme Weather Conditions

Extreme weather conditions are rare and in general the coastline climate is fairly consistent. Winds occasionally reach gale force velocity and berg wind conditions can persist for a week or longer, causing higher than usual temperatures. Drough conditions are rare and rainfall is usually higher than average once every 10 years causing ephemeral rivers to flow.

- ***TOPOGRAPHY:***

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area, topography was described and included in this report as part of the Ecological study (Appendix 4).

The terrain varies from plains with open high hills or ridges in the north, level plains with some relief in the west, plains with open low hills or ridge in the centre, and irregular plains with low mountains in the east. is characterised by irregular plains, with low hills or ridges in the east. Altitude ranges from 100 - 200 m above sea level on the plans, 220 – 280 m on the hill slopes, and 300 – 350 m along the hill tops. The terrain on the plains varies between a gentle slope of 1 % to moderate slopes of up to 5 %. Steeper slopes (11 – 22 %) are found on the hills and ridges.

Topographically, Kannikwa 156 is dominated by the Kamma River valley, which enters at the northeastern corner of the farm from a northerly direction, and then turns west-southwestward, running through the farm to exit along the northern part of the western border (see Figure 13) (taken out of the Megalodon Diamond Exploration Pty Ltd first phase diamond drilling report by Creo design Pty Ltd, August 2008).

The ground south-southeast of the Kamma River valley climbs gradually toward the foot of Vyftienmyl se Berge, part of the Lekkersing Formation to the east. A break in Vyftienmyl se Berge at Gemsbokvlei homestead provides fluvial access to Kannikwa 156 from the east, but the diamond potential of this route needs to be established at a later stage (taken out of the Megalodon Diamond Exploration Pty Ltd first phase diamond drilling report by Creo design Pty Ltd, August 2008).

The fairly flat, even surface of most of the central part of Kannikwa 156, belies the intensively incised and scoured fluvial bedrock morphology which lies underneath (taken out of the Megalodon Diamond Exploration Pty Ltd first phase diamond drilling report by Creo design Pty Ltd, August 2008).

The coastal lowland rises gently from the sea to approximately 150m. Over this area it is generally gently undulating hilly topography with scree filled valleys and gneiss kopjes. The Great Escarpment marks the eastern border of the coastal plain. Closer to the coast, predominantly southerly winds have played a major part in moving sediments northwards and inland. Dune fields and blow-out depressions are common. Sparse rock outcrops have been subject to wind erosion and sandblasting (taken out of the Megalodon Diamond Exploration Pty Ltd first phase diamond drilling report by Creo design Pty Ltd, August 2008).

Figure 13. Google Earth View of the entrance of the Kamma River into Kannikwa 156.

- ***SOILS:***

  Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area, soil was described and included in this report as part of the Ecological study (Appendix 4).

  Land types found on the property include Ae71, Af17, Ag52, Ai12, Ah33 and Ha32 (Figure 14). Most of the property, especially the central parts, is characterised by red-yellow apedal, well drained soils, red with high base status and deeper than 300 mm. This depicts the Ae71 and Af17 landtypes, with Af17 usually associated with dunes while Ae71 is not. Ai12 and Ah33 are also associated with red-yellow apedal, well drained soils, but with yellow (Ai12) or red and yellow (Ah33) soil, with high base status and usually contain less than 15% clay. In the Ha32 landtype, grey sandy soils are dominant, while Ag52 represents soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the landscape.

The terrain has low to moderately low susceptibility in terms of erosion and flooding hazards. However, the susceptibility of soils to wind erosion is very high, with high to moderately high susceptibility to water erosion. The soils also have a high to very high susceptibility to compaction.

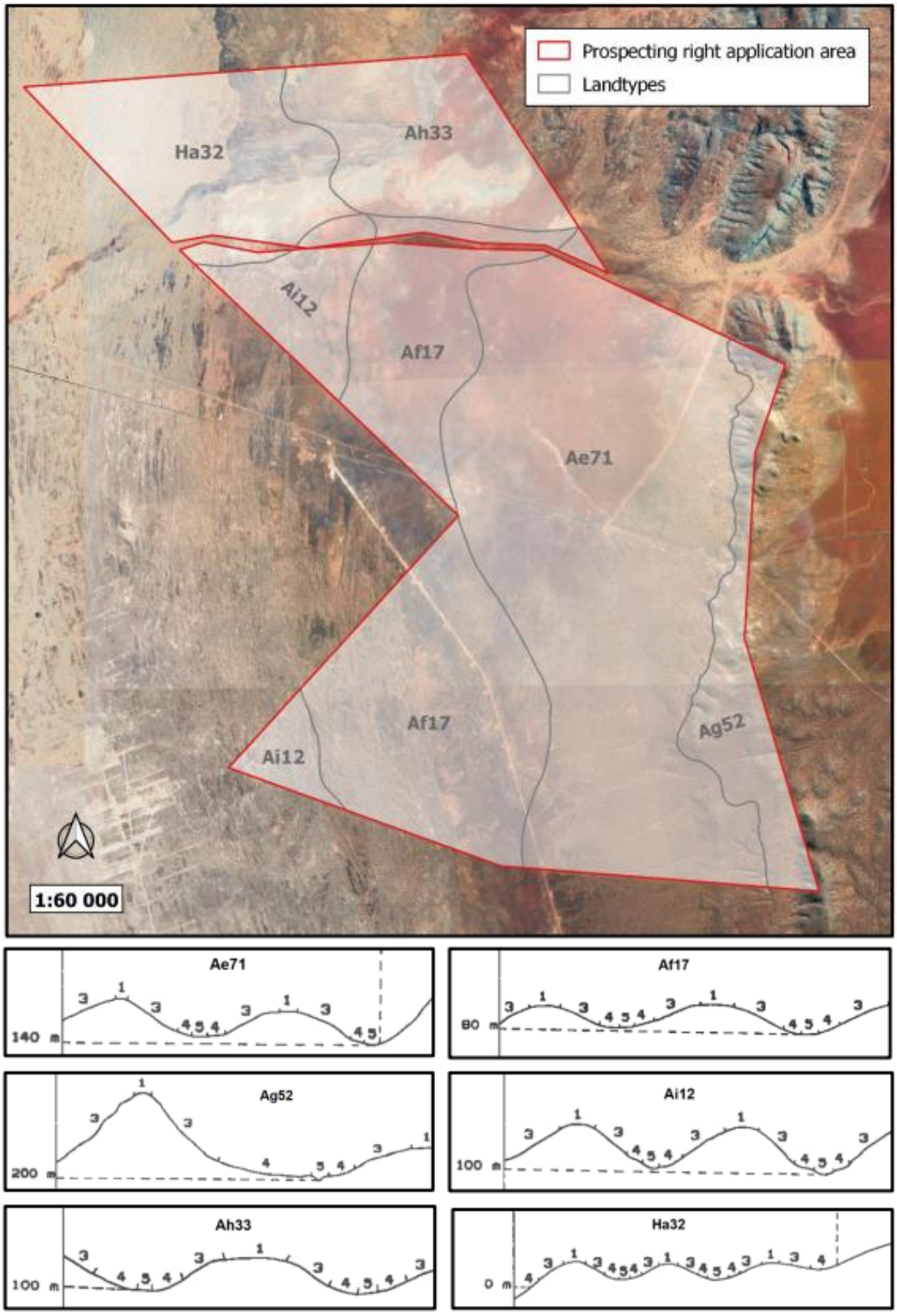


Figure 14. The distribution of land types at the study site. (Map taken out of the Ecological study by Dr. B Milne).

- ***LAND CAPABILITY AND LAND USE:***

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area land capability and land use was described and included in this report as part of the ecological study. (Appendix 4)

The major land uses in the area are mining and agriculture. The land capability of the study site is non-arable with variable potential grazing land, i.e., moderate (north-western corner), low (most of the remaining parts) and very low (hills in the east). The grazing capacity is 60 - 72 ha/LSU, with the agricultural region being demarcated for sheep farming.

Land Use before Prospecting
Currently, the study area is used as natural pastures for livestock grazing.

Evidence of Disturbance
Apart from the proposed prospecting activities, the Kannikwa Vlakte Wind Farm Project was granted on the Farm Kannikwa Vlakte 157, and the Eskom's Gromis-Oranjemund Transmission Power Line servitude runs through the study area (Figure 15). Furthermore, the regional route R382 as well as the Kleinsee- and Lekkersing public gravel roads cut through the study area. An old rail route, which has been left abandoned for decades runs in between the property boundaries in the north and has therefore been excluded from the application area.

Existing Structures
Existing infrastructure includes a landing strip and numerous farm tracks (Figure 15). Ample evidence of historic diggings, for road construction and diamonds, are also present, along with old buildings and ruins. Besides the alluvial diamond deposits, other minerals known to occur here include Kieselguhr and Dimension Stone (quartzite).

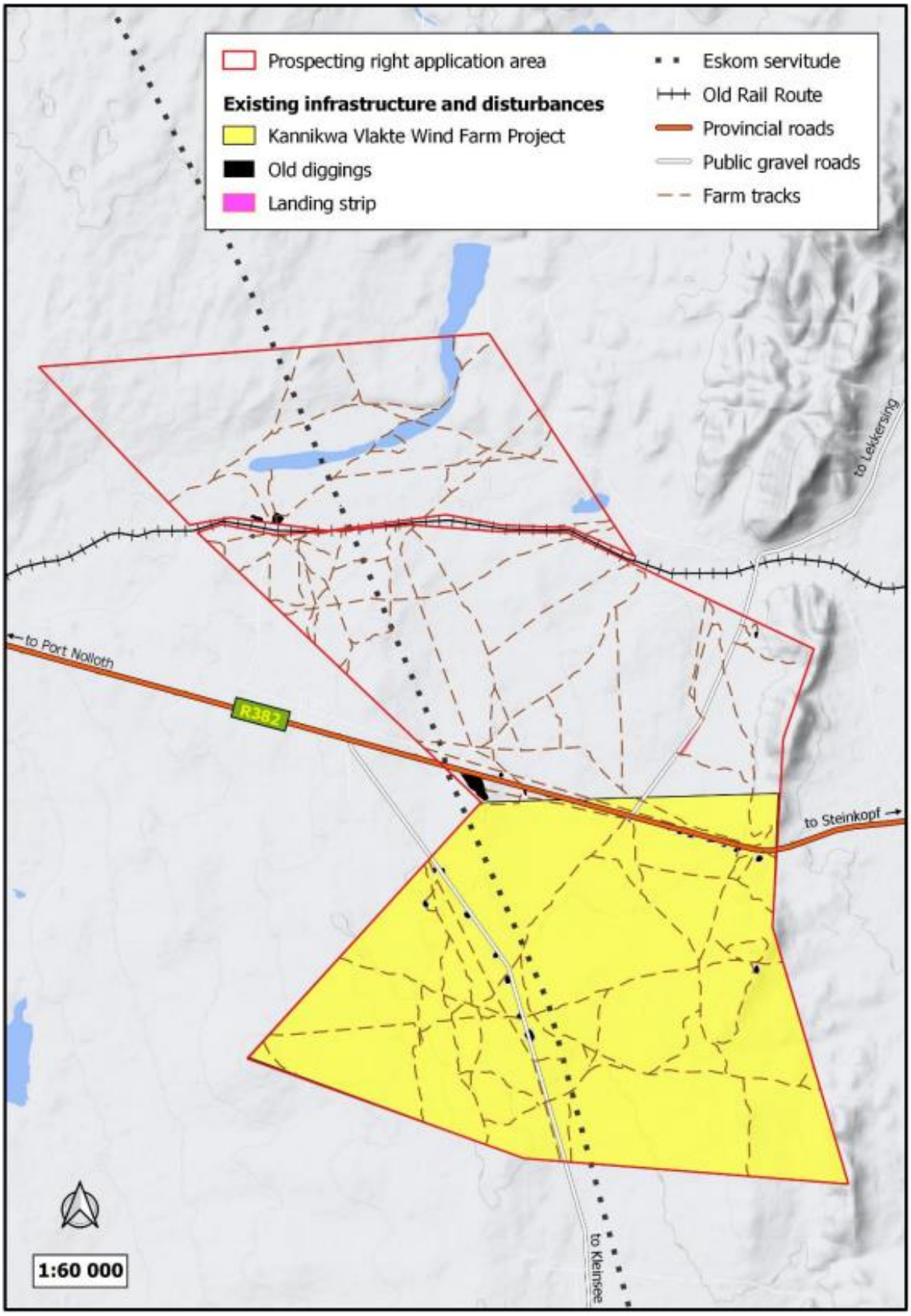


Figure 15. Evidence of existing infrastructure and past disturbances in the study area

- ***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 prospecting area, and to determine the possible impact of prospecting 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. (Appendix 4).

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by any means hunt, kill, poison, capture, disturb, or injure any protected (Schedule 2) or specially protected (Schedule 1) wild animals. Furthermore, Section 12 (1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner. According to the act "wild animal" means live vertebrate or invertebrate animal, and the egg or spawn of such animal. Landscape features on Kannikwa provide habitat opportunities to faunal communities and those likely to be found on site are discussed in their respective faunal groups.

Mammals

As many as 50 terrestrial mammals and eight bat species have been recorded in the region, of which eight are listed either in the IUCN or the Mammal Red List of South Africa, Lesotho and Swaziland. Virtually all mammals of the study area are protected; either according to Schedule 1, 2 or 3 of NCNCA .

Geoffroy's horseshoe Bat, Honey Badger, Striped Polecat, Aardwolf and African Wild Cat have a high probability to occur across the site based on their wide habitat tolerance. Similarly, Cape Fox and Bat-eared Fox have a high probability to occur on most of the habitats but are not expected on the hills based on their affinity for open arid habitats or plains. Aardvark and Grant's Golden Mole are expected to occur in the sandy habitats, while Littledale's Whistling Rat is expected in the dunes and dry riverbed. Leopard is primarily expected to be found on the hills but may perhaps very seldomly wander across the remaining habitats. Grey Rhebok is not expected on site but may be found along the hills.

The remaining protected bat species and Stone dormouse are not expected on site. The Angolan Wing-gland Bat prefers riverine habitat, while the African Straw-coloured Fruit-bat requires trees. The Stone Dormouse is restricted to rocky areas along escarpments.

Problem animals (Schedule 4) with a high likelihood to occur on site include Black-backed Jackal, and Caracal.

Reptiles

The Kannikwa prospecting area lies within the distribution range of at least 67 reptile species. Two red listed species occurs in the area. Cordylus macropholis (Large-scaled Girdled Lizard) is listed as Near Threatened and experiences a continued decline in area, extent and habitat quality due to coastal development and mining. It prefers the succulent Euphorbia caput-medusae as shelter, which was common on site, especially in the sandy habitats. Therefore, this Girdled Lizard has a high likelihood to occur on site. Homopus signatus (Speckled Dwarf Tortoise) is listed as Vulnerable. Its population has decreased with 30% over the last 75 years due to anthropogenic land transformation. They prefer rocky terrain and Heuweltjieveld. They are therefore expected to occur in the dwarf shrubland on shallow soil, as well as on the hills.

Most of the remainder reptiles of the study area are protected either according to Schedule 1 or 2 of NCNCA. Specially protected species include Bradypodion occidentale (Western Dwarf Chameleon), Chamaeleo namaquensis (Namaqua Chameleon), Karusasaurus polyzonus (Southern Karusa Lizard), Namazonurus lawrenci (Lawrence's Nama Lizard) and Ouroborus cataphractus (Armadillo Lizard).

The Western Dwarf Chameleon prefers undisturbed strandveld and Namaqua Chameleon inhabits gravel plains and sandy substrates. These species therefore are expected to occur in most of the habitats on site, especially the sandy habitats and shallow soil dwarf shrublands. The Southern Karusa Lizard, Lawrence's Nama Lizard and Armadillo Lizard are all rock-dwelling species and will most likely only be restricted to the hills.

During the field survey, Bitis arietans schneideri (Namaqua Dwarf Adder), Meroles ctenodactylus (Giant Desert Lizard) and Meroles suborbitalis (Spotted Desert Lizard) were encountered in the sandy shrubland habitats. Spotted Barking Geckos were also vocal along the sandy substrates.

Amphibians

Five amphibian species are known from the region, of which one is listed and three are endemic. The Desert Rain Frog (Breviceps macrops) is listed as Near Threatened (IUCN) and Vulnerable (SA Frog Atlas), while Vandijkophrynus robinsoni (Paradise Toad), Breviceps namaquensis (Namaqua Rain Frog), and Cacosternum namaquense (Namaqua Caco)

are regional endemics. All the frog species from the study region are protected according to Schedule 2 of the NCNCA.

The Rain frogs are terrestrial species independent of waterbodies. The Desert Rain Frog normally burrows into sand dunes vegetated with low, succulent shrubs during the day and emerges at night to feed. It is most active during foggy nights. It is a terrestrial breeder, presumably laying a batch of eggs in a chamber below the surface on vegetated dunes. The Namaqua Rain Frog is also a fossorial species that lives in scrub-covered sandy areas. It breeds by direct development and is not associated with water. The Namaqua Caco and Paradise Toad are mainly associated with rocky outcrops where they shelter under stones during the dry season. They breed during the rainy season in various small waterbodies.

Avifauna

Kannikwa does not fall within or near (< 80km) any of the Important Bird Areas (IBA) defined by Birdlife South Africa. A total number of 171 bird species have been recorded from the study area, of which 17 are listed either according to the IUCN or the SA Red Data Book of Birds. Furthermore, all birds are protected either according to Schedule 1, 2 or 3 of NCNCA.

The hills in the east, sandy substrates, succulents and shrubland vegetation provide ample micro-habitats to several bird species on Kannikwa. Greater Kestrel was observed breeding along the Eskom powerlines and using the surrounding shrubland as hunting grounds. Other bird species of conservation concern expected to occur in the earmarked areas include Black Harrier and Burchell's Courser. Verreaux's Eagle, known from the region, is primarily expected to breed in the hills, but could use the rest of the site as hunting grounds.

Most of the remaining protected birds of prey are also expected to traverse the site, but none of the wetland or marine birds are expected to occur here.

Fish

In addition to those regulations in the NCNCA pertaining to wild animals, Section 32 and 33 of the NCNCA states that no person may, without a permit angle and not immediately release, catch, import, export, transport, keep, possess, breed, or trade in a specimen of a specially protected or protected fish. No fish species are expected to be found in the Kamma River.

Invertebrates

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

Eight invertebrate species of the Northern Cape appear on the IUCN Red Data list of threatened species and are listed. Of these, the distribution range of Brinckiella mauerbergerorum (Mauerberger's Winter Katydid) overlaps with that of the study area. It is listed as Vulnerable and currently known from only ten locations. The area and extent of its habitat are estimated to be in decline because of habitat destruction by livestock grazing. It is usually found on succulent shrubs.

Those species that are specially protected according to Schedule 1 of the NCNCA include all Velvet worms as well as some baboon spider species, Stag Beetles and the Flightless Dung Beetle. None of these taxa are known to occur in the study region.

All Rock- Creeping- and Burrowing Scorpions are protected according to Schedule 2 of the NCNCA, along with several beetles, butterflies and moths. Of these, the Sand Burrowing Scorpion, Opistophthalmus ammopus, Brush-footed Butterflies, Vanessa cardui (Painted lady) and several Gossamer-winged Butterflies, i.e., Chrysoritis trimeni (Diamond opal), Aloeides nollothi (Port Nolloth russet), Leptomyrina lara (Cape black-eye), Trimenia macmasteri mijburghi (Karoo silver-spotted copper) and Cacyreus dicksoni (Karoo geranium bronze) occur in the study area.

One major habitat delimits possible invertebrate communities in the study area, i.e., vegetation classified as Karoo (Picker et al. 2004). This habitat represents unique species assemblages, with an above-average representation of beetles, grasshoppers, flies, wasps, and lacewings. The protected Katydid, butterflies and scorpions discussed above are expected to be associated with this habitat. The snail, Trigonephrus sp. was especially abundant on the sandy substrates, while Blister Beetles, Longleg Tokkies, Frantic Surface Beetles and Tawny Balbyter Sugar Ant were also observed.

- **Vegetation (Flora):**

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area natural flora was described and included in this report as part of the ecological study. (Appendix 4).

Broad-scale vegetation patterns

Kannikwa falls within the Succulent Karoo Biome (Mucina and Rutherford 2006). According to the vegetation map of Mucina and Rutherford (2012), the site is represented by six broad-scale vegetation units, i.e. Richtersveld Coastal Duneveld, Richtersveld Sandy Coastal Scorpionstailveld, Lekkersing Succulent Shrubland, Southern Richtersveld Yellow Duneveld, Namaqualand Strandveld, and Southern Richtersveld Inselberg Shrubland (Figure 16).

Richtersveld Coastal Duneveld is restricted to a broad belt of 1 to 12 km along the Atlantic Ocean coast in the Northern Cape. It stretches from a point between Boegoe Twins and Alexander Bay to about halfway between Port Nolloth and Kleinzee. It lies at altitudes between 0 and 200 m and is found on wind-blown white sands of coastal origin overlying rocks from the Holgate and Grootderm Formations (Gariep Supergroup). Around Port Nolloth and the Holgate River mouth active dune fields are prominent. Extreme wind speeds and sand blasting occur from the south. The terrain is generally flat with some large, gently rolling hills. Relatively homogenous vegetation covers stable sand sheets where Stoeberia utilis typically grows on dune crests and S. beetzii on stabilised sand sheets, while the pioneers Lampranthus hoerleinianus and Cladoraphis cyperoides settle in habitats created by recent sand deflation. This unit is classified as least threatened and it is estimated that about 10 % of it has been transformed, mainly by diamond mining. None is currently being conserved within a statutory conservation area. Namaqualand endemics include Stoeberia beetzi and Arctotis scullyi, while the Richtersveld endemic Amphibolia succulenta also occur in this unit.

Richtersveld Sandy Coastal Scorpionstailveld is restricted to the Northern Cape along a fragmented band running parallel to the coast, 8 to 28 km inland, from the southwestern corner of the Annisvlakte (north), to 30km south of Holgat River. It also occurs between Alexander Bay and Jakkalsputs. Altitudes range between 100 and 400 m. The terrain is flat and comprise intense biological soil surface crusts. Sandy loam soils are dominant, partly covered by yellow and red wind-blown sand. The vegetation is dominated by Brownanthus pseudoschlichtianus, intermixed with other common species like Stoeberia beetzii, Othonna

cylindrica, Lebeckia multiflora, Cephalophyllum ebracteatum and Phyllobolus decurvatus. The unit is classified as least threatened with very little transformation, and none being protected in statutory conservation areas. Namaqualand endemics include Phyllobolus decurvatus, Stoeberia beetzi and Mesembryanthemum pellitum, while Gariep endemics include Eberlanzia ebracteata and Brownanthus pseudoschlichtianus.

Lekkersing Succulent Shrubland is found in the Northern Cape, along a longitudinal band in the Southwestern Richtersveld. It occurs in the lowlands west and southwest of the central mountain ridge of the Richtersveld, with the core area stretching for 70km from near the Goariep Mountain in the north to just east of Port Nolloth in the south. It lies at altitudes between 150 and 550 m. The terrain is characterised by a mosaic of hills, flat or slightly rolling plans, with embedded quartz fields and ridges, some sand sheets and dunes, rocky gorges, and some mountains. Most of the area is hilly with shallow loam or sand cover and gravel above bedrock. The vegetation occurs as leaf-succulent dwarf shrubland. This unit is classified as least threatened, but in some places the vegetation is highly degraded by overgrazing, especially around Lekkersing. None of the unit is currently being conserved in any statutory conservation areas, but the protection of the quartz fields near Vlakmyn, as well as the Quartzitic rocks south of Lekkersing, including Karachabpoort, is recommended.

Southern Richtersveld Yellow Duneveld is restricted to the Richtersveld region in the Northern Cape where it forms a strip running parallel to the coastline (5 to 12 km inland), from the Holgat River in the north to east of Port Nolloth in the south. A small, isolated patch also occurs east of Vyftienmyl se Berge. Altitudes range from 50 to 300 m. It is associated with flat to undulating sand shields, but also dunes forming flat whale-backs. Vegetation grows on yellow wind-blown sands of coastal origin, with dune tops being covered with Stoeberia utilis, while interdune valleys are dominated by Brownanthus pseudoschlichtianus, B. arenosus, Cheiridopsis robusta and Cephalophyllum ebracteatum. The unit is classified as least threatened and it is slightly transformed by mining, without any statutory protection.

Namaqualand Strandveld is found in the Northern and Western Cape from Gemsbokvlei to Donkins Bay. Most of it is situated deep inland (40 km) but approaches the coast near the river mouths of the Buffels-Swartlintjies-, Spoeg- Bitter- and Groen Rivers. Altitudes range between 20 and 380 m. The terrain is flat to slightly undulating coastal peneplain and soils are quaternary sand (stabilised aeolian, deep, red, stable dunes and deep sand) overlying marine sediments and granite gneisses. The

vegetation is presented as species-rich low shrubland, dominated by many succulent and non-succulent shrubs. It is classified as least threatened, but 10% has already been transformed and major threats include the coastal mining for heavy metals in the Brand-se-Baai area. It is also subject to extensive grazing. None of the unit is statutorily conserved, but small private reserves (Bojaansklip, Donkins Bay, Doorspring, Molyneux and Zeven Puts) protect some of its vegetation.

Southern Richtersveld Inselberg Shrubland is restricted to inselbergs in the Southern Richtersveld of the Northern Cape, scattered across the plains between Anenous Pass and Port Nolloth and includes Klaarkop, Kabies se Berg, Rooidam se Koppe, Steenbok se Berge, and Beesvlei se Berg. It however excludes Vyftienmyl se Berge. Altitudes range from 100 to 600 m. Each inselberg is unique in terms of size, altitude, steepness, rockiness, and spatial aggregation, but smaller inselbergs are more arid than higher ones. They are associated with shallow loamy sand over granites, gneiss, and schist of the Gladkop and Hoogoor Suites. The lower parts are covered by sparse chamaephyte vegetation, dominated by Zygophyllum prismatocarpum, while on higher altitudes dense vegetation of dwarf leaf-succulents and lichens occur. The unit is classified as least threatened, and none is statutorily conserved. The inselbergs house many endemics (e.g., Euphorbia ephedroides, Namaquanthus vanheerdei, Polymita steenbokensis, Tylecodon cordiformis and Crassula alstonii) in need of pro tection status, but besides small stock grazing there is no specific threat.

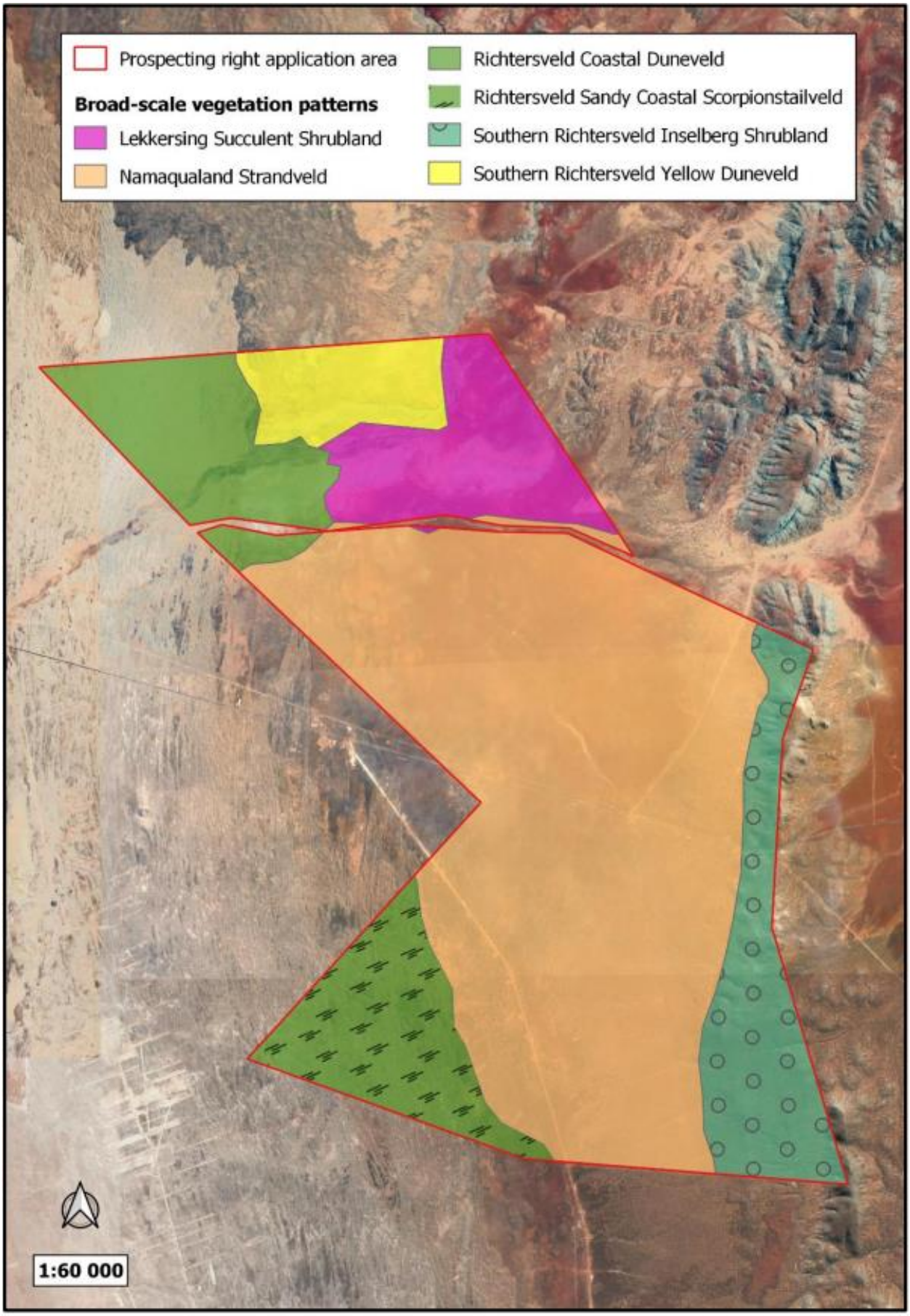


Figure 16. The broad-scale vegetation units (Mucina and Rutherford 2012) present in the study area.

Fine-scale vegetation patterns

Plant communities in the study area are delineated according to plant species correspondences and changes in soil structure. They can be divided into five distinct units (Figure 17), which are described below. These descriptions include unique characteristics and the dominant species found in each unit.

i) Stoeberia beetzii – Roepera morgsana low shrubland on deep red sand

This community covers the northern central parts of the study area (Figure 17). The vegetation is presented as low shrubland, defined by a sparse succulent shrub layer, intermixed with annual succulents, herbs, bulbs and a weakly developed grass layer. Deep, red, consolidated sand constitute at least 20% of the ground cover.

Stoeberia beetzii and Roepera morgsana dominated the shrub layer, but Asparagus capensis and Euphorbia mauritanica were also abundant. Common species included Roepera cordifolia, Cheiridopsis denticulata, Mesembryanthemum pseudoschlichtianum, Pteronia glabrata, Osteospermum oppositifolium, Crassothonna sedifolia, and Salsola sp., but other species also present here included Stoeberia frutescens, Pelargonium crithmifolium, Ruschia viridifolia, Atriplex vestita, A. lindleyi, Aizoon sarcophyllum, Lycium tetrandrum, L. cinereum, Jordaaniella cuprea, Tylecodon wallichii, Pentzia incana, P. quinquefida, Cotyledon orbiculata, Euphorbia rhombifolia, Euphorbia dregeana, Cephalophyllum inaequale, Quaqua parviflora, Nolletia gariepina, Calobota sericea and Didelta carnosa.

Annual and biennial succulents were dominated by Mesembryanthemum pellitum, with M. hypertrophicum, M. articulatum and M. barklyi also being common. Herbs included Wahlenbergia asparagoides, Manulea altissima, Dimorphotheca sinuata, Arctotis fastuosa, Lyperia tristis and Grielum grandiflorum, while the bulb species visible during the survey included Ornithoglossum undulatum and Gethyllis namaquensis. The grass layer consisted of Schismus schismoides, Ehrharta pusilla, Stipagrostis ciliata, Cladoraphis spinosa and C.cyperoids.

ii) Mesembryanthemum dinteri – Eberlanzia ebracteata dwarf shrubland on shallow soil

This community covers the south-eastern parts of the study area, with a small patch in the north-west (Figure 17). The vegetation is defined by dwarf shrubland growing on shallow, rocky soils, with Heuweltjies scattered across the unit and a conspicuous presence of lichens and biological soil crusts.

Most of the vegetation on the Heuweltjies were dormant and dried out during the time of the survey, but dominating perennials included Stoeberia beetzii, Euphorbia ephedroides and Asparagus graniticus. The surrounding matrix was dominated by Mesembryanthemum dinteri and Eberlanzia ebracteata, but

Euphorbia rhombifolia, Jordaaniella cuprea, Crassula muscosa, Drosanthemum tardum, Cheiridopsis robusta and Amphibolia succulenta were also common. Other species found here include Tylecodon reticulatus, Monsonia ciliata, Pelargonium crithmifolium, Asparagus graniticus, Mesembryanthemum pseudoschlichtianum, M. pellitum, M. delum Euphorbia mauritanica, E. caput-medusae, E. dregeana Ruschia viridifolia, R. leucosperma, Drosanthemum luederitzii and Crassothonna sedifolia. The grass Schismus schismoides occurs sporadically.

iii) Euphorbia dregeana – Stoeberia beetzii shrubland on alluvium

This community lies within the ephemeral channels of the Kamma River in the north (Figure 17). The vegetation is presented as a shrubland growing on alluvium. Here, Euphorbia dregeana and Stoeberia beetzii dominated, but Enarganthe octonaria was also very common. Other species included Osteospermum oppositifolium, Lycium cinereum, Stoeberia frutescens, Roepera morgsana, Tetraena retrofracta, Jordaaniella cuprea, Mesembryanthemum pellitum, M. dinteri, Eberlanzia ebracteata, Senecio sarcoides, Atriplex vestita, A. lindleyi, A. nummularia, Aizoon sarcophyllum and Salsola spp. The grass Schismus schismoides was widespread at low densities.

iv) Pteronia glabrata– Eberlanzia ebracteata dwarf shrubland on white sand

This community covers two disjunct pockets in the northern parts of the study area (Figure 17). Here, the vegetation grows on white wind-blown sand and is presented as a sparse dwarf shrubland, dominated by Pteronia glabrata and Eberlanzia ebracteata. Apart from the dominant species, Eberlanzia ebracteata was also abundant. Other shrubs and succulents included Asparagus capensis, A graniticus, Pentzia quinquefida, Senecio aloides, Crassothonna sedifolia, Stoeberia beetzii, Amphibolia rupis-arcuatae, Tylecodon reticulatus,
Roepera cordifolia, Pelargonium crithmifolium, Mesembryanthemum hypertrophicum, M.dinteri, M. pellitum, Jordaaniella cuprea, Euphorbia ephedroides, E. rhombifolia, E. caputmedusae, Cheiridopsis denticulata and Salsola spp. The herbs Kewa salsoloides and Felicia namaquana as well as the bulb Gethyllis namaquensis were also recorded here. Grasses included Cladoraphis cyperoids and Stipagrostis ciliata.

v) Euphorbia mauritanica – Stoeberia frutescens shrubland on sand dunes

This community falls within the north-western and north-eastern corners of the study area, where it occurs on white to light-coloured sand dunes(Figure 17). The vegetation is presented as shrubland, defined by a sparse shrub layer, intermixed with herbs, bulbs and a weakly developed grass layer. Lichens were growing abundantly on shrubs.

Euphorbia mauritanica and Stoeberia frutescens were the dominant taller shrubs, and Pentzia quinquefida dominated the lower shrub layer. Other common shrubs included Roepera morgsana, Osteospermum oppositifolium,

Crassothonna sedifolia, Senecio aloides, Stoeberia beetzii, Asparagus capensis, Lycium tetrandrum, Tetraena retrofracta, Jordaaniella cuprea, Euphorbia ephedroides, E. caput-medusae, Pelargonium crithmifolium and Nolletia gariepina.

Grielum grandiflorum dominated the herb layer, but Lessertia diffusa, Wahlenbergia asparagoides and Felicia namaquana were also common. The bulb Gethyllis namaquensis occurred widespread, and the grasses Schismus schismoides, Stipagrostis ciliata and Cladoraphis cyperoids were abundant.

Population of sensitive, threatened, and protected plant species

The SANBI Red List provides information on the national conservation status of South Africa's indigenous plants, which are protected under the National Environmental: Biodiversity Act (Act No. 10 of 2004) (NEMBA), while the National Forests Act (No. 84 of 1998) (NFA) and the Northern Cape Nature Conservation Act (Act No. 9 of 2009) (NCNCA) restricts activities regarding sensitive plant species. Section 15 of the NFA prevents any person to cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister. Section 49 (1) and 50 (1) of the NCNCA states that no person may, without a permit pick, transport, possess, or trade in a specimen of a specially protected (Schedule 1) or protected (Schedule 2) plants. Furthermore, Section 51(2) states that no person may, without a permit, pick an indigenous plant (Schedule 3) in such manner that it constitutes large-scale harvesting.

Most species from the region are classified as least concern; a category which includes widespread and abundant taxa. However, a total of 19 species are red listed, of which two were recorded during the field survey and another three potentially occur in or near the areas earmarked for mining. Many of the remaining species may potentially occur on the hills in the east, but no mining activities are expected to take place here. In addition to these, specially protected species (Schedule 1) and protected species (Schedule 2) of the NCNCA known from the study region. These include Lessertia diffusa, Senecio albopunctatus, all Euphorbia spp., Pelargonium spp., Manulea spp., Nemesia spp., Aizoaceae (Mesembryanthemaceae), Amaryllidaceae, Apocynaceae, Asphodelaceae, Crassulaceae, and Iridaceae.

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

No species from the study area are protected in terms of the NFA.

Weeds and invader plant species

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

Indicators of bush encroachment

Bush encroacher species are controlled in terms of Regulation 16 of CARA; where land users of an area in which natural vegetation occurs and that contains communities of encroacher indicator plants are required to follow sound practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs. No declared indicators of bush encroachment in the Northern Cape, were recorded on site.

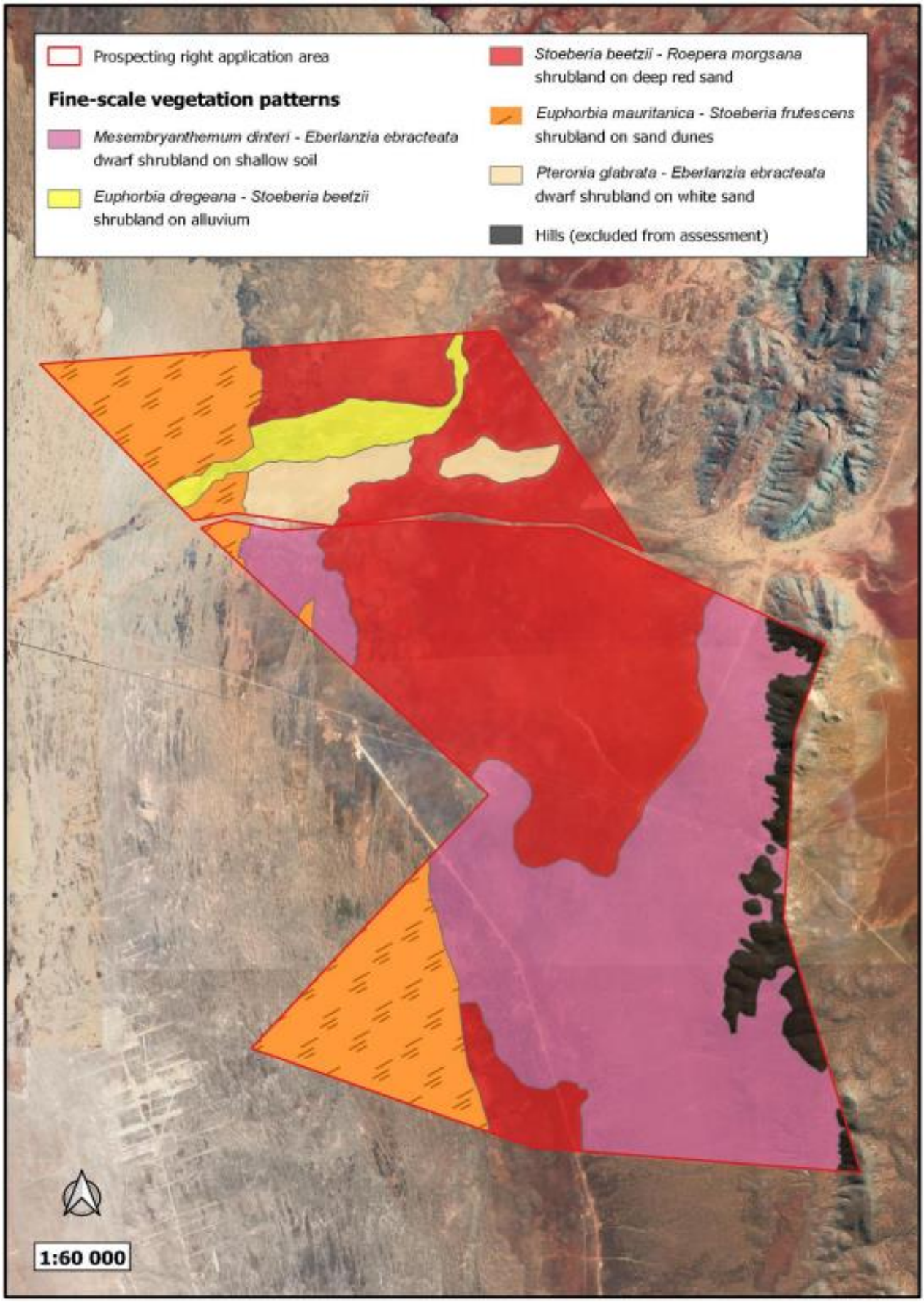


Figure 17. The distribution of fine-scale plant communities in the study area (Map taken out of the Ecological study by Dr. B Milne, 2020)

- ***SURFACE WATER***

Dr Elizabeth (Betsie) Milne has been appointed by Wadala Mining to provide an ecological study in order to highlight the ecological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the diversity and ecological status of the application area Surface water was described and included in this report as part of the ecological study. (Appendix 4).

The National Water Act (36 of 1998) (NWA) provides a framework to protect water resources.
According to this Act, a water resource includes a watercourse, surface water, estuary, or aquifer; whereas a water course includes:
a) a river or spring,
b) a natural channel in which water flows regularly or intermittently,
c) a wetland, lake or dam into which, or from which, water flows, and
d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse.
Any reference to a watercourse includes its bed and banks and a water resource does not only include the water within the system, but also the entire water cycle; i.e., evaporation, precipitation, the habitats and processes.

The purpose of this Act (Section 2) is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors - (g) protecting aquatic and associated ecosystems and their biological diversity and (h) reducing and preventing pollution and degradation of water resources. No activity may take place within a watercourse unless authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

The Kannikwa study area falls within the Coastal quaternary catchments F20B, F20C, F20D, F20E of the Lower Orange Water Management Area (Figure 18). These quaternary catchments have all been allocated a Present Ecological State (PES) of 'Largely Natural' (B) by Smook et al. (2002) and information regarding their mean annual rainfall, evaporation potential and runoff is provided in Table 4.

According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE), the study area falls within the Namaqualand Sandveld Bioregion, where about 1.9 % (17 797 ha) of the land area is covered by inland wetlands, including depressions, floodplains, seeps, and valley-bottom wetland types (Van Deventer et al. 2019). The spatial extent according to the present

ecological status per wetland type is depicted in Table 5. Basically, all floodplains and valley-bottom wetlands have been severely modified, but most of the seep wetlands are still in natural or nearnatural condition. Many of the depressional wetlands have been moderately (60 %) to severely (22 %) modified, but about 16 % are still in a largely natural condition.

Table 4. Catchment characteristics for the Coastal quaternary catchments in which the study area falls, as presented by Smook et al. (2002).

Quaternary catchment	Catchment Area (km^2)	Mean Annual Rainfall (mm)	Mean Annual Evaporation (mm)	Mean Annual Runoff (10^6 m^3)
F20B	514	91	2 100	0.18
F20C	613	80	2 100	0.13
F20D	455	71	2 100	0.06
F20E	435	92	2 100	0.15

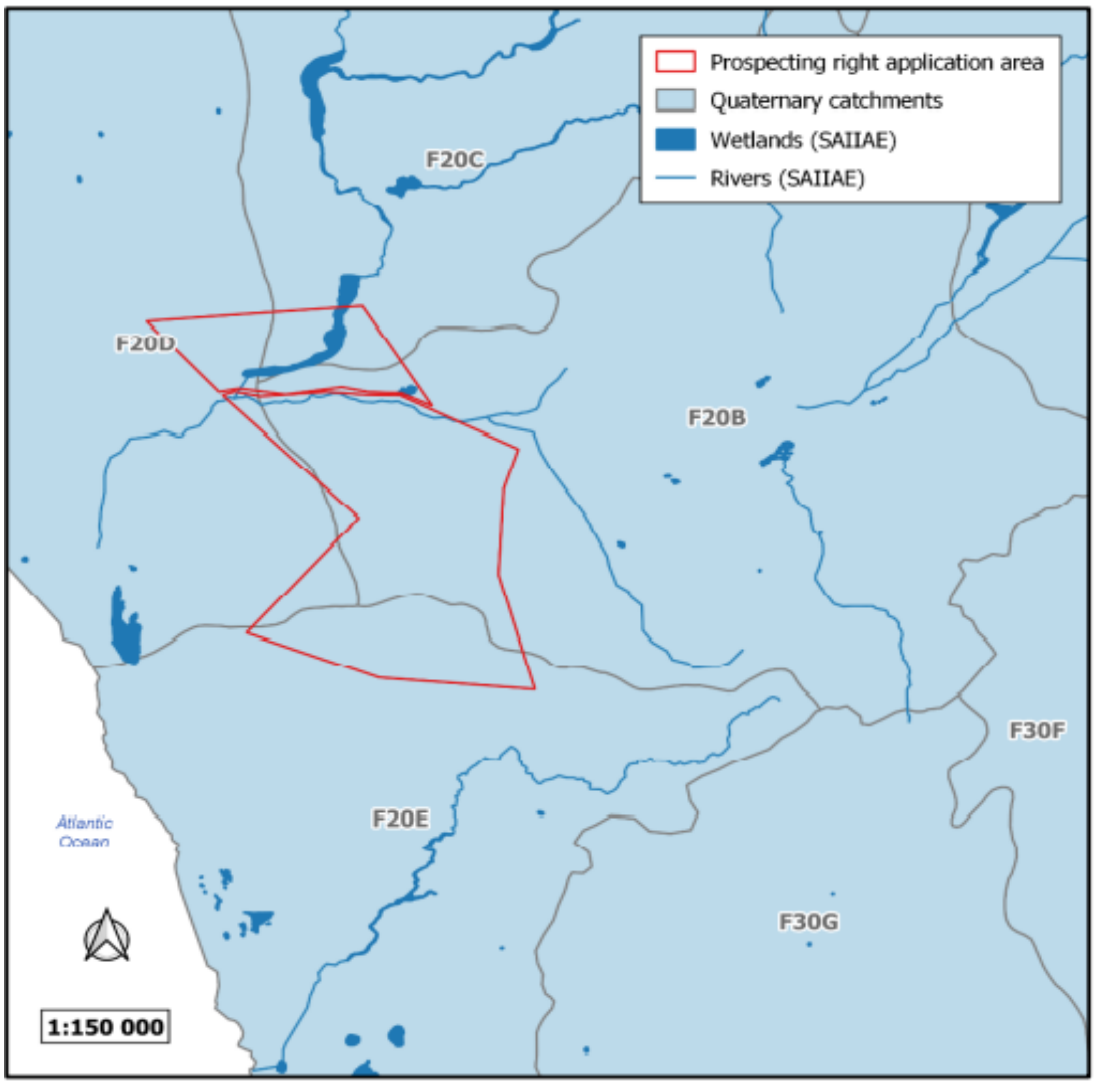


Figure 18. The locality of the proposed prospecting area in relation to the Coastal quaternary catchments of the Lower Orange Water Management Area.

Table 5. Percentage of inland wetland spatial extent according to the present ecological status per wetland type of the Namaqua Sandveld Bioregion.

Wetland type	Total Extent (%)	% Natural or near-natural (A/B)	% Moderately modified (C)	% Heavily to severely/critically modified (D/E/F)
Depression	82.8	16.9	60.7	22.4
Floodplains	4.1	-	-	100
Seeps	4.7	96.9	-	3.1
Valley-bottom	8.5	1.6	0.2	98.2

One depression occurs on Kannikwa, and two branches of the Kamma River flows through the property, along with several drainage lines (Figure 19). According to SAIIAE, the Kamma River is Largely Natural, Least Threatened and moderately- to well protected. SAIIAE has also classified the depression to be Largely Natural, but in reality, the entire depression has been subject to ploughing (Figure 19) and is therefore assumed to be severely modified. It has been classified as threatened by SAIIAE.

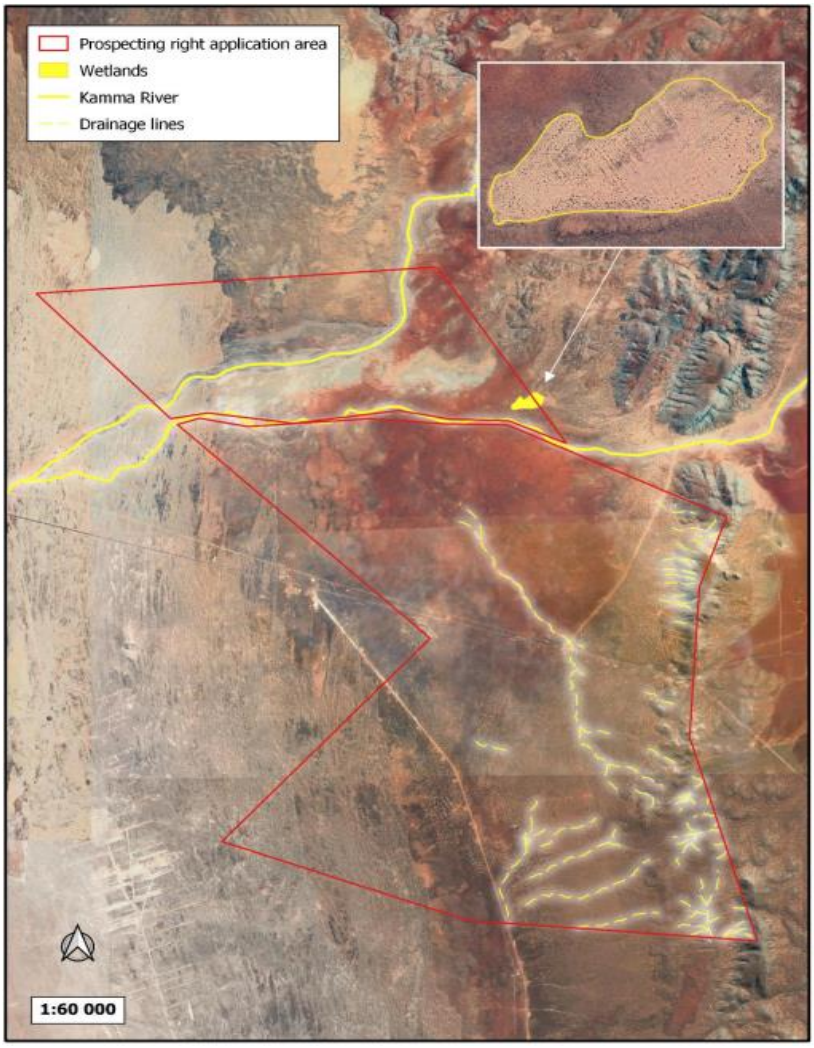


Figure 19. The location of SAIIAE wetlands, rivers and drainage lines on the proposed prospecting right area, with a closer look at the plough lines across the depression (insert).

- ***GROUND WATER:***

(1)
Joints and fractures often occur at contacts between different geological units, such as between metamorphic rocks of the Okiep Group (Mc) and the gniesses of the Little Namaqualand (MI) and Hoogoor (Mho) Suites respectively, and between the diamictite of the Dwyka Group (Mc). These contact zones can be utilized for groundwater development.

(2)
Groundwater can often be found in joints and fractures at the contracts of different layers within a geological unit, such as the contacts between the quartzite, conglomerate, arkose and schist of the Stinkfontein Formation (Nst), gneiss, quartzite and schist of the Okiep Group (Mc), tillite and occasional lenses of sandstone and shale of the Dwyka Group (C-Pd), and between the shale and subordinate sandstone of the Ecca Group(Pe)

(3)
Sand-and gravel-filled palaeo-channels on the costal flats can be used for groundwater development. As these features are covered with sand, exploration is needed to locate them

(4)
Weathered zones, especially when in the form of basins of weathering in crystalline rocks of the Okiep Group (Mc) and Little Namaqualand Suite (MI), can be targeted for generally limited groundwater development

(5)
Occasional shear zones have relatively good groundwater potential and yields in excess of 0,5l/s can be obtained in these features

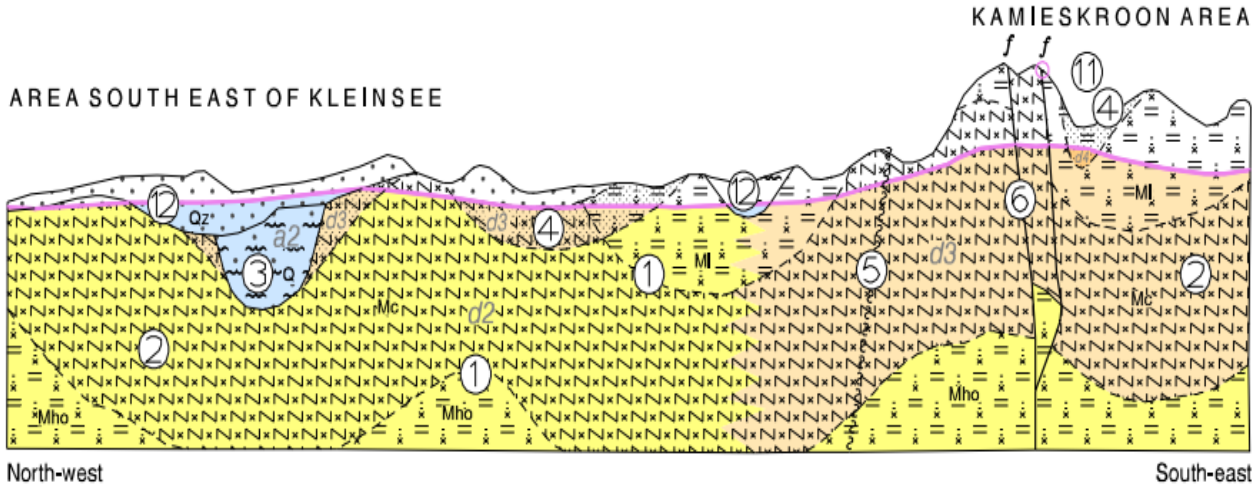


Figure 20. Ground-water zone

Ground-water zone:

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

- **Air Quality**

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

Existing Sources

The air background quality is very good due to low industrial activity and very low population density. Given the surrounding extent of semi-desert, dust generation is high under windy conditions (dust storm) however under normal conditions no extreme dust conditions are noted on site.

New source

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

Areas of impact

The wind is predominantly from the south (onshore). In winter the winds decrease considerably and blow more frequently from the north. Berg winds are a feature of the entire Benguela region and may occur throughout the year, but are more frequent in winter. The wind is hot and dry and usually blows from the east or north east., there is a potential for fall-out dust to impact on the surrounding farm properties, which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas

The dust is controlled by watering down the roadway used by these trucks while bulk sampling. 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 farming operations on both sides of the proposed prospecting 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 prospecting area and where necessary, protective equipment is used in certain areas where machinery is used.

(11) VISUAL ASPECTS:

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

(12) AREAS OF CULTURAL-HISTORICAL OR ARCHAEOLOGICAL INTEREST

Dr Edward Matenga has been appointed by Wadala Mining to provide an Heritage Impact Assessment study in order to highlight the heritage characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the heritage status of the application. (Appendix 5).

This heritage specialist report has been prepared in support of a prospecting right application on the Farms Kannikwa 157 and Kannikwa Vlakte 157 situated near Port Nolloth in the Ritchtersveld Local Municipality, Northern Cape.

An exploration permit is sought for diamonds expected to be found in gravel deposits on the farms.

The impact assessment is in fulfilment of Section 38(8) of the National Heritage Resources Act (No 25/1999) which requires screening for the possible occurrence of heritage resources that may be affected by the proposed activities. This procedure allows appropriate measures to be taken as mitigation.

The following is a summary of the findings of this study.

The Stone Age

The Namaqualand Karoo plains were occupied by hunters and foragers and later semi-nomadic herders who subsisted on stone tool technologies. Scatters of stone tools were encountered on the ridges on the Farm Kannikwa 156. The observations comprised mainly quartz flake waste with a few formal tools.

Burial grounds

No burial grounds were reported on the farm.

Footprint of the old railway line from Port Nolloth to Steinkopf

The landowner of Kannikwa 156 treasures a footprint of the old railway line from Port Nolloth to Steinkopf, of which a well-preserved section bisects the farm. It is a remnant earth embankment on which rusted railway track fastening system components such as rusted dog spikes are occasionally seen. Sites KAN01, KAN02 and KAN04 represent a western section of the track. Recognising the historical importance of the old track the landowner motivated for the exclusion of the old railway line footprint from the prospecting right. It is further recommended in this report that a servitude of 50 m be reserved on either side of the track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius.

Conclusion and recommendations

The old railway track will be preserved. A 50 m wide servitude will be reserved on either side of the old track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius. The prospecting application can be approved with a condition that the old railway track and settlement are protected.

The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Palaeontological

Prof Marion Bamford has been appointed by Wadala Mining to provide an Palaeontological Impact Assessment study in order to highlight the Palaeontological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the palaeontological status of the application. (Appendix 6).

A desktop Palaeontological Impact Assessment was requested for the Prospecting Right Application on the Farm Kannikwa 156 and Farm Kannikwa Vlakte 157 near Port Nolloth in Richtersveld Local Municipality, Northern Cape, Northern Cape Province.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the non-fossiliferous granites and gneisses of the Namaqualand area, indicated a having zero to insignificant palaeosensitivity on the SAHRIS map. The rest of the area is also indicated as having low (blue) palaeosensitivity and this applies to the fluvial sands and alluvium along the ephemeral watercourses and the Gordonia Formation sands. It is unlikely that any fossils would be found in the sands and alluvium because these are transported sediments but clasts of wood have been found on the nearby Farm Oubeep. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor / environmental officer/ other designated responsible person once excavations/drilling/trenching activities have commenced. As far as the palaeontology is concerned, the project should be authorised.

The SAHRIS palaeosensitivity map for Farms Kannikwa 156 and Kannikwa Vlakte 157 appears to be based on the 1: 1 000 000 geological map rather than the 1:250 000 and the West Coast Group strata are not distinguished

from the Quaternary Kalahari Group sediments. The low resolution map provided by Roberts et al. (2006; Fig 1) shows that the West Coast Group sediments extend inland roughly 20 km at Port Nolloth so we can assume that Kannikwa which is about 8-10km inland will be within the West Coast Group zone. However, the lower lying areas will be filled with sands and alluvium from upstream, probably Gordonia Formation and younger transported sediments. Since it is not known exactly which sediments are in the Kannikwa prospecting area, a Fossil Chance Find Protocol should be added.

Along the coast, especially in the small river channels, on Farm Oubeep which is southwest of the prospecting area, there are deposits of Cretaceous fossil woods that have been washed down the palaeo-rivers with the alluvial diamonds (Bamford and Corbett, 1994, 1995). The silicified woods are large sub-rounded pebbles and cobbles with chatter marks but have distinct woody striations.

The palaeontological sensitivity of the area under consideration is presented in Figure 21. The site for prospecting is in the Quaternary sands and alluvium, possibly sourced from the Gordonia Formation. Since these sands have been transported, they would not contain any fossils in primary context. They might have included fragments of more robust fossils such as bones or silicified woods from farther upstream. When and if the river flows the stones, bones and fragments would be tumbled and washed downstream so their occurrence would be very rare and unpredictable. The SAHRIS palaeo sensitivity map indicates that the area is of zero sensitivity (Figure 21) but should be moderate because fossils can be transported from farther inland.

The older granites of the Little Namaqualand Suite are of volcanic origin and would not preserve any fossils.

Figure 21. SAHRIS palaeosensitivity map for the site for the prospecting right application, Kannikwa 156 and Kannikwa Vlakte 157, shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

From the SAHRIS map above the area is indicated as low to zero sensitivity.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and of the incorrect type to contain fossils (Namaqua Suite) or are transported sands derived from a non-fossiliferous source. Since there is an extremely small chance that transported fossils may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the granites, gneiss, quartzites, sandstones and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils because the material is transported and friable, however, there could be pebbles and cobbles in the rivers channels that are transported and rounded pieces of fossil wood.

Recommendation

Based on the lack of any previously recorded fossils from the Kannika farms area, it is unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a very small chance that fossil woodss may occur in the palaeo-river beds and channels so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once drilling, trenching or excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be extremely low so the project should be authorised.

Chance Find Protocol

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

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

(13) *BROAD-SCALE ECOLOGICAL PROCESSES:*

The proposed prospecting site falls within critical biodiversity areas (Figure 22), as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuysen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape. The area along the Kamma River, including its catchment is classified as Critical Biodiversity Area One. The remaining sections in the north and south is classified as Critical Biodiversity Area Two. A new portion of the Richtersveld National Park (Protected Area) lines the border of the study site in the north (Figure 23).

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) recognises the watercourse and hills to be of Highest Biodiversity Importance (Figure 23), which constitute the highest risk for mining. Most of the remaining sections are of High Biodiversity Importance, with a small portion in the south-east with Moderate Biodiversity Importance. The Richtersveld National Park is legally protected and therefore Mining in this area is prohibited. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision making in the mining sector.

Furthermore, according to the National Web based Environmental Screening Tool the study area is considered to have sensitive environmental features (Figure 24). This tool is a geographically based web-enabled application which allows a proponent intending to apply for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity.

According to this the Kannikwa study area is of medium sensitivity based on the Plant Species Theme. This sensitivity is attributed to the fairly high number of specialised, sensitive and protected plant species found in the habitats on site. The medium sensitivity in the central parts of the site is based on the suitable habitat and known distribution of the invertebrates Brinckiella mauerbergerorum (Mauerberger's Winter Katydid) and Chrysoritis trimeni (Diamond opal). The high sensitivity in the northern- and southern sections of the site is based on the suitable habitat for Black Harrier and Verreaux's Eagle. The northern- and southern parts of the study site is further considered to be of very high

sensitivity based on the Aquatic Biodiversity Theme, attributed to the Kamma River as well as the freshwater ecosystem priority area quinary catchments. Finally, the Terrestrial Biodiversity Theme is also of very high sensitivity, as a direct function of the Northern Cape Critical Biodiversity Areas Map (discussed above).

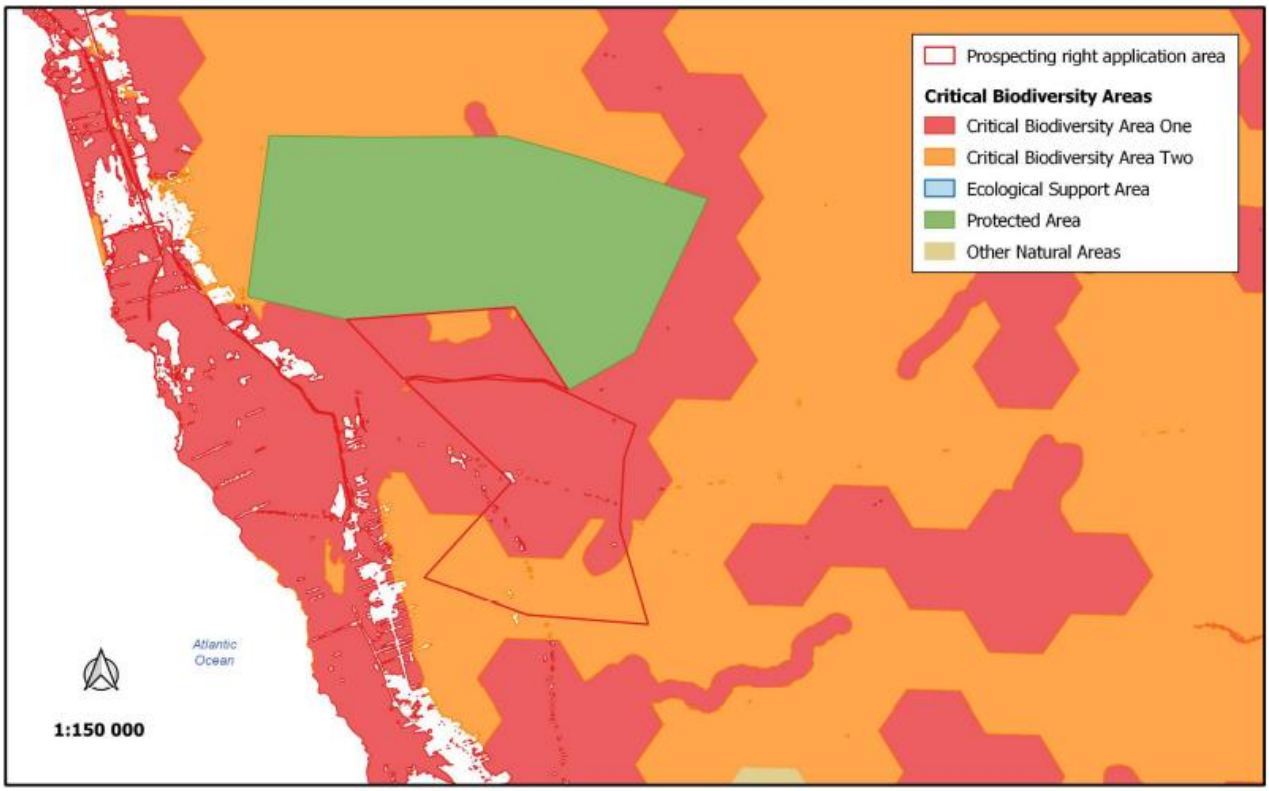


Figure 22. The study area in relation to the Northern Cape Critical Biodiversity Areas.

Figure 23. The study area in relation to the Mining and Biodiversity Guidelines.

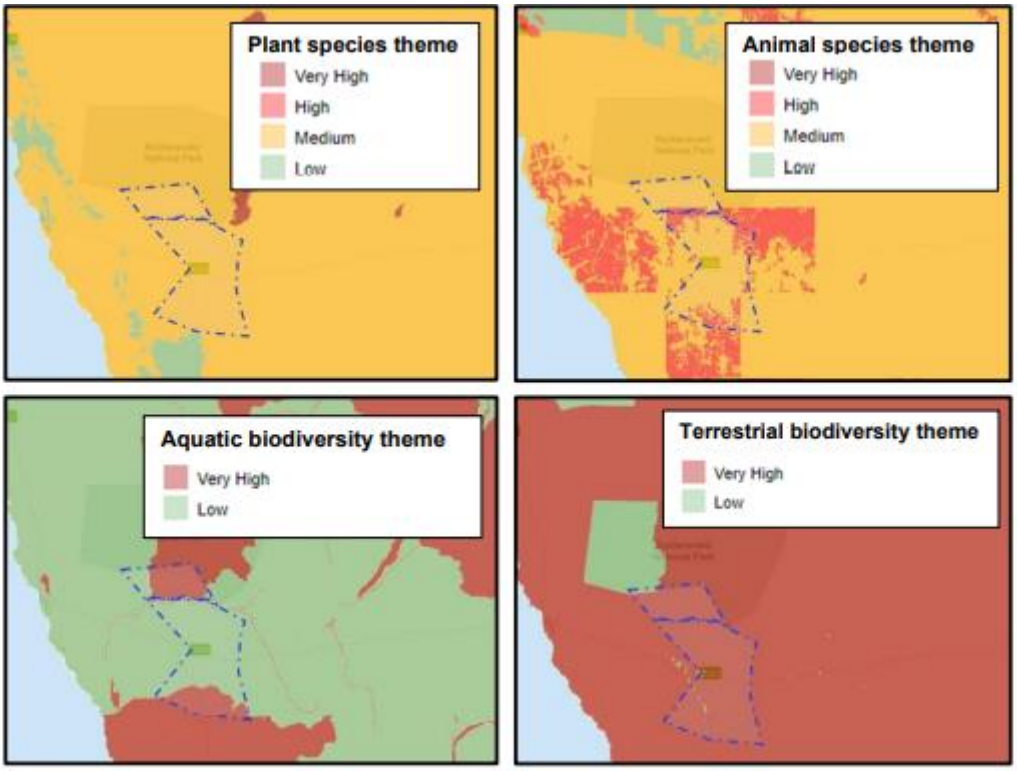


Figure 24. Environmental sensitivities in the study area, according to the National Web based Environmental Screening Tool.

According to the Environmental Management Framework and Strategic Environmental Management Plan for the Namakwa District Municipality (2011) the hills in the east fall within their Environmental Management Zones: A – Critical. This zone includes several environmentally sensitive features and development should be avoided. If the development is critical to the economic and social wellbeing of the local population, utmost care should be taken to avoid impacts and mitigate where possible.

The remainder of the site falls within Zone B – High. Several environmentally sensitive features are present, and development should be restricted. This rating is not very lenient in terms of development but does recognise that development cannot be excluded where compelling economic and social benefits will be derived for the local and regional population. All legislative requirements should be adhered to, and a fully inclusive consideration of the biophysical receptors should be undertaken. Development in these areas will also require a comprehensive public participation process with input from stakeholders and government organisations.

Finally, mining is one of the major sectors within the Namakwa District Municipalities, with current and historic activities already impacting the indigenous vegetation between Port Nolloth and the study area (Figure 25). These factors increase the proposed operation's cumulative impacts.

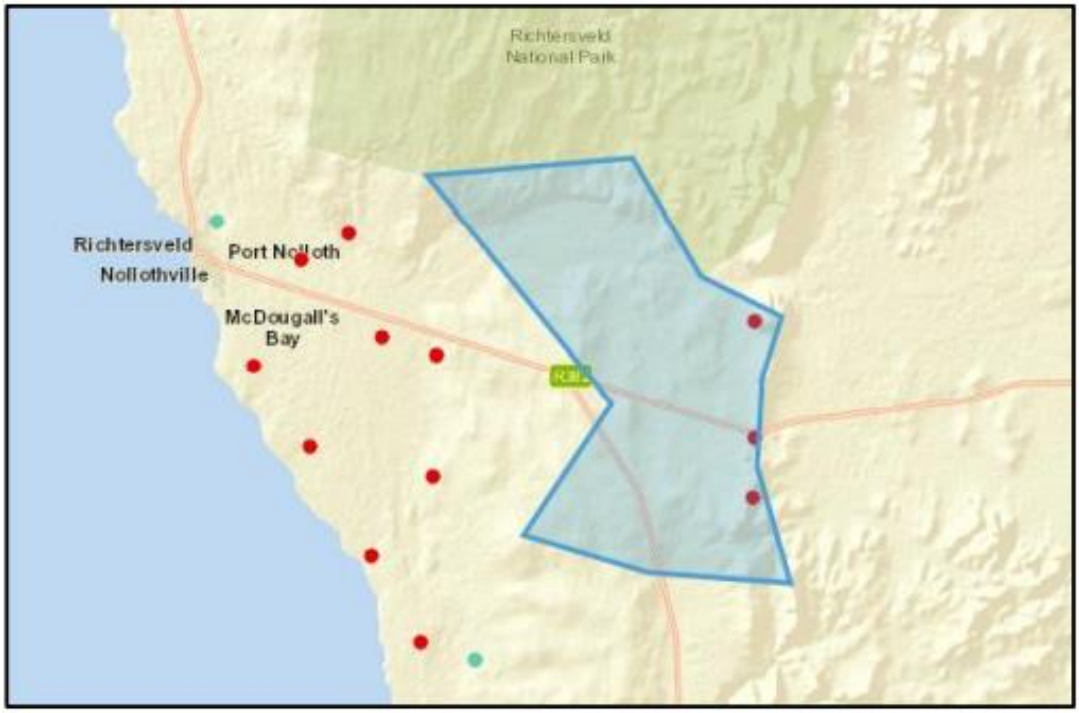


Figure 25. The extent of past and present mining near the study area.

Site sensitivity

The ecological sensitivity map for Kannikwa is illustrated in Figure 26. The Kamma River, drainage lines and the hills in the east are all considered to be of very high sensitivity. The Kamma River and drainage lines are highly sensitive due to their vital ecological and hydrological functionality and significance. All watercourses are unique habitats protected in terms of the National Water Act (Act No 36 of 1998). The hills in the east is expected to harbour a high number of very specialised, sensitive, protected endemic plants and provides potential habitat for protected bird-, reptile-, and frog species. These highly sensitive areas should be considered as no-go areas.

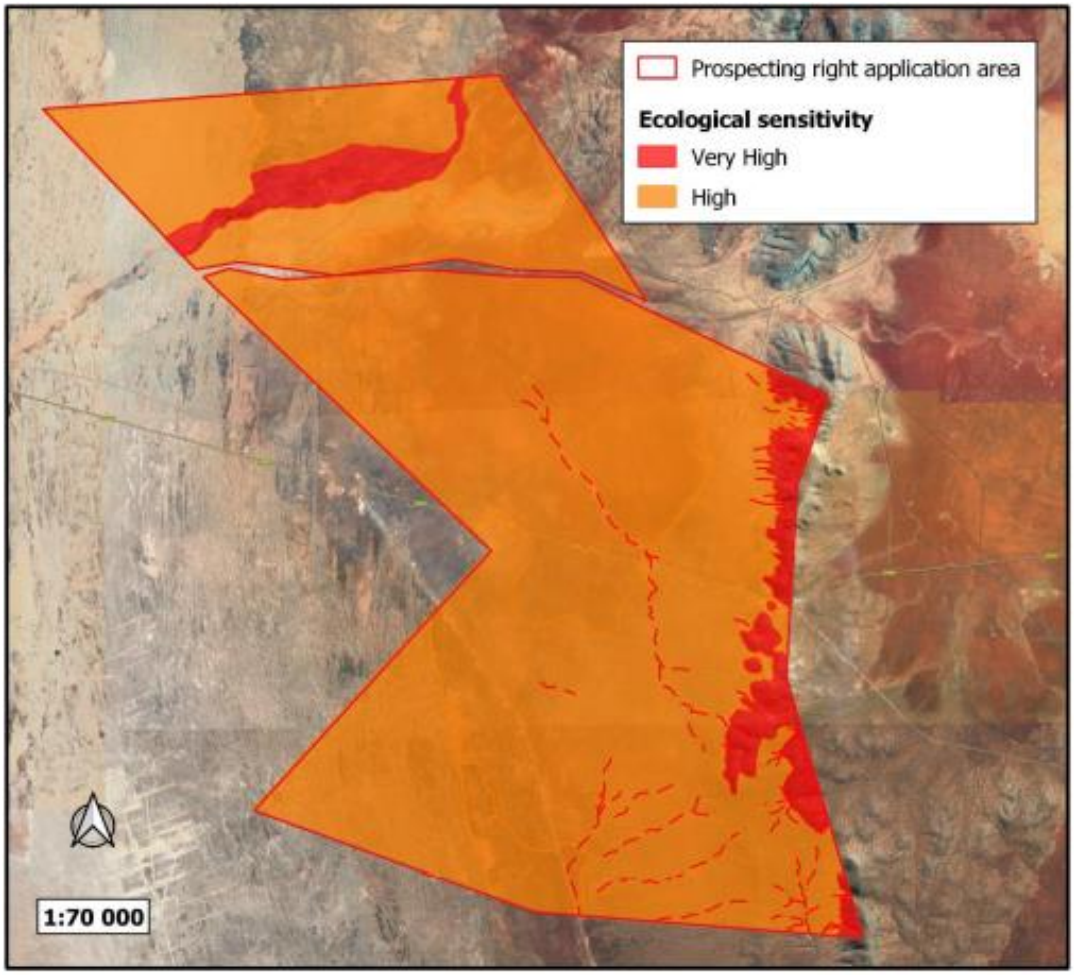


Figure 26. A sensitivity map for the Kannikwa prospecting area.

The remainder of the site is of high sensitivity. These areas also host several plant species of conservation concern and provide suitable habitat to faunal species of conservation concern. The sandy substrates are also highly susceptible to wind erosion. However, the Richtersveld National Park next to the site guarantees protection for similar habitat types. Therefore, these areas of high sensitivity are not regarded as no-go areas, but activities should proceed with caution as it may not be possible to mitigate all impacts appropriately.

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

Richtersveld Municipality is one of six Category B Local Municipalities which form part of the broader Namakwa District as per the Municipal Demarcation Act.

Richtersveld Municipality is an administrative area in the Namakwa District of the Northern Cape Province. The Richtersveld is a unique landscape surrounded by a variety of contrasts.

In Port Nolloth is the ocean, at Alexander Bay there is the Orange River, and at Lekkersing and Eksteensfontein there is underground water that is a little brackish. Rainfall is minimal and water is a scarce commodity, yet the vast plains, which are considered a special place by some, are still a very beautiful region with unique characteristics that attract thousands of tourists. The Richtersveld is a conservation area.

The main economic sectors are: mining, agriculture, fishing and tourism. The area includes a number of big rural areas, as well as the following towns: Port Nolloth, Alexanderbay, Sanddrift, Kuboes, Eksteenfontein and Lekkersing.

A distinct geographical feature of the Municipality is that it is located at the north-western most tip of the Northern Cape Province, South Africa and the African continent. The under mentioned illustration puts the geographic location of Richtersveld Municipality into perspective and also indicates the location in relation to the Namakwa District. The map below depicts the vastness of the Richtersveld and the towns it consist of.

RICHTERSVELD AT A GLANCE
DEMOGRAPHIC ANALYSIS

Richtersveld Municipality consists of 4 wards. The wards include the following towns & settlements.

Ward	Area
1	Kuboes, Eksteenfontein & Lekkersing
2	Alexanderbay, Beauvallon & Sanddrift
3	Sizamile and part of town, Nollothville
4	McDougallsbay, Parts of Nollothville and town including the central business section

Port Nolloth is the main economic centre of the Municipality and is also the town where the head office of the Richtersveld Municipality is situated. Richtersveld Municipality had a total population of 11982 in 2011. Similar to other rural municipalities, Richtersveld

Municipality has also experienced common challenges such as skew patterns of wealth distribution, relatively high levels of unemployment and crime.

The recent mine closure of Transhex Operations in Ward 2 has negatively impacted on the economic activities and income of people.

The total population is Richtersveld Municipality is 12487.

Table 6. shows that the population of Richtersveld has increased from 11982 persons in 2011 to 12 487 persons in 2016.

Percentage distribution of the population in Richtersveld by sex, 2016

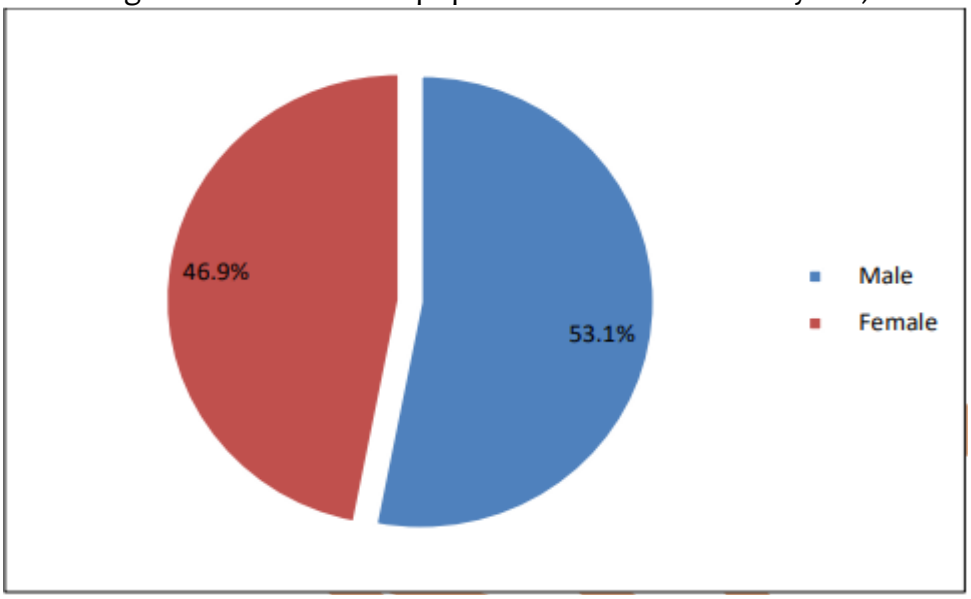


Figure 27. depicts a greater proportion of males than females in Richtersveld, at 53.1% and 46.9% respectively.

Population per town in Richtersveld

Town	Households	Town	Population
Kuboes	235	Kuboes	823
Eksteenfontein	125	Eksteenfontein	719
Lekkersing	118	Lekkersing	765
Sanddrift	260	Sanddrift	858
Alexanderbay	411	Alexanderbay	1760
Port Nolloth	3405	Port Nolloth	7562

Distribution of the population of Namakwa district by local municipality, 2016

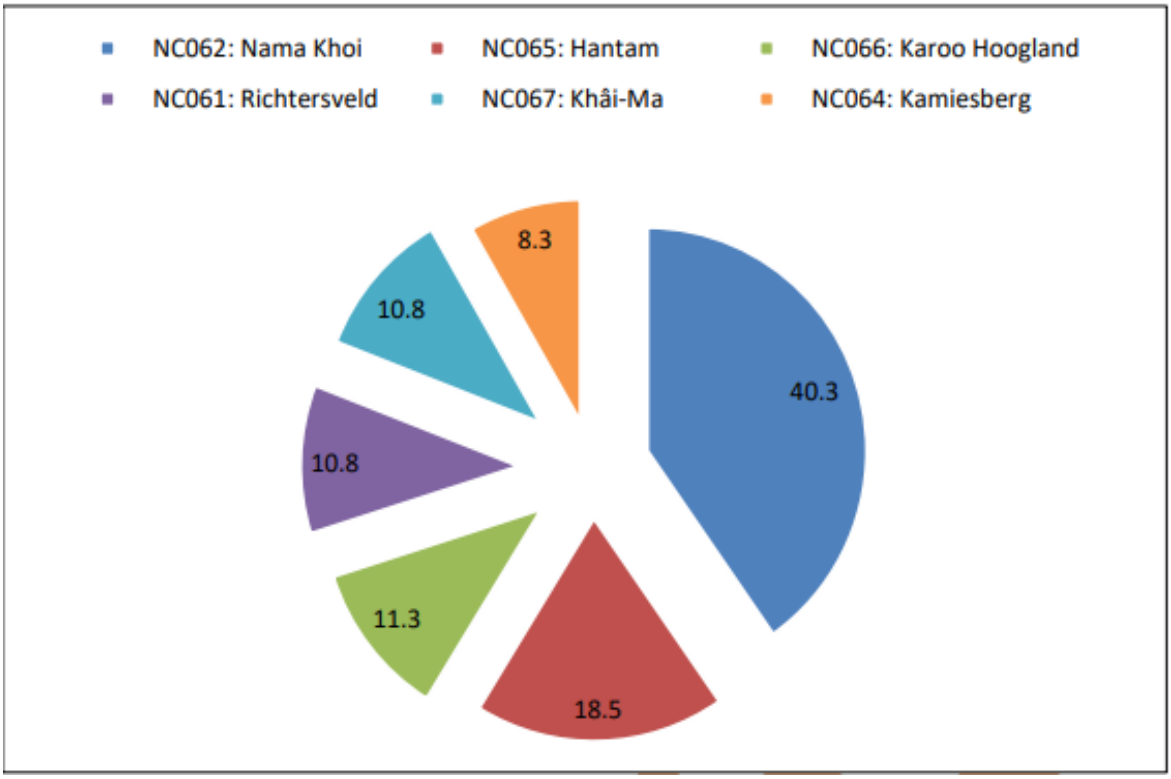


Figure 28. above indicates that Nama Khoi municipality had a 40.3% share of the total population in Namakwa district. This was followed by Hantam, Karoo Hoogland, Richtersveld, Khâi-Ma and Kamiesberg local municipalities with 18.5%, 11.3%, 10.8%, 10.8 and 8.3% respectively of the total district population.

Population by group type, 1996-2016

	1996	2001	2011	2016
Black African	1 000	1 117	1 568	1 173
Coloured	9 540	7 769	9 178	10 347
Indian or Asian	18	15	58	50
White	2 164	1 223	1 013	917
Other	-	-	165	-
Unspecified	98	-	-	-
Total	12 819	10 125	11 982	12 487

Table 7 summarizes the number of persons by population group from 1996 to 2016.
Percentage distribution of the population by group type, 2016

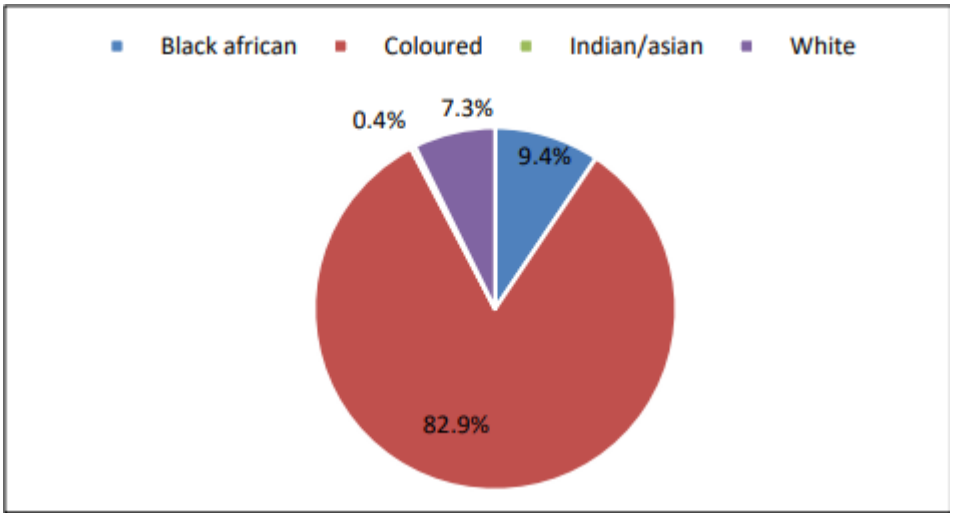


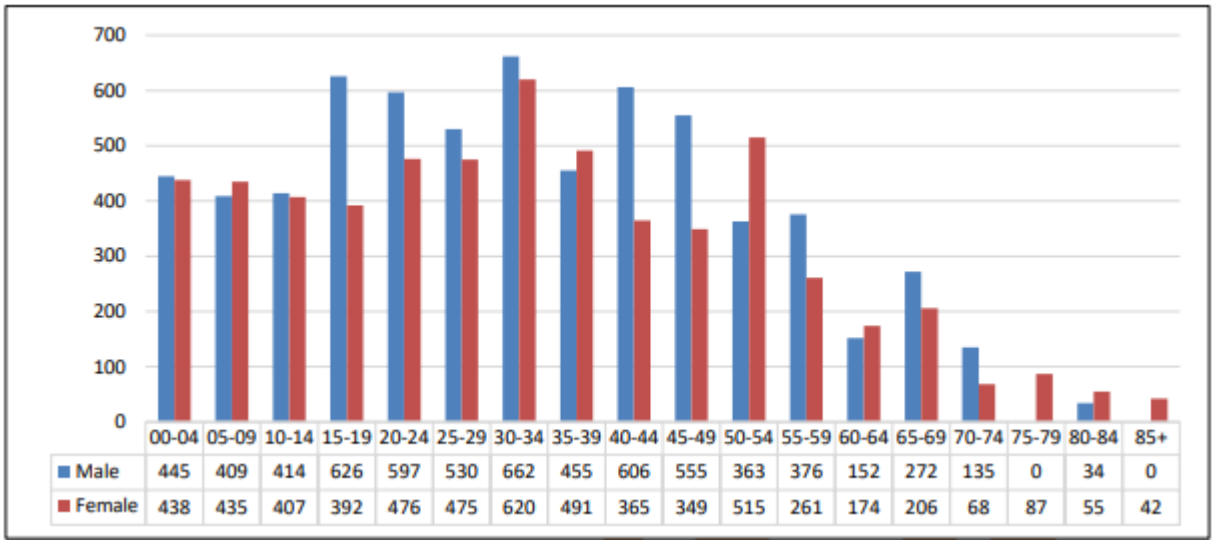
Figure 29. outlines the percentage distribution of the population of Richtersveld in 2016, where the Coloured population group accounts for 82.9% of the population in the municipality, followed by the Black African, White and Indian/Asian population groups.

Population by 5 year age groups and sex, 1996-2016

	1996			2001			2011			2 016		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
00 - 04	642	598	1 240	509	451	960	481	456	937	445	438	883
05 - 09	654	602	1 256	509	443	951	482	440	922	409	435	844
10 - 14	633	562	1 195	468	456	924	525	472	997	414	407	821
15 - 19	446	466	912	487	411	898	487	394	881	626	392	1 018
20 - 24	644	562	1 205	445	425	870	475	434	910	597	476	1 073
25 - 29	826	590	1 416	478	440	919	674	533	1 207	530	475	1 005
30 - 34	724	594	1 318	466	458	924	524	444	968	662	620	1 283
35 - 39	550	486	1 036	446	463	909	506	435	941	455	491	946
40 - 44	511	403	914	311	358	668	526	439	965	606	365	971
45 - 49	335	303	638	308	292	600	447	454	902	555	349	904
50 - 54	278	230	508	214	209	423	365	328	692	363	515	878
55 - 59	207	153	360	173	179	352	286	251	537	376	261	638
60 - 64	115	146	262	114	129	243	191	215	406	152	174	325
65 - 69	102	95	197	88	120	208	140	166	306	272	206	477
70 - 74	59	45	104	67	72	139	84	87	172	135	68	203
75 - 79	37	53	89	31	33	64	54	73	128	-	87	87
80 - 84	15	34	49	15	30	45	30	34	64	34	55	89
85+	10	17	27	11	18	29	23	27	50	-	42	42
Unspecified	49	46	95	-	-	-	-	-	-	-	-	-
Total	6 837	5 985	12 821	5 140	4 987	10 126	6 300	5 682	11 985	6 631	5 856	12 487

Table 8 shows the population for Richtersveld by five-year age groups and sex. It shows a general decrease in the population for the age groups over the period of 1996 to 2016. There is however a significant percentage increase in the proportion of elderly population aged 65 years and above, signifying a greater life span for elderly population in the province.

Distribution of the total population by age group and sex, 2016



	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Male	445	409	414	626	597	530	662	455	606	555	363	376	152	272	135	0	34	0
Female	438	435	407	392	476	475	620	491	365	349	515	261	174	206	68	87	55	42

Figure 30. indicates that the greater proportion of the population of Richtersveld is young, consisting mainly of children and youth. There is however a greater proportion of males
compared to females for ages from 10 to 34 years, and the female population shows a greater proportion in numbers compared to males for ages 75 and above. This signifies a greater lifespan for females than males.

Distribution of persons aged 1 year and older by language spoken most often in the household, 2016

Language spoken in household	Number	Percentage (%)
Afrikaans	11 397	**92.5**
IsiXhosa	526	**4.3**
English	257	**2.1**
Setswana	63	**0.5**
Other	53	**0.4**
IsiZulu	19	**0.2**
Total	**12 316**	**100.0**

Table 9 above shows that the language spoken mostly by households in Richtersveld is Afrikaans, representing a total of 11 397 (92.5%) households, followed by those who speak IsiXhosa at 4.3%. The least spoken language in Richtersveld is IsiZulu and Setswana.

Disability type and degree of difficulty in functioning by sex, 2016

Disability type	Degree of difficulty	Male	Female	Total
Seeing	No difficulty	5 028	4 172	9 200
	Some difficulty	1 002	1 039	2 041
	A lot of difficulty	155	194	349
	Cannot do at all	-	-	-
	Do not know	-	13	13
	Total	6 185	5 418	11 603
Hearing	No difficulty	5 902	5 143	11 045
	Some difficulty	179	245	425
	A lot of difficulty	70	30	100
	Cannot do at all	17	-	17
	Do not know	18	-	18
	Total	6 186	5 418	11 605
Communication	No difficulty	6 101	5 371	11 472
	Some difficulty	50	48	98
	A lot of difficulty	-	-	-
	Cannot do at all	17	-	17
	Do not know	18	-	18
	Total	6 186	5 419	11 605
Walking or climbing stairs	No difficulty	5 886	4 965	10 852
	Some difficulty	132	297	429
	A lot of difficulty	85	131	216
	Cannot do at all	64	25	89
	Do not know	18	-	18
	Total	6 185	5 418	11 604
Remembering	No difficulty	5 888	4 978	10 867

	Some difficulty	279	321	600
	A lot of difficulty	-	108	108
	Cannot do at all	-	-	-
	Do not know	18	12	29
	Total	6 185	5 419	11 604
Self-care	No difficulty	6 116	5 274	11 389
	Some difficulty	52	103	155
	A lot of difficulty	-	28	28
	Cannot do at all	-	13	13
	Do not know	18	-	18
	Total	6 186	5 418	11 603

Table 10 shows that 349 persons in Richtersveld are having a lot of difficulty seeing. This is followed by those with difficulties with walking or climbing stairs (216 persons) and those having a lot of difficulty with memory (remembering) with 108 persons. Females are generally more susceptible to having disabilities than males in the municipality.

Highest level of education for persons aged 20 years and above, 1996-2016

	No schooling	Some Primary	Complete Primary	Some Secondary	Grade 12/Std 10	Higher	Total*
Number							
1996	1 333	3 153	1 598	3 686	1 020	473	11 262
2001	668	2 875	1 371	2 827	1 151	272	9 165
2011	273	2 846	1 288	4 055	1 544	566	10 572
2016	45	1 181	941	3 837	2 113	576	8 692
Percent (%)							
1996	11.8	28.0	14.2	32.7	9.1	4.2	100.0
2001	7.3	31.4	15.0	30.8	12.6	3.0	100.0
2011	2.6	26.9	12.2	38.4	14.6	5.4	100.0
2016	0.5	13.6	10.8	44.1	24.3	6.6	100.0

Table 11 shows an improvement in the level of education in Richtersveld over the period 1996 to 2016, where there was a decline in the number and proportion of persons aged 20 years and above with no schooling (from 11.8% to 0.5%). It shows a significant increase in the proportion of persons with higher education, from 4.2% in 1996 to 6.6% in 2016. There is also an increase in the proportion of persons who have grade 12/standard 10.

LEVELS OF SERVICE TO COMMUNITIES

Access to Services

One of the major challenges of the Richtersveld municipal region is the vast geographic layout. When access to services are assessed within the IDP, it includes the vast amount of households that are in the rural areas. These households do pose a major challenge in terms of service delivery as they have to be connected to basic municipal service over vast distances.

The access to basic services is crippled by the low culture of payment due to the historical past and the fact that due to the integration or demarcation a flat rate was installed. This has caused more problems in relations to the payment of services but also the willingness to grasp responsibility for payment of services.

Water

Water Management

In the previous financial year the municipality has spent more than R21m on the improved of water services in Sanddrift, Kuboes, Lekkersing, Eksteenfontein and Port Nolloth through the drought relief and Water Services Improvement Grant (WSIG). Richtersveld Municipality is an accredited Water Services Authority in terms of the National Water Act (Act 36 of 1998) and provides potable water to Lekkersing, Eksteenfontein and Port Nolloth. Transhex Operations Ltd provides fresh water for Sanddrift and Kuboes.

Although water is supplied by these mining houses no formal Service Level Agreements are intact. All towns do not have sufficient water sources except Alexanderbay, Kuboes and Sanddrift. In Port Nolloth where the water source is under ever increasing pressure due to numerous residential developments and holidaymakers, there is a bidding process underway to build a 1,5mega litre desalination plant in conjunction with DWA & Sanitation. The bidding process includes the advancement of the portion counter funding that is required from the department. In relation to the improvement of water services to Port Nolloth we remain steadfast in our endeavours to secure water services. To this end, the municipality ought to urgently looking at alternatives to the desalination idea which took centre stage since 2008 without any success. The upgrading of the 8Mile pipeline will aid to ensure an improved service to communities of Sizamile, Port Nolloth town, Nollothville as well as McDougalls bay.

Richtersveld Municipality is working closely with DWA & Sanitation to improve the Blue & Green Drop Status. To qualify for a Blue Drop Status, the water quality management system has to be between 96% and 100%. All efforts will be put in place to ensure that there is improvement on the status and to restore the quality of water.

High water losses still remain a challenge and council need to explore ways in which to improve this situation as it also leads to revenue losses. During the public participation of the IDP process it became evident that the communities in Eksteenfontein, Kuboes and Lekkersing insisted that the municipality prioritised the supply of water to their respective towns. To this end funding was secured under the WSIG program of the DWA

& Sanitation to improve services and the supply for household consumption and to mitigate on the service during summertime.

Richtersveld Municipality has approved a Water Services Development Plan (WSDP) in 2010 which is one of the sector plans of this IDP. This WSDP needs to be reviewed to bring in line the proposed development plans. The WSDP describes the future plans to secure water sources and entails the development of more boreholes, recycling of waste water effluent, desalination of possibly groundwater and seawater as the last and most expensive option. Proper planning and the achievement of the goals and targets determined in the WSDP will allow Council to meet their strategic objectives of providing quality basic services. Sufficient water sources and proper infrastructure for water provision is a fundamental requirement for economic growth and development facilitation.

Diamond mining can be regarded is one of the largest industrial water users in the Richtersveld municipal area but the main water users still remain households for domestic purposes, schools and agricultural activities for irrigation purposes. Domestic household usage normally peaks in the summer holidays in all towns. In Port Nolloth which is flooded with holiday makers and visitors to our beaches becoming an increasing challenge for the municipality. All water infrastructure needs to accommodate this peak period. It has now become a norm over the last couple of years to institute and strictly enforce water restrictions especially in this coastal town. The water losses in Port Nolloth is more than 17% which is outside of the acceptable norms but can be attributed towards dilapidated infrastructure, asbestos piping and the dune sands which make it difficult to detect leakages easily.

There is a deliberate attempt to provide prepaid water meters as it will assist in the demand management but also change the payment culture and to ensure that the municipality can be able to maintain and provide the service. To this end, it need a thorough process of engaging with communities and to educate and run awareness campaigns for buy-in and acceptance.

DELIVERY OF WATER SERVICES

The Water Services Act (Act 108 of 1997) requires every municipality to draft a comprehensive Water Services Development Plan (WSDP). The WSDP is also regarded as one of the sector plans of the IDP because most of the planning for development being social, economic or environmental will depend on access to water services.
Richtersveld Municipality has to ensure that all its customers receive efficient, affordable, economical and sustainable access to water services. The recent drought relief provided by DWS has ensure a meaningful impact on the delivery of water services. The drought relief has largely contributed towards a sustainable supply of water for households and more than 8 boreholes were drilled and equipped.

The municipality has developed and submitted a plan to improve water services in all towns especially Kuboes and Port Nolloth as priority areas under the drought relief.

PROJECT NAME	ACTIVITY	COSTING
15 Mile	Sink and equip 6 x boreholes	R15m
Kuboes water services	Improve and secure extraction point on river banks	R16.9m
AC Pipe replacement	Improvement of services on Alexanderbay pipeline	R4.5m

The WSDP of Richtersveld Municipality highlights specific issues with regards to water management and strategies to ensure the sustainability of adequate water to the end users in the municipal area. It also sets targets for interventions with a specific focus on the following aspects:

- Basic water and sanitation services to each and every household in Richtersveld
- Sustainable water supply to ensure the health & wellness of communities
- Access to bulk water supply to attract industrial and other types of economic development to the area
- Ensure quality and clear drinking water to all consumers
- Establishment of infrastructure to ensure adequate storage capacity
- Rehabilitation of ageing infrastructure in order to ensure the long term sustainability of water services
- Continuous monitoring and control of water losses
- Adequate water pressure for all consumers

BLUE DROP STATUS

In order for Richtersveld Municipality to obtain Blue Drop certification or improve on the previous performance, the following must be done:

- Fully implement the water safety plans which will certainly have significant financial implications to the municipality.
- Train and retrain process controllers for all water treatment systems in Richtersveld Municipality
- Continuously maintain and replace outdated water infrastructure
- Set up systems to log and capture water related information on the internet based

Blue Drop System

The current municipal Blue Drop Score is at 36, 77% and shown little improvement in the approach to drinking water quality management.

ELECTRICITY

The major challenge for the municipality is the dilapidated infrastructure and the street lightning in all of the outside towns which are serviced by Eskom. The current electricity losses at Port Nolloth is more than 28%.

Electricity distribution in Richtersveld municipal area is done by Richtersveld Municipality and Eskom respectively and the under mentioned table indicates which entity is responsible for electricity distribution.

RICHTERSVELD MUNICIPALITY	ESKOM
Port Nolloth town area	Alexanderbay
Nollothville	Eksteenfontein
McDougalls bay	Kuboes
	Lekkersing
	Sizamile
	Sanddrift

The table above depicts the unbalanced manner of electricity supply which defeat the objective of improved basic services and debt collection methods. All the formal residential areas in Richtersveld Municipality have access to electricity but street lighting is a major concern. The municipality does not generate any electricity and buys all its electricity from Eskom. There is a need to look at alternative method of supply due to the high costs of electricity. The municipality has embarked on an investigation in terms of electricity supply and might be able to detect any irregularities. Cable and electricity theft is a big concern and has led to the stoppage of services.

Currently the municipality do not have a problem in terms of its capacity to deliver bulk electricity services for any current and future residential or commercial developments in the area. An application to increase in NMD from 2000 KVA to 3500 has being submitted to ESKOM for approval. The selling of electricity to end users makes up a significant portion of the income budget of the municipality but does not secure the financial viability of the institution. Even though Richtersveld Municipality do not have a long term strategy to explore alternative energy sources, it does however promote and support private initiatives to explore the generation of energy through solar and wind farms by private entities.

Richtersveld Municipality provides all indigent households that are linked to the network with 50 kilowatt hours of free electricity. Free Basic Electricity to the residents was implemented on 01 October 2009 according to the Free Basic Electricity Notice, 1693 of 2003 and still continued today. The provision of Free Basic Electricity certainly impacted positively on the impoverished communities due to the financial relieve on their service payments. It also enhanced their constitutional right to energy in terms of the Constitution of South Africa of 1996.

The municipality has improved streetlights in all towns although not at a satisfactorily level to all but will continue to do so. This is part of the programme of safer communities and to improve service delivery.

Indigent household services provided by municipality

Number of households benefiting from indigent support system, 2016

Namakwa District Municipality	Indigent households registered with municipalities	Benefitting			
		Water	Electricity	Sewerage and sanitation	Solid waste management
Hantam Municipality	1 452	1 452	1 229	1 452	1 452
Kamiesberg Municipality	1 276	1 276	1 201	205	1 226
Karoo Hoogland	944	944	944	944	944
Nama-Khoi Municipality	5 045	5 045	5 045	5 045	5 045
Richtersveld Municipality	1 068	1 068	1 033	1 068	1 068
Khâi-Ma Municipality	1 752	1 752	1 353	1 751	1 751
Total	**11 537**	**11 537**	**10 805**	**10 465**	**11 486**

Source: Non-financial census of municipalities, 2017

Table 12 shows that the number of indigent households registered in the Namakwa district for the year 2016 is 11 537 units with Nama-Khoi municipality having the highest number of such households at 5 045 units, followed by Khai-Ma, Hantam, and Kamiesberg municipality with 1 752, 1 452 and 1 276 indigent households registered as indigent respectively. The municipalities with the least number of indigent households are Karoo Hoogland and Richtersveld with each having 944 and 1 068 indigent households respectively.

It is to be noted that not all indigent households across the respective municipalities are benefiting from free basic services from the municipality however, with the exception of households in Karoo Hoogland and Nama-Khoi municipality, where all indigent households are receiving free basic services from the municipality.

SEWERAGE & SANITATION

Alexanderbay has a full waterborne sewerage system in place while Port Nolloth and the rest of the towns are partially serviced with a septic tank system. The existing tanker service is under huge pressure especially in Port Nolloth during peak holiday seasons. The upgrading of the oxidation ponds in Port Nolloth was prioritised in the 2017/2018 FY.

In Kuboes, Eksteenfontein and Lekkersing there are UDF and VIP toilet systems in place. Within the next five years the aim is to eradicate or minimise the UDF and VIP toilet system in our communities. This will not only provide a dignity but ensure that historical backlogs are confronted with clear interventions to make a difference in people's lives.

Council has resolved that oxidation ponds be developed in towns but with the main focus on Port Nolloth. Future sewerage plants will be done as funds become available. Sewer tanks are not seen as a sewerage backlog.

A number of new business and residential developments have started particularly in Port Nolloth which means that the sewerage purification works in Port Nolloth needs to be upgraded as a matter of urgency to accommodate these new developments.

Adding to this is the need for the integration of areas such as Diamond City, Rainbow City, Single City, Ovenbay Sun, Hicksons Barracks, Ovenbay Barracks and Silver City to the sewer system. The Richtersveld Municipal Council realises that if it wants to achieve the strategic objectives of establishing proper infrastructure for basic service delivery it must put a high priority on the upgrading of waste water treatment plants over the next 5 years. There is an urgent need for Council to review planning to integrate the sewer services in the aforementioned areas as the honey sucker can no longer keep up with the level of service standard. A new sewer tanker was manufactured and has largely contributed towards our objective of improved services. The municipality will look at a new method of prepaid services once all the backlogs and current fleet has been upgraded to render a proper service.

This will certainly unlock business development potential, attract investment to the area as well as facilitate the implementation of much needed residential developments.

Type of sanitation facilities used by household, 1996-2016

Table 12 below shows an increase in the proportion of households that use a flush or chemical toilet in Richtersveld, from 70.2% in 1996 to 85.3% in 2016. There is a slight increase in the proportion of households using a pit latrine, from 10.9% in 1996 to 12.6% in 2016. It shows a significant decrease in the proportion of households using bucket latrine in 1996 to 2016.

	Flush or chemical	Pit latrine	Bucket latrine	None of the above	Total
1996	70.2	10.9	4.5	13.8	**100.0**
2001	79.1	13.5	3.2	4.1	**100.0**
2011	78.8	12.5	0.9	7.5	**100.0**
2016	85.3	12.6	0.3	1.4	**100.0**
2018	89.2	10.4	0.2	1.2	**100.0**

WASTE MANAGEMENT

Refuse Disposal

The SA Constitution states that the people of South Africa have the right to an environment that is not detrimental to human health and Local Government is assigned the responsibility for refuse removal, refuse dumps and solid waste disposal.

Therefore, all the towns in the municipal area have a solid waste programme in place and all households are serviced once a week and all businesses at least two times a week. Recycling at source is encouraged throughout the area.

The Waste Management goal is to optimize the waste management strategy to ensure continuous cost-effective services by also encouraging waste minimization and recycling activities to enhance in proper management services. The Richtersveld Integrated Waste Management plan was completed and approved by Council in 2015.

This is one of the core basic services rendered by Richtersveld Municipality and involves the collection of refuse from households and businesses within the jurisdiction of the municipality.

All of the households have their refuse removed at least once a week and businesses twice a week. During the recent public participation process communities highlighted the implementation of a wheelie bin refuse removal system to replace the current black bag system. Richtersveld Municipality is doing an analysis of the cost implication of this wheelie bin system and will certainly consider it once the financial implications have been established.

Currently there are six (6) licensed landfill sites in all the towns of the municipality where all the refuse of the towns are being dumped. The Richtersveld Integrated Waste Management Plan set strategic objectives for the next five years in this regard. The Plan was compiled in 2013 in conjunction with Department of Environmental Affairs & Nature Conservation, Namakwa District and adopted by Council in 2014. There are still a number of challenges in terms of waste management, which includes:

- Illegal dumping of domestic refuse, despite the fact that the municipality have placed
- numerous public signage and notices in most residential areas Illegal entrance by scavengers at the landfill site
- Shortage of staff and resources in the Solid Waste Department

There is an Integrated Waste Management Plan in place.

Type of refuse removal used by household, 1996-2016

	Removed by local authority at least once a week	Removed by local authority less often	Communal refuse dump	Own refuse dump	No rubbish disposal	Other	Total
1996	68.8	8.0	0.7	10.6	10.2	1.7	**100.0**
2001	74.6	4.7	0.0	12.2	8.5	0.0	**100.0**
2011	82.9	7.7	0.6	6.0	1.2	1.6	**100.0**
2016	87.2	8.0	3.2	0.4	0.3	0.8	**100.0**
2018	90.1	6.0	2.8	0.3	0.3	0.5	**100.0**

Table 13 shows an increase in the proportion of households in Richtersveld municipality whose refuse is removed by the local authority at least once a week, from 68.8% in 1996 to 87.2% in 2016. It shows a decrease in the proportion of households that have no rubbish disposal.

ROADS

The connection roads within Richtersveld consist of 150km of dirt roads which makes

travelling between towns from the R382 very difficult as the maintenance of these roads are very low. The Richtersveld Municipality is the first municipality in the Namakwa District who has compiled and adopted an Integrated Transport Plan (ITP).

The fact that Richtersveld Municipality is situated along R382 as a regional road in the Northern Cape the entire towns except Alexanderbay and Port Nolloth poses particular economic and logistical challenges to the area. The maintenance of the said road is very problematic as it passes through the town of Port Nolloth and cannot done by the Richtersveld Municipality on its own. There is a need for assistance by the Provincial department of Public Works and Roads to ensure that the road is maintained. There is a need to re-route all heavy trucks through Port Nolloth as these trucks cause huge damages to the existing R382.

The 80km dirt road between Alexanderbay and Kuboes was resurfaced with the assistance from Public Works, Alexkor RMC JV and Trans Hex Operations Ltd. There is an indication to resurface the dirt road between Alexanderbay and Kuboes again.

HEALTH SERVICES

Health Services in the municipal area are currently done by the Department of Health in the district. In assessing the level of health services in the Richtersveld there is an urgent need to improve the service due to the vast distances and conditions of dirt roads.

The new notion therefore as being putting forward was to ensure that health services be rendered in a block format, eg. Alexanderbay, Sanddrift and Kuboes as one block with the revitalization of the clinic at Alexanderbay to serve the block.

The other block to consist of Lekkersing, Eksteenfontein and Port Nolloth with the construction of the Community Health Centre (CHC) in Port Nolloth. The construction of the CHC has come to a grind halt but construction works will be starting soon again. The Emergency Medical Services (EMS) in the municipal jurisdiction also need to be whined up.

The following health facilities are found in the municipal area:

- Port Nolloth Hospital with available doctors
- Provincial clinics in Alexanderbay, Kuboes, Lekkersing, Sanddrift, Eksteenfontein
- Mine clinic in Baken is still operating at a very low scale.
- Private doctors and district surgeons

Health Facilities are fairly distributed throughout the municipal area

EDUCATION

Education levels have a major bearing on the quality of life. The inability of an individual to perform certain basic functions due to illiteracy is also part of elements that define human poverty. Low educational levels are likely to push individuals to unemployment and to low paying jobs. Low educational levels also limit the ability of an individual to learn new skills, to be trained and developed.

There is an urgent need to align subjects at high school with the main stream career choices to ensure that people are employable, to attract and retain skills that are required and scarce within the Richtersveld, eg. Accounting, etc.

The primary school at Lekkersing is very dilapidated and has structural damages and estimated repair costs is in the tune of R3,7m.

There is need to engage with the Department of Education, School Governing Body, URCSA,parents and school community to look at the current situation and path a way forward. A request to meet with these role players was submitted to the Namakwa District Municipality for assistance.

Strategic Objectives

The Richtersveld Council considered the current levels of development within the Richtersveld municipal region and developed five (5) Strategic Objectives that identifies the areas of impact for their term of office. When developing strategic objectives, the municipal Integrated Development Plan should be developed within the legislative and strategic framework provided by national and provincial government.

(b) Description of the current land uses

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

The major land uses in the area are mining and agriculture. The land capability of the study site is non-arable with variable potential grazing land, i.e., moderate (north-western corner), low (most of the remaining parts) and very low (hills in the east). The grazing capacity is 60 - 72 ha/LSU, with the agricultural region being demarcated for sheep farming.

Apart from the proposed prospecting activities, the Kannikwa Vlakte Wind Farm Project was granted on the Farm Kannikwa Vlakte 157, and the Eskom's Gromis-Oranjemund Transmission Power Line servitude runs through the study area. Furthermore, the regional route R382 as well as the Kleinsee- and Lekkersing public gravel roads cut through the study area. An old rail route, which has been left abandoned for decades runs in between the property boundaries in the north and has therefore been excluded from the application area.

Currently, the study area is used as natural pastures for livestock grazing. (information taken out of the ecological study by Boscia Ecological Consultants Dr. Betsie Milne Appendix 4).

(2) Evidence of Disturbance:-

On the application area there are existing roads.

(3) Existing Structures: -

The Kannikwa Prospect lies fairly close to the West Coast of South Africa and the coastal town of Port Nolloth. At its closest point, Kannikwavlakte 157 is 6 km from the coast and Kannikwa 156 is 9 km from the coast and 8 km from the town of Port Nolloth.

The Port Nolloth to Steinkopf tar road (the R382) bisects the border between Kannikwa 156 and Kannikwavlakte 157, in other words, it runs straight through the middle of the Kannikwa Prospect as a whole. Furthermore, the Port Nolloth to Kleinzee dirt road runs through Kannikwavlakte 157 and the Port Nolloth to Lekkersing dirt road runs through Kannikwa 156. These roads together provide excellent access to all parts of the Kannikwa Prospect.

Existing infrastructure includes a landing strip and numerous farm tracks. Ample evidence of historic diggings, for road construction and diamonds, are also present, along with old buildings and ruins. Besides the alluvial diamond deposits, other minerals known to occur here include Kieselguhr and Dimension Stone (quartzite) (information taken out of the ecological study by Boscia Ecological Consultants Dr. Betsie Milne Appendix 4).

A few widely spaced wind pumps supply limited amounts of water, which is mainly used for cattle drinking. Although high voltage power lines run across both Kannikwa 156 and Kannikwavlakte 157, no end-user electricity outlet is available on either farm.

The nearby coastal town of Port Nolloth offers plenty accommodation in the form of a hotel and numerous guest houses. Port Nolloth has a SPAR supermarket and FNB bank. It has several restaurants, clothing shops, hardware shops and general dealers. Port Nolloth also has several vehicle workshops, a fuel station, some engineering workshops specializing in gravel processing equipment, and various speciality shops such as a stationery shop, furniture shop and butcher.

Furthermore, Port Nolloth has a medium-sized harbour, which can accommodate vessels up to 300 tonne size. It has several schools and churches. It has a large, well-equipped police station, a magistrate's court, post office, municipality, library, two museums and a weather station. It has a medium-sized hospital, a clinic and a pharmacist. Port Nolloth has excellent mobile phone reception, and reception on the higher parts of Kannikwa 156 is good.

For specialized engineering works and supplies, a large hospital and any other such specialized services, the town of Springbok is 140km by tar road from Port Nolloth.

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

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

(d) Environmental and current land use map

(Show all environmental, and current land use features)

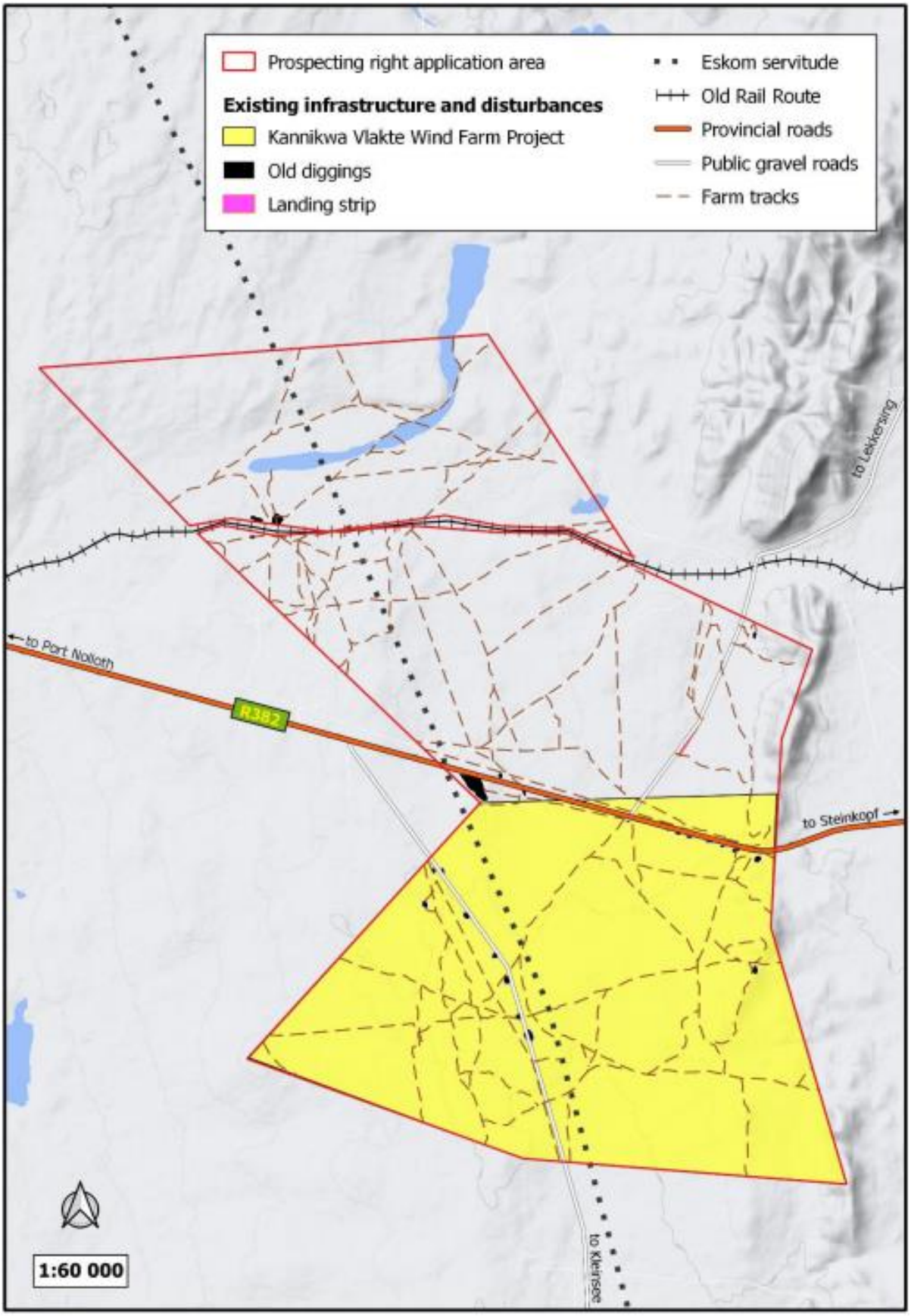


Figure 31. Environmental and current land use map

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

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

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Highly unlikely	Residual	insignificant Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Low Medium	Possible for life of Operation	Residual	Low Local	• Prospecting continuously, if possible and does not influence prospecting and safety requirements. • Employ effective rehabilitation strategies to restore surface topography of prospecting areas and plant site. • Stabilise the mine residue deposits. • All temporary infrastructures should be demolished during closure.
Soils	**Increase in Soil Erosion** During clearing of an area for drill pads, the excavation of	Low - Medium	Possible frequently	Decommissioning	Low Medium Local	• Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible

	minerals, construction of infrastructure and roads, stockpiling, natural events. Vegetation will be stripped for construction of drill pads, new roads, and excavations. As a result, these areas will be bare, and the sandy substrate is especially susceptible to wind erosion. Furthermore, any topsoil-, overburden- and ore stockpiles can be eroded by wind, rain, and flooding. Exposed sediments in the watercourses can					once activities in the area have ceased. • No new roads, infrastructure or prospecting areas should be developed over watercourses, including drainage lines. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers. • Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

	be carried away during runoff causing downstream sediment deposition. Any leaking pipes can also cause additional water erosion.					
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Loss of topsoil and soil fertility During clearing of an area for drill pads, the excavation of minerals, construction of infrastructure and roads, stockpiling. Topsoil contains living organisms that naturally regulate the ecological functioning of a habitat. Therefore, any	Medium - High	Certain for life of operation	Residual	Low Medium On-site	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads, infrastructure and stockpile areas. • These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %.

	disturbances to the intact soil profile can result in soil sterilisation which will directly affect vegetation communities. Apart from the direct disturbances caused by the prospecting activities, loss of soil fertility can also occur through soil compaction by dump loads as well as heavy machinery and vehicles.					• Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Alteration of soil character and quality	Medium - High	Certain for life of operation	Residual	Low-Medium On site	• Topsoil needs to be removed and stored separately during prospecting and the construction of roads,

	During clearing of an area for drill pads, the excavation of minerals, construction of infrastructure and roads, stockpiling, oil and petrochemical spills. Topsoil contains living organisms and seed banks that provide ecological resilience against disturbances, and any disturbances to the intact soil profile will change its ability to sustain natural ecological functioning. Vehicles and prospecting equipment may potentially leak					infrastructure, and stockpile areas. • These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired. • Topsoil must not be handled when the moisture content exceeds 12 %. • Topsoil stockpiles must by no means be mixed with sub-soils. • The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. • For restoration of the affected areas without topsoil, soils can be sourced from other • sustainable areas and chemically changed to match with the surrounding environment. • To restore areas where compacted soil occurs, a

	hazardous fluids on the soil surface, which will cause soil pollution. Apart from the direct disturbances caused by the prospecting activities, soil compaction by dump loads as well as heavy machinery and vehicles will causes a decrease in large pores, and subsequently the water infiltration rate into soil.					ripper blade or deep plow can be pulled across the affected area to alleviate compaction. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings. • Vehicles and machinery should be regularly serviced and maintained. • Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Drip trays must be available on site and installed under all stationary vehicles. • Spill kits to clean up accidental spills must be well-marked and available on site. • Workers must undergo induction to ensure they are prepared for rapid clean-up procedures. • Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.

Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Low-Medium	Possible for life of operation	Residual	Low-Medium On-site	• Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Low-Medium	Possible for life of operation	Residual	Low Medium On-site	• Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Hydrocarbon spills from vehicles and fuel storage areas may contaminate the groundwater resource locally	Low-Medium	Possible for life of operation	Residual	Low-Medium Local	• Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. • Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Surface Water	Alteration /destruction of watercourses	Medium - High	Possible for life of operation	Permanent	Low -Medium Regional	• All activities associated with the prospecting operation must be planned to avoid any

	During drilling, excavation of minerals, construction of infrastructure and roads, stockpiling. During prospecting activities there is a possibility that the watercourses on site (i.e., drainage lines and Kamma River) might be altered or indirectly affected. This includes direct prospecting within the watercourses as well as development of roads, infrastructure or stockpiles within their channels, catchment areas, or buffer zones. Such activities					• disturbances to the watercourses and their buffer zones. • No new roads should be created across a watercourse and no prospecting should take place in • the Kamma River. If this is unavoidable, a water use license to alter the beds and banks of each • earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected watercourses.

	can completely change the hydrologic regime or habitat conditions of the watercourses, which will not only compromise their ecological functioning, but also have downstream effects.					
	Siltation of surface water During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, natural events. Vegetation will be stripped in preparation for the prospecting areas and associated	Low Medium	Possible infrequent	Decommissioning	Low Regional	• Bare ground exposure should always be minimised in terms of the surface area and duration. • Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased. • No new roads, infrastructure or prospecting areas should be developed over watercourses. • Disturbances during the rainy season should be monitored and controlled. • Any potential run-off from exposed ground should be controlled with flow retarding barriers.

	infrastructure. These bare areas will be very susceptible to water erosion without plants to stabilise the soil, creating potential sediment source zones. High runoff events could potentially cause the drainage lines and Kamma River to be filled with silt from prospecting areas if the sediment source zones lie along the drainage paths towards these watercourses. This may lead to a change in hydrologic regime or character of the watercourses.					• Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	**Loss of and disturbance to indigenous vegetation** During clearing of an area for drill pads, the excavation of minerals, construction of infrastructure and roads, stockpiling. The Kannikwa prospecting activities is expected to destroy a large area of natural Succulent Karoo vegetation. It is expected that the ecological functioning and biodiversity will take many years to fully recover.	Low - Medium	Certain for life of operation	Residual	Low Medium On-site	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles. • Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas. • Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas. • Apply for permits to authorise the clearance of indigenous plants from DENC at least

	Furthermore, vehicle traffic and prospecting activities generate lots of dust which can reduce the growth success and seed dispersal of many small plant species in the adjacent areas.					three months before such activities will commence.
	Loss of Red data and/ or protected floral species Removal of listed or protected plant species during clearing of an area for drill pads, the excavation of minerals, construction of infrastructure and roads, stockpiling. Intentional removal of listed or protected	Medium - High	Possible, infrequent	Residual	Low On-site	• The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and-rescue operation. • It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, due to the nature of the proposed prospecting activities they will most likely all be removed or relocated (if possible). The relevant permits from DENC

	plant species for non-mine related purposes, e.g., illegal succulent trade. There are numerous plant species of conservation concern present in the Kannikwa Prospecting Right area, including the red listed Amphibolia succulenta (NT) and Wahlenbergia asparagoides (NT), which was recorded in the earmarked area. Haemanthus pubescens subsp. arenicola (Rare), Babiana hirsuta (NT) and Nemesia saccata (VU) also potentially occurs here. Therefore, it is					should be applied for at least three months before such activities will commence. • The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants. • 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 to ensure successful translocation. • The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.

	likely that the prospecting operation could potentially have a major impact on these species if their local population is destroyed. Furthermore, any illegal harvesting of the succulent plants of conservation concern for trade by staff, contractors or secondary land users could have devastating effects on the population of these species.					• All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species. • Employ regulatory measures to ensure that no illegal harvesting takes place.
	Introduction or spread of alien species During clearing of an area for drill pads, the excavation of minerals, construction of	Low-Medium	Possible, infrequently	Residual	Low Local	• Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible. • Mechanical methods of control should be implemented pro-actively as

	infrastructure and roads, stockpiling, improper rehabilitation practises. Existing populations. Only two invasive species (Atriplex spp.) occur in the study area. Nevertheless, any anthropogenic disturbances to natural vegetation, especially the clearance of large areas of land, provide the opportunity for invasive plants to increase. This is due to their opportunistic nature of dispersal and establishing in disturbed areas. If invasive plants					soon as invasive species start to emerge. • Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	establish in disturbed areas, it may cause an impact beyond the boundaries of the prospecting site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity as well as reduction in the ecological value and land use potential 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.					
	Encouragement of bush encroachment During clearing of an area for the excavation of minerals, construction of infrastructure and roads, stockpiling, improper rehabilitation practises. Existing populations. Bush encroachment is a natural phenomenon characterised by the excessive expansion of certain shrub species at the expense of other	Very Low	Highly unlikely, annually or less	Residual	Very Low On-site	• Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands. • Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication. • Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

	plant species. While general clearing of the area and prospecting activities destroy natural vegetation, bush encroaching plants can increase due to their aggressive nature in disturbed areas. If encroaching plants establish in disturbed areas, it may lower the potential for future land use and decrease biodiversity. However, no bush encroaching species were recorded on site. Therefore, this impact is highly unlikely during the					

	prospecting operation.					
Fauna	**Loss, damage and fragmentation of natural habitats** During clearing of an area for drill pads, the excavation of minerals, construction of infrastructure and roads, stockpiling. Fragmentation of habitats typically leads to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This can be in the form of small-scale fragmentation	Medium – High	Certain for life of operation	Residual	Low Medium Regional	• All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • The footprint areas of the prospecting activities must be scanned for any burrow complexes prior to any destructive activities by means of a search-and-rescue operation. • It is recommended that complexes are identified and marked prior to intended activity and should be incorporated into the design layout and left in situ. However, due to the nature of the proposed prospecting activities they will most likely be destroyed. The relevant permits from DENC should be applied for at least three months before such activities will commence.

	for reptiles, amphibians, and invertebrates, to more large-scale fragmentation that hinder dispersal of birds and plants. It also includes the destruction of burrows, tunnels, and chambers as well as the degradation of ephemeral aquatic habitats in the Kamma River channel. Small-scale fragmentation disconnects breeding and foraging links, increasing stress and energy budget deficits, which is especially taxing on animals living in arid environments. Larger scale fragmentation					• The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors. • No new roads should be created across a watercourse. • No prospecting should take place in the Kamma River or along its banks. If this is unavoidable, a water use license to alter the beds and banks of the river should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected habitats.

	results in a subsequent loss of genetic variability between meta-populations occurring within the study site. Pockets of fragmented natural habitats hinder the growth and development of populations. The prospecting activities is expected to result in the loss of connectivity and fragmentation of natural micro-habitats primarily on a local scale.					
	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and	Low-Medium	Certain, for life of operation	Decommissioning	Low Local	• Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint. • The extent of the prospecting activities should be demarcated on site layout

	vibration; human and vehicular movement on site resulting from prospecting activities; excavations. The site provides suitable habitat for several species of conservation concern. Red listed species that are known from the area include Grant's Golden Mole, Littledale's Whistling Rat, Large-scaled Girdled Lizard, Speckled Dwarf Tortoise, Desert Rain Frog, Verreaux's Eagle, Black Harrier, and Mauerberger's Winter Katydid. The proposed prospecting activities could					plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone. • The footprint areas of the prospecting activities must be scanned for any protected faunal species prior to any destructive activities by means of a search-and-rescue operation. • If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits. • It is recommended that these individuals be rescued and relocated by a registered professional prior to intended activities. • No prospecting should take place in the Kamma River and no new roads should be

	lead to the death and displacement of some of these species. The transformation of natural habitats will result in the loss of micro-habitats, affecting individual species and ecological processes. This will result in the displacement of faunal species that depend on such habitats, e.g., birds that nest in trees or animals residing in holes in the ground, among rocks or underneath plants. Increased noise and vibration will disturb and					created across drainage lines. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site. • All reptiles, amphibians as well as bird nests and small mammal litters 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 a maximum speed limit of 40 km/h as well as driving mindfully on site to lower the risk of animals being killed on the roads or elsewhere in the prospecting area.

	possibly displace wildlife. Fast moving vehicles cause road kills of small mammals, birds, reptiles, amphibians, and many invertebrates. Intentional killing of snakes, reptiles, and owls will negatively affect their local populations.					
Broadscale Ecological processes	Compromise of Broadscale ecological processes Clearing of vegetation and disturbance during the construction of roads and prospecting activities; alterations to watercourse habitat characteristics.	Medium-High	Certain for life of operation	Residual	Low-Medium Regional	• Implement best practise principles to minimise the footprint of transformation. • No new roads should be created across a watercourse and no prospecting should take place in the Kamma River. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities. • Employ sound rehabilitation measures to restore characteristics of all affected habitats.

	Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. The Succulent Karoo harbours many range-restricted species and are vulnerable to such cumulative disturbances through species losses. However, the adjacent Richtersveld National Park guarantees some protection to the terrestrial					• The footprint areas must be scanned for protected species prior to any destructive activities by means of a search-and-rescue operation and the relevant permits from DENC should be applied for at least three months before any species are threatened by destruction, death or displacement.

	habitats and therefore potentially alleviates some of the cumulative losses to endemic species. Habitat alterations will also destroy connectivity of vital ecological corridors of aquatic food webs in the ephemeral Kamma River, which could have cascading effects on a catchment level.					
Air Quality	Sources of atmospheric emission associated with the prospecting operation are likely to include fugitive dust from materials handling operations, wind	Low	Certain for life of operation	Decommissioning	Low Local	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.

	erosion of stockpiles, and vehicle entrainment of road dust.					
SOCIAL SURROUNDINGS						
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Noise Impacts	Clearing of footprint areas, stripping of stockpiling of topsoil	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Construction activities Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Construction of internal Roads	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels
	Assembly plant equipment Noise increase at the prospecting site.	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels

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

						specifications on acceptable noise levels
	Back fill of prospecting footprint area	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
	Planting of grass and vegetation at the rehabilitated areas	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels Planting of grass and/or vegetation should be limited to daytime only
	Removal of infra-structure	Low	Possible Infrequently	Decommissioning	Low Local	Equipment and/or machinery which will be used must comply with the manufacturers specifications on acceptable noise levels
Visual impacts	Potential visual impact on gravel road	Low Regional	Certain	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact. As the visual impact would be low.
	Potential Visual Impact on the surrounding land users/ residents	Low Regional	Highly Likely	Construction, Operation and Decommissioning	Low Local Site	The design of the proposed prospecting development will determine the visual impact.
	Potential visual impact of the proposed development on	Low Regional	Highly Likely	Construction, Operational and Decommissioning	Low Local Site	Design of the proposed development can ensure that the development forms part of the area and is aesthetically pleasing.

	the Sense of Place					
	Potential visual impact of the proposed development on the construction phase of the surrounding land users in close proximity	Low Regional	Highly Likely	Construction	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact. • Ensure that the design fits into the surrounding environment and it is aesthetically pleasing; • Ensure that rubble, litter and disused construction materials are managed and removed regularly; • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way;
	Potential visual impact of the proposed development on the operational phase of the surrounding land users in close proximity.	Low Regional	Highly likely	Operational	Low Local Site	Wetting of exposed areas should be undertaken as required to prevent dust pollution having a negative visual impact. • Ensure that the design fits into the surrounding environment and it is aesthetically pleasing. • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; • Rehabilitation of disturbed areas and re-establishment of vegetation;

Traffic	Potential negative impacts on traffic safety and deterioration of the existing road networks.	Low	Low Likelihood	Decommissioning	Low Local	Utilise existing access roads, where applicable; implement measures that ensure adherence to traffic rules.
Heritage resources	The Deterioration of sites of cultural and heritage importance.	Low	Low Likelihood	Decommissioning	Low Local	Any heritage and cultural resources (e.g. ruins, historic structures, etc.) must be protected and preserved by the delineation of a no-go zone. Should any further resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist. Burial remains should not be disturbed or removed until inspected by an archaeologist.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	**Population Impacts** Employment Opportunities and skills Inequities	Medium Positive	Decommis-sioning	Start-up and Construction	Medium Positive Local	• Training of potential future employees, contract workers and/or community members should focus on prospecting related skills which would furthermore equip trainees/beneficiaries with the necessary portable skills to find employment at the available employment sectors within the study area. Multi-skilling is thus not necessarily

						the preferred training and skills development method. • Training courses should be accredited and certificates obtained should be acceptable by other related industries.
	Safety and Security Risks	Low Negative	Highly Probable	Construction	Low Negative Local	• A Fire/Emergency Management Plan should be developed and implemented at the outset of the prospecting operation. • Open fires for cooking and related purposes should not be allowed on site. • Appropriate firefighting equipment should be on site and workers should be appropriately trained for fire fighting • The prospecting area should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation. • The prospecting site should be clearly marked and "danger" and "no entry" signs should be erected. • Speed limits on the local roads surrounding the prospecting sites should be enforced.

						• Speeding of prospecting vehicles must be strictly monitored • Local procurement and job creation should receive preference.
	Health Impacts	Low Negative	Highly probable	Construction	Low Negative Local	• Maximise the employment of locals where possible • First aid supplies should be available at various points at the prospecting site • The general health of prospecting workers should be monitored on an on-going basis
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the prospecting company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	Ensure continuous and transparent communication with IAP's

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision)

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

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

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

Impact Assessment

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

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

The criteria used to assess the Consequence of the impacts are shown in the table 14 below/overleaf. The limits were defined in relation to mining characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

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

Table 14. Consequence of impacts is defined as follows.

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

Consequence of impacts is defined as follows:

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

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

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

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

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

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

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

Table 15. Criteria used to assess the **SIGNIFICANCE** of impacts

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

Table 16. Explanation of **PROBABILITY** of impact occurrence

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

Table 17. Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
0	Insignificant/ non harmful	There will be no impact at all – not even a very low impact on the system or any of its parts.
1	Minimal/potentially harmful	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
2	Medium / slightly harmful	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
3	High / Critical / Serious	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort.

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

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

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

During construction and operation of the prospecting, 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 prospecting will unearth the natural topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation where present will be stripped in preparation for placement of temporary prospecting 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 prospecting operation, there is a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil unusable 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 prospecting 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 bulk sampling operation.

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

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to prospecting 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 temporary prospecting 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 prospecting 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 prospecting 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 prospecting 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 prospecting 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 prospecting operation, and that the economy will not decline to its original level prior to the development of this project. This is because the prospecting 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 prospecting closure in advance, but it is acceptable to assume that the prospecting 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 mineral resource through proper planning.
- The prospecting should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by mine manager.

Topography

Level of risk: Low

Mitigation measures

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

Soil erosion

Level of risk: Low- Medium

Mitigation measures

- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in each area have ceased.
- Bare ground exposure should be minimised in terms of the surface area and duration.
- The operation must co-ordinate different activities in order to optimise the excavated pits and trenches and thereby prevent repeated and unnecessary excavations and disturbances to the vegetation and soil.
- Construction/excavations during the rainy season (November to March) should be monitored and controlled.
- Run-off from exposed ground should be controlled with flow retarding barriers.
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses.
- Excavated and stockpiled soil material are to be stored on the higher lying areas of the footprint area and not in any natural storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate.
- Regular audits carried out to identify areas where erosion is occurring (incl. linear activities such as roads and pipelines); followed by appropriate remedial actions.

Loss of Soil fertility

Level of risk: Low- Medium

Mitigation measures

- Topsoil needs to be removed and stored separately during prospecting and the construction of roads, infrastructure and stockpile areas.
- These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.

- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings.

Alteration of Soil character and quality

Level of risk: Medium-High

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.
- Topsoil needs to be removed and stored separately during prospecting and the construction of roads, infrastructure, and stockpile areas.
- These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings.
- Vehicles and machinery should be regularly serviced and maintained.
- Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Drip trays must be available on site and installed under all stationary vehicles.
- Spill kits to clean up accidental spills must be well-marked and available on site.

- Workers must undergo induction to ensure they are prepared for rapid clean-up procedures.
- Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.

Land capability and land use

Level of risk: Low to Medium

Mitigation measures

- Employ appropriate rehabilitation strategies to restore land capability.
- Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.

Ground water

Level of risk: Low

Mitigation measures

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

Surface water

Alteration/destruction of watercourses

Level of risk: Medium -High

Mitigation measures

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.
- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.

- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The prospecting site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmentally friendly materials must be used to minimize pollution of surface water runoff and/or underground water resources.
- Pipe leakages should be minimized.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non prospecting waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.
- The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.

Surface water

Siltation of surface water

Level of risk: Low

Mitigation measures

- Bare ground exposure should always be minimised in terms of the surface area and duration.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.
- No new roads, infrastructure or prospecting areas should be developed over watercourses.
- Disturbances during the rainy season should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.
- Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

Loss of Indigenous flora

Level of risk: Low to medium

Mitigation measures

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible.
- Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles.
- Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas.

- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas.
- Apply for permits to authorise the clearance of indigenous plants from DENC at least three months before such activities will commence.

Loss of Red data and / or protected floral species

Level of risk: Medium-High

Mitigation measures

- The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and-rescue operation.
- It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, due to the nature of the proposed prospecting activities they will most likely all be removed or relocated (if possible). The relevant permits from DENC should be applied for at least three months before such activities will commence.
- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants.
- 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 to ensure successful translocation.
- The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.
- All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species.
- Employ regulatory measures to ensure that no illegal harvesting takes place.

Introduction or spread of Alien invasive plants

Level of risk: Low to Medium

Mitigation measures

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

Bush Encroachment

Level of risk: Low

Mitigation measures

- Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands.
- Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication.
- Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

Fauna

Habitat fragmentation

Level of risk: Medium-High

Mitigation measures

- All activities associated with the prospecting operation must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.
- Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.
- Employ sound rehabilitation measures to restore the characteristics of any affected habitats. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint.
- The extent of the proposed prospecting should be demarcated on site layout plans.
- The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.
- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The environmental induction should occur in the appropriate languages for the workers who may require translation.
- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit.

Disturbance displacement and killing of fauna

Level of risk: Low-Medium
Mitigation measures

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

Broadscale Ecological processes

Compromise of broadscale ecological processes
Level of risk: Medium -High
Mitigation measures
Implement best practise principles to minimise the footprint of transformation.

- No new roads should be created across a watercourse and no prospecting should take place in the Kamma River. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- Employ sound rehabilitation measures to restore characteristics of all affected habitats.
- The footprint areas must be scanned for protected species prior to any destructive activities by means of a search-and-rescue operation and the relevant permits from DENC should be applied for at least three months before any species are threatened by destruction, death or displacement.

Air quality

Level of risk: Low-Medium
Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for prospecting only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.
- The length of time where open areas are exposed should be restricted. Prospecting should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may / are exposed for long periods of time.

- For all prospecting activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
    - Speed limits;
    - Spraying of surfaces with water;
    - Prospecting and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Low to Medium

Mitigation measures

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

Visual impacts

Level of risk: Low to Medium

Mitigation measures

Mitigation measures may be considered in two categories:

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

Traffic and road safety

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

Heritage resources

Level of risk: Medium

Mitigation measures

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

Chance Find Protocol

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

Socio-economic

Level of risk: Low-Medium
Mitigation measures
In order to ensure that negative impacts are minimised and positives are enhanced, the following is recommended:

- As job creation is one of the most pressing socio-economic needs in the local community, through the development of the Kannikwa operation should focus on related local job creation, whilst considering the limitations of the available local skills.
- The Kannikwa operation should assist their employees to find suitable housing in the towns surrounding the prospecting area.
- Assistance in terms of skills development for those that would be employed during the project, as well as for permanent employees during the operational phase of the project would be necessary. Education is critical to sustain the socio-economic development of the community members living in the area. Continued support for training and capacity building thus remain important.

Interested and affected parties
Level of risk: Low
Mitigation measures

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

ix) Motivation where no alternative sites were considered

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

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

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

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

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

i) Assessment of each identified potentially significant impact and risk

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

ACTIVITY Whether listed or not listed.	**POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**ASPECTS AFFECTED**	**PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)**	**SIGNIFICANCE IF NOT MITIGATED**	**MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity**	**SIGNIFICANCE IF MITIGATION**
Processing Plant: 2 X 16 feet pans	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Medium
Ablution Facilities	Soil contamination	Soil Groundwater Odours	Construction Commissioning Operational	Low	Maintenance of sewage facilities on a regular basis. Removal of chemical toilets on closure	Very Low

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

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

					Develop a mechanism to record and respond to complaints. Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.	

					Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall prospecting footprint. The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; Snares & traps removed and destroyed;	
Salvage yard (Storage and laydown area)	Possible Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Low
Stockpile area	Dust Possible Groundwater contamination	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Medium	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills	Low

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

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

j) Summary of specialist reports

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
ECOLOGICAL ASSESSMENT REPORT **THUNDERFLEX 78 (PTY) LTD** **The Farm Kannikwa 156** **The Farm Kannikwa Vlakte 157** **District of Namakwa** **Northern Cape Province** **By Dr Betsie Milne** **June 2022** **APPENDIX 4**	**CONCLUSION, RECOMMENDATIONS AND OPINION REGARDING AUTHORISATION** Five plant communities were identified within the area earmarked for prospecting activities in the study area. Of these, the Kamma River is most sensitive (Very High), primarily based on its national protection status as a watercourse. The remainder of the site is of High sensitivity based on several red listed plant species recorded here, and potential important habitat it provides to red listed mammals, birds, reptiles, amphibian, and invertebrate species. The most profound impacts expected to be related to the proposed prospecting operation include cumulative loss of intact Succulent Karoo habitat and associated range-restricted flora and fauna species. Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any destruction, death or displacement of protected flora and fauna species. The destruction of sensitive natural habitats on site is inevitable. The significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the prospecting operation. In my opinion, authorisation for the proposed operation should not be granted unless the applicant commits to strictly adhere to effective avoidance, management, mitigation and rehabilitation measures.	X	Contained in the mitigation measures and EMPR
Heritage Impact Assessment (including Palaeontological Desktop Assessment) for a Mine Prospecting Application on the Farm Kannikwa 156 and Farm Kannikwa Vlakte 157 near Port Nolloth in Richtersveld Local Municipality, Northern Cape	**EXECUTIVE SUMMARY** 1.This heritage specialist report has been prepared in support of a prospecting right application on the Farms Kannikwa 157 and Kannikwa Vlakte 157 situated near Port Nolloth in the Ritchtersveld Local Municipality, Northern Cape. 2.An exploration permit is sought for diamonds expected to be found in gravel deposits on the farms. 3.The impact assessment is in fulfilment of Section 38(8) of the National Heritage Resources Act (No 25/1999) which requires screening for the possible	X	Contained in the mitigation measures and EMPR

Prepared by **Edward Matenga** **(PhD Archaeology & Heritage, MPhil, Archaeology; Uppsala/Sweden)** **21 March 2022** **APPENDIX 5**	occurrence of heritage resources that may be affected by the proposed activities. This procedure allows appropriate measures to be taken as mitigation. 4.The following is a summary of the findings of this study. 5.The Stone Age The Namaqualand Karoo plains were occupied by hunters and foragers and later semi-nomadic herders who subsisted on stone tool technologies. Scatters of stone tools were encountered on the ridges on the Farm Kannikwa 156. The observations comprised mainly quartz flake waste with a few formal tools. 6.Burial grounds No burial grounds were reported on the farm. 7.Footprint of the old railway line from Port Nolloth to Steinkopf The landowner of Kannikwa 156 treasures a footprint of the old railway line from Port Nolloth to Steinkopf, of which a well-preserved section bisects the farm. It is a remnant earth embankment on which rusted railway track fastening system components such as rusted dog spikes are occasionally seen. Sites KAN01, KAN02 and KAN04 represent a western section of the track. Recognising the historical importance of the old track the landowner motivated for the exclusion of the old railway line footprint from the prospecting right. It is further recommended in this report that a servitude of 50 m be reserved on either side of the track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius. **CONCLUSION AND RECOMMENDATIONS** The old railway track will be preserved as it was left out of the prospecting right. A 50 m wide servitude will be reserved on either side of the old track. The prospecting application can be approved with a condition that the old railway track and settlement is protected. The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.		

Palaeontological Impact Assessment for the proposed Prospecting Right application for the Farm Kannikwa 156 and Farm Kannikwa Vlakte 157 near Port Nolloth in Richtersveld Local Municipality, Northern Cape Province **19 March 2022** **Prof Marion Bamford Palaeobotanist** **APPENDIX 6**	**Executive Summary** A desktop Palaeontological Impact Assessment was requested for the Prospecting Right Application on the Farm Kannikwa 156 and Farm Kannikwa Vlakte 157 near Port Nolloth in Richtersveld Local Municipality, Northern Cape, Northern Cape Province. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development. The proposed site lies on the non-fossiliferous granites and gneisses of the Namaqualand area, indicated a having zero to insignificant palaeosensitivity on the SAHRIS map. The rest of the area is also indicated as having low (blue) palaeosensitivity and this applies to the fluvial sands and alluvium along the ephemeral watercourses and the Gordonia Formation sands. It is unlikely that any fossils would be found in the sands and alluvium because these are transported sediments but clasts of wood have been found on the nearby Farm Oubeep. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor / environmental officer/ other designated responsible person once excavations/drilling/trenching activities have commenced. As far as the palaeontology is concerned, the project should be authorised. **Recommendation** Based on the lack of any previously recorded fossils from the Kannika farms area, it is unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a very small chance that fossil woodss may occur in the palaeo-river beds and channels so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once drilling, trenching or excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be extremely low so the project should be authorised.	X	Contained in the mitigation measures and EMPR

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

k) Environmental impact statement

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

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

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

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion based on the presented specialist assessments and impact assessment that the Environmental Authorization application should be authorised. In terms of the ecological study Dr. Milne said in her opinion, authorisation for the proposed operation should not be granted unless the applicant commits to strictly adhere to effective avoidance, management, mitigation and rehabilitation measures.

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

- Adhere to the approved Environmental Management Programme
- Adhere to the Emergency procedures Report and implement spill clean-up procedures
- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation if applicable.
- Major spills should be reported within 24hr to the Department of Water and Sanitation and the NCDENC.

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

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

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

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

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Appendix (Figure 26)**

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

The sensitivity map for the Kannikwa prospecting operation is illustrated in Figure 33. All watercourses in the study area are also unique habitats protected in terms of the National Water Act (Act No 36 of 1998). These units are essentially **no-go areas.**

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

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

In terms of the Heritage Impact Assessment the old railway track will be preserved. A 50 m wide servitude will be reserved on either side of the old track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius. The prospecting application can be approved with a condition that the old railway track and settlement are protected.

In terms of the ecological study One depression occurs on Kannikwa, and two branches of the Kamma River flows through the property, along with several drainage lines. According to SAIIAE, the Kamma River is Largely Natural, Least Threatened and moderately- to well protected. SAIIAE has also classified the depression to be Largely Natural, but in reality, the entire depression has been subject to ploughing and is therefore assumed to be severely modified. It has been classified as threatened by SAIIAE. No activity may take place within a watercourse unless authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

Please see Final Site Map below.

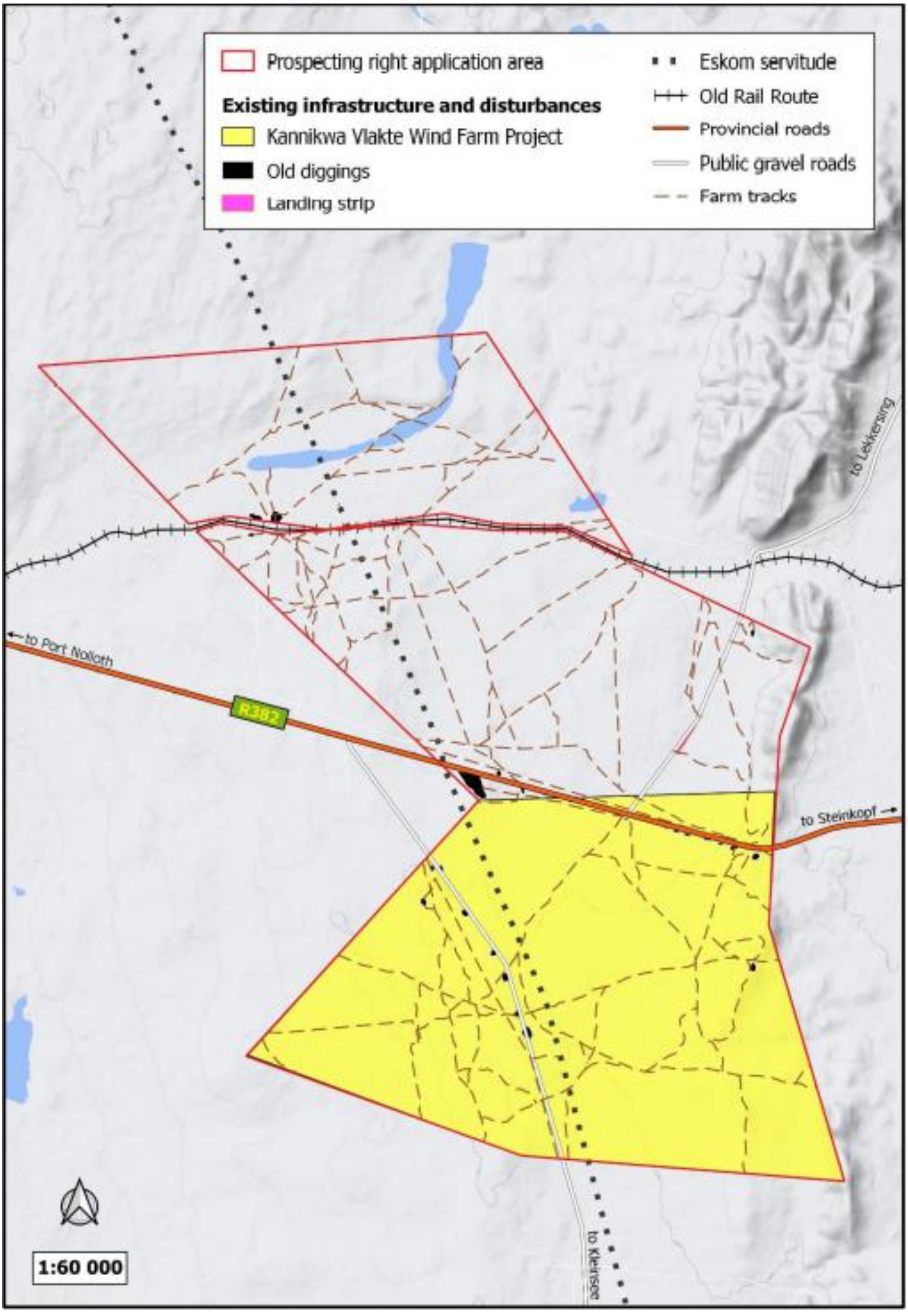


Figure 32. Existing infrastructure map (Dr. B Milne, Ecological report).

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

During construction and operation of the prospecting, 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 prospecting will unearth the natural topography. The construction of infrastructure and various facilities in the prospecting area can also result in loss of soil due to erosion. Vegetation where present will be stripped in preparation for placement of temporary prospecting 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 prospecting operation, there is a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil unusable 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 prospecting 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 bulk sampling operation.

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

The transformation of natural habitats to prospecting and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to prospecting 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 temporary prospecting 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 prospecting 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 prospecting 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 prospecting 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 prospecting 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 prospecting operation, and that the economy will not decline to its original level prior to the development of this project. This is because the prospecting 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 prospecting closure in advance, but it is acceptable to assume that the prospecting 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.

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

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

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

- The creation of job opportunities in the area, and associated local economic development;

- Economic and revenue contribution to the local municipal area, as well as the District and adjacent municipalities;
- The positive impact of prospecting activity on the regional and local economy; and
- Positive impact of extensive local procurement focus.

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

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

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

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

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

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

Topography

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

Soil

- Topsoil needs to be removed and stored separately during prospecting and the construction
- of roads, infrastructure, and stockpile areas.
- These topsoil stockpiles must be kept as small as possible to prevent compaction and the
- formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.

- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
- The topsoil should be replaced as soon as possible on to the disturbed areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings.
- Vehicles and machinery should be regularly serviced and maintained.
- Refuelling and vehicle maintenance must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Drip trays must be available on site and installed under all stationary vehicles.
- Spill kits to clean up accidental spills must be well-marked and available on site.
- Workers must undergo induction to ensure they are prepared for rapid clean-up procedures.
- Any soil or area that is contaminated must be cleaned immediately by removing the soil and disposing it as hazardous waste in the correct manner.
- Topsoil needs to be removed and stored separately during prospecting and the construction
- of roads, infrastructure and stockpile areas.
- These topsoil stockpiles must be kept as small as possible to prevent compaction and the formation of anaerobic conditions.
- Topsoil must be stockpiled for the shortest possible timeframes to ensure that the quality of the topsoil is not impaired.
- Topsoil must not be handled when the moisture content exceeds 12 %.
- Topsoil stockpiles must by no means be mixed with sub-soils.
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- For restoration of the affected areas without topsoil, soils can be sourced from other sustainable areas and chemically changed to match with the surrounding environment.
- To restore areas where compacted soil occurs, a ripper blade or deep plow can be pulled across the affected area to alleviate compaction.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings and succulent cuttings.
- Bare ground exposure should always be minimised in terms of the surface area and duration.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible once activities in the area have ceased.
- No new roads, infrastructure or prospecting areas should be developed over watercourses, including drainage lines.
- Disturbances during the rainy season should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.

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

Flora

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible.
- Implement effective avoidance measures to limit any activities in the highly sensitive areas, by applying the no-go principles.
- Ensure measures for the adherence to a maximum speed limit of 40 km/h to minimise dust fallout and associated effects on plants in the adjacent pristine areas.
- Encourage the growth of natural plant species in all affected areas by sowing indigenous seeds or by planting seedlings.
- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of affected areas.
- Apply for permits to authorise the clearance of indigenous plants from DENC at least three months before such activities will commence.
- The footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to any destructive activities by means of a search-and-rescue operation.
- It is recommended that these plants are identified and marked prior to intended activity. These plants should ideally be incorporated into the design layout and left in situ. However, due to the nature of the proposed prospecting activities they will most likely all be removed or relocated (if possible). The relevant permits from DENC should be applied for at least three months before such activities will commence.
- The setup of a small nursery is advisable to maximise translocation and re-establishment efforts of all the rescued plants.
- 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 to ensure successful translocation.
- The designation of an environmental officer is recommended to render guidance to the staff and contractors with respect to suitable areas for all related disturbance and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation.
- All those working on site must be educated about the conservation importance of the flora occurring on site as well as the legislation relating to protected species.
- Employ regulatory measures to ensure that no illegal harvesting takes place.

Introduction or spread of alien species:

- Implement best practise principles to minimise the footprint of transformation, by keeping to existing roads and earmarked areas where possible.
- Mechanical methods of control should be implemented pro-actively as soon as invasive species start to emerge.

- Regular follow-up monitoring of invasive control areas needs to be implemented to ensure effective eradication.
- Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

Encouraging bush encroachment:

- Mechanical methods of control should be implemented pro-actively when encroaching species form dense stands.
- Regular follow-up monitoring of encroached control areas needs to be implemented to ensure effective eradication.
- Encourage proper rehabilitation of disturbed areas through soil restoration and reseeding of indigenous plant species.

Fauna

Habitat fragmentation

- All activities associated with the prospecting operation must be planned, where possible to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The footprint areas of the prospecting activities must be scanned for any burrow complexes prior to any destructive activities by means of a search-and-rescue operation.
- It is recommended that complexes are identified and marked prior to intended activity and should be incorporated into the design layout and left in situ. However, due to the nature of the proposed prospecting activities they will most likely be destroyed. The relevant permits from DENC should be applied for at least three months before such activities will commence.
- The extent of the earmarked area should be demarcated on site layout plans. No staff, contractors or vehicles may leave the demarcated area except those authorised to do so.
- Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no-go zone for employees, machinery or even visitors.
- No new roads should be created across a watercourse.
- No prospecting should take place in the Kamma River or along its banks. If this is unavoidable, a water use license to alter the beds and banks of the river should be obtained from DWS prior to such activities.
- Employ sound rehabilitation measures to restore characteristics of all affected habitats.

Disturbance, displacement and killing of fauna

- Careful planning of the operation is needed to avoid the destruction of pristine habitats and minimise the overall disturbance footprint.
- The extent of the prospecting activities should be demarcated on site layout plans, and no personnel or vehicles may leave the demarcated area except if authorised to do so. Areas surrounding the earmarked site that are not part of the demarcated area should be considered as a no-go zone.
- The footprint areas of the prospecting activities must be scanned for any protected faunal species prior to any destructive activities by means of a search-and-rescue operation.

- If any of the protected wildlife species are directly threatened by habitat destruction or displacement during the prospecting operation, then the relevant permits from DENC should be obtained followed by the relevant mitigation procedures stipulated in the permits.
- It is recommended that these individuals be rescued and relocated by a registered professional prior to intended activities.
- No prospecting should take place in the Kamma River and no new roads should be created across drainage lines. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- Everyone on site must undergo environmental induction for awareness on not capturing or harming species that are often persecuted out of superstition and to be educated about the conservation importance of the fauna occurring on site.
- All reptiles, amphibians as well as bird nests and small mammal litters 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 a maximum speed limit of 40 km/h as well as driving mindfully on site to lower the risk of animals being killed on the roads or elsewhere in the prospecting area.

Surface water

Alteration/destruction of watercourses

- All activities associated with the prospecting operation must be planned to avoid any disturbances to the watercourses and their buffer zones.
- No new roads should be created across a watercourse and no prospecting should take place in the Kamma River. If this is unavoidable, a water use license to alter the beds and banks of each earmarked watercourse should be obtained from DWS prior to such activities.
- Employ sound rehabilitation measures to restore characteristics of all affected watercourses.

Siltation of surface water

- Bare ground exposure should always be minimised in terms of the surface area and duration.
- Re-establishment of plant cover on disturbed areas must take place as soon as possible once
- activities in the area have ceased.
- No new roads, infrastructure or prospecting areas should be developed over watercourses.
- Disturbances during the rainy season should be monitored and controlled.
- Any potential run-off from exposed ground should be controlled with flow retarding barriers.
- Regular monitoring during the prospecting operation should be carried out to identify areas where erosion is occurring; followed by appropriate remedial actions.

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil

and grease must be removed on a regular basis from the operation by a registered approved contractor.

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

Groundwater

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

- Proper sanitation facilities must be provided for employees.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel al fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
  Ensure good housekeeping rules.

Air Quality

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

Noise

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

Mechanical equipment

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

Safety

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

Archaeology:

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

Chance Find Protocol

- Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.
- The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a

SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

- If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

Visual

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

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

- To ensure efficient extraction of the diamonds and to prevent the sterilization of any diamond reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- The non-perennial stream is classified as a water system according to GN704 and is a natural storm water accumulation stream. No water system shall be mined before an authorization is obtained from DWS.
- Rehabilitation of disturbed areas during the prospecting life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.

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

m) Final proposed alternatives

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

The 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 prospecting operation will be assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality of the prospecting operation will however not form part of this consideration, as the location of the prospecting site is determined by the possible geological location of the mineral resource.

n) Aspects for inclusion as conditions of Authorisation

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

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

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

(Which relate to the assessment and mitigation measure proposed)

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

Assumptions and limitations in the ECOLOGICAL ASSESSMENT REPORT

The field survey took place during early summer. This was not an optimal time of the year for this succulent karoo habitat, because it predominantly receives winter rainfall. According to the landowner the area has also been experiencing severe drought. Most of the succulents were dead or dormant, but some shrubs and grasses were flowering or in fruit. The vegetation was therefore not in the most favourable state for the assessment. Furthermore, due to the brief duration of the survey, the species list obtained cannot be regarded as comprehensive. Ideally, a site should be visited several times during different seasons to ensure a full complement of plant and animal species present, are captured. However, this is rarely possible due to time and cost constraints related to prospecting right application processes.

No access was granted for the areas south of the R382 and therefore these areas could not be fully assessed and potentially compromised the accuracy of this assessment. Nevertheless, the survey focussed on the larger portion north of the R382, for which landowners' permission could be obtained. The findings obtained from these areas were then extrapolated to the entire prospecting right area. The hills lining the eastern border of the study area were not included in this assessment, since they have not been earmarked for the prospecting activities.

Assumptions in the Heritage Impact Assessment

The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Assumptions and uncertainties in the Palaeontological Impact Assessment

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the granites, gneiss, quartzites, sandstones and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils because the material is transported and friable, however, there could be pebbles and cobbles in the rivers channels that are transported and rounded pieces of fossil wood.

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

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

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

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the prospecting operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the

competent authority should take all the necessary steps to ensure that the prospecting operation complies with the conditions set out in the approval of the EMPR.

Dr. Betsie Milne in the Ecological study stated the following: The destruction of sensitive natural habitats on site is inevitable. The significance of the impacts will ultimately be affected by the success of the mitigation measures implemented during the prospecting operation. In my opinion, authorisation for the proposed operation should not be granted unless the applicant commits to strictly adhere to effective avoidance, management, mitigation and rehabilitation measures.

Dr. Edward Matenga in the Heritage study stated the following: The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Prof Marion Bamford stated the following in the Palaeontological desktop study: Based on the lack of any previously recorded fossils from the Kannika farms area, it is unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a very small chance that fossil woods may occur in the palaeo-river beds and channels so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once drilling, trenching or excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be extremely low so the project should be authorised.

ii) Conditions that must be included in the authorisation.

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

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

Five plant communities were identified within the area earmarked for prospecting activities in the study area. Of these, the Kamma River is most sensitive (Very High), primarily based on its national protection status as a watercourse. The remainder of the site is of High sensitivity based on several red listed plant species recorded here, and potential important habitat it provides to red listed mammals, birds, reptiles, amphibian, and invertebrate species. The most profound impacts expected to be related to the proposed prospecting

operation include **cumulative loss of intact Succulent Karoo habitat and associated range-restricted flora and fauna species**. Permit applications need to be lodged with the Northern Cape Department of Environment and Nature Conservation three months prior to any destruction, death or displacement of protected flora and fauna species (taken out of the ecological study by Dr. Betsie Milne).

(2) Rehabilitation requirements

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

Infrastructure areas

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

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

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

Topsoil and Stockpile Deposits:

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

Ongoing Seepage, Control of Rain Water:

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

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.

- Provide analytical water quality information describing trends (present conditions and changes).

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

Water Monitoring Points

Surface water: One depression occurs on Kannikwa, and two branches of the Kamma River flows through the property, along with several drainage lines. According to SAIIAE, the Kamma River is Largely Natural, Least Threatened and moderately- to well protected. SAIIAE has also classified the depression to be Largely Natural, but in reality, the entire depression has been subject to ploughing and is therefore assumed to be severely modified. It has been classified as threatened by SAIIAE.

There are no surface water sources from which the applicant can collect samples for testing.

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

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

Final Rehabilitation Roads:

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

Submission of Information:

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

Maintenance (Aftercare):

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.

- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore, all agreed commitments should be implemented by Mine Management.

After-effects Following Closure:

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

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

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

q) Period for which the Environmental Authorisation is required

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

r) Undertaking

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

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

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the Jakkalsdans site as it stands currently (risking premature rehabilitation) is estimated to be R 1 755 261 according to the DMR calculations.

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

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

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

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

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

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

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

ii) Motivation for the deviation

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

u) Other information required by the competent Authority

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

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

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

From a social perspective the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).
It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area; therefore, the monitoring activities cannot be expressed in financial terms.

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

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act (Provide the results of investigation, assessment, evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 herein)

Dr Edward Matenga has been appointed by Wadala Mining to provide an Heritage Impact Assessment study in order to highlight the heritage characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the heritage status of the application. (Appendix 5).

This heritage specialist report has been prepared in support of a prospecting right application on the Farms Kannikwa 157 and Kannikwa Vlakte 157 situated near Port Nolloth in the Ritchtersveld Local Municipality, Northern Cape.

An exploration permit is sought for diamonds expected to be found in gravel deposits on the farms.

The impact assessment is in fulfilment of Section 38(8) of the National Heritage Resources Act (No 25/1999) which requires screening for the possible occurrence of heritage resources that may be affected by the proposed activities. This procedure allows appropriate measures to be taken as mitigation.

The following is a summary of the findings of this study.

The Stone Age

The Namaqualand Karoo plains were occupied by hunters and foragers and later semi-nomadic herders who subsisted on stone tool technologies. Scatters of stone tools were encountered on the ridges on the Farm Kannikwa 156. The observations comprised mainly quartz flake waste with a few formal tools.

Burial grounds

No burial grounds were reported on the farm.

Footprint of the old railway line from Port Nolloth to Steinkopf

The landowner of Kannikwa 156 treasures a footprint of the old railway line from Port Nolloth to Steinkopf, of which a well-preserved section bisects the farm. It is a remnant earth embankment on which rusted railway track fastening system components such as rusted dog spikes are occasionally seen. Sites KAN01, KAN02 and KAN04 represent a western section of the track. Recognising the historical importance of the old

track the landowner motivated for the exclusion of the old railway line footprint from the prospecting right. It is further recommended in this report that a servitude of 50 m be reserved on either side of the track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius.

Conclusion and recommendations

The old railway track will be preserved. A 50 m wide servitude will be reserved on either side of the old track. An old settlement on the farm connected with the railway line must also be protected by the reservation of a buffer of 50 m radius. The prospecting application can be approved with a condition that the old railway track and settlement are protected.

The study is mindful that some important discoveries may occur during the prospecting and mining phases. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

Palaeontological

Prof Marion Bamford has been appointed by Wadala Mining to provide an Palaeontological Impact Assessment study in order to highlight the Palaeontological characteristics of the proposed prospecting area, and to determine the possible impact of prospecting on the palaeontological status of the application. (Appendix 6).

A desktop Palaeontological Impact Assessment was requested for the Prospecting Right Application on the Farm Kannikwa 156 and Farm Kannikwa Vlakte 157 near Port Nolloth in Richtersveld Local Municipality, Northern Cape, Northern Cape Province.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the non-fossiliferous granites and gneisses of the Namaqualand area, indicated a having zero to insignificant palaeosensitivity on the SAHRIS map. The rest of the area is also indicated as having low (blue) palaeosensitivity and this applies to the fluvial sands and alluvium along the ephemeral watercourses and the Gordonia Formation sands. It is unlikely that any fossils would be found in the sands and alluvium because these are transported sediments but clasts of wood have been found on the nearby Farm Oubeep. Therefore, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor / environmental

officer/ other designated responsible person once excavations/drilling/trenching activities have commenced. As far as the palaeontology is concerned, the project should be authorised.

The SAHRIS palaeosensitivity map for Farms Kannikwa 156 and Kannikwa Vlakte 157 appears to be based on the 1: 1 000 000 geological map rather than the 1:250 000 and the West Coast Group strata are not distinguished from the Quaternary Kalahari Group sediments. The low-resolution map provided by Roberts et al. (2006; Fig 1) shows that the West Coast Group sediments extend inland roughly 20 km at Port Nolloth so we can assume that Kannikwa which is about 8-10km inland will be within the West Coast Group zone. However, the lower lying areas will be filled with sands and alluvium from upstream, probably Gordonia Formation and younger transported sediments. Since it is not known exactly which sediments are in the Kannikwa prospecting area, a Fossil Chance Find Protocol should be added.

Along the coast, especially in the small river channels, on Farm Oubeep which is southwest of the prospecting area, there are deposits of Cretaceous fossil woods that have been washed down the palaeo-rivers with the alluvial diamonds (Bamford and Corbett, 1994, 1995). The silicified woods are large sub-rounded pebbles and cobbles with chatter marks but have distinct woody striations.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and of the incorrect type to contain fossils (Namaqua Suite) or are transported sands derived from a non-fossiliferous source. Since there is an extremely small chance that transported fossils may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the granites, gneiss, quartzites, sandstones and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils because the material is transported and friable, however, there could be pebbles and cobbles in the rivers channels that are transported and rounded pieces of fossil wood.

Recommendation

Based on the lack of any previously recorded fossils from the Kannika farms area, it is unlikely that any fossils would be preserved in the sands and alluvium of the Quaternary. There is a very small chance that fossil

woodss may occur in the palaeo-river beds and channels so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the contractor, environmental officer, or other responsible person once drilling, trenching or excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be extremely low so the project should be authorised.

Chance Find Protocol

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

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

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

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

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

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

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

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

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

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

c) Composite Map

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

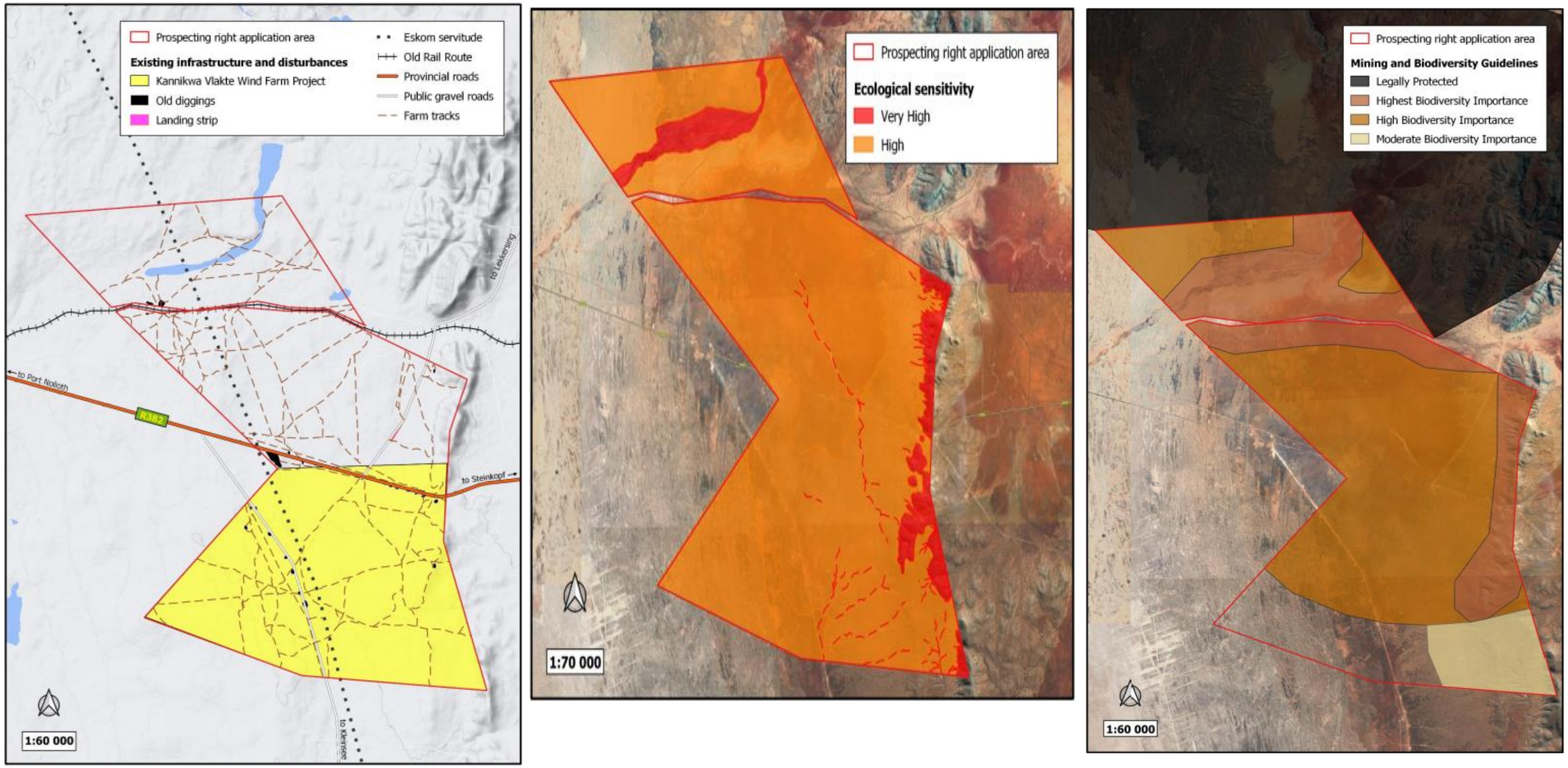

Figure 33. A sensitivity map for the prospecting area indicating areas of high (orange) and very high (red) sensitivity.

d) Description of impact management objectives including management statements

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

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

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

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

Rehabilitation of infrastructure areas

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

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

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

Mine Residue Dump

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

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

Management principles pertaining to Mine Residue dump include:

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

Maintenance

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

- Such processes include erosion of the rehabilitated areas, Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the prospecting activity to apply for closure of these different areas.

Performance assessments

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

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

Decommissioning and closure objectives

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

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

Negative economic impacts

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

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

- The Kannikwa operation will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the operation, the local and regional economies and associated abandonment of community infrastructures surrounding the prospecting activities.

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

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

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

No potential risk for Acid Mine Drainage exists.

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

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

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

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

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

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

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

There will be two 16 feet pans that will require water when bulk sampling is reached. The only other activity relating to the cost of water in the prospecting operation relates to dust suppression in the prospecting area and on the roads when hauling and transporting material to the processing plant on the farms as part of the rehabilitation process.

It must however be noted that the water supply to the activities will be sourced from underground or from the ocean. The necessary Water Use Licence will be applied for.

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

viii) Has a water use licence been applied for?

A Water use Licence application (WULA) will be prepared and submitted as soon as the EIA EMP has been submitted as this document and the Right is a minimum requirement for the application.

ix) Impact to be mitigated in their respective phases

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

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

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

Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Prospecting Right.
Prospecting Area.	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 20 hectares at any one time.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Dump control and monitoring Erosion control		Upon cessation of the individual activity (continuous rehabilitation)
Salvage yard (Storage and laydown area)	Construction Commissioning Operational	No construction material, area to be levelled with a	Access control Maintenance of fence		Removal of fence around salvage yard and ripping of salvage yard area upon

	Decommissioning Closure	grader and fenced with a gate and access control	Storm water run-off control Immediately clean hydrocarbon spill		closure of the prospecting right.
Gravel Stockpile area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint (at full production) of 0.01ha for the stockpile area at any one time.	Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control. Immediately clean hydrocarbon spills. Rip disturbed areas to allow re-growth of vegetation cover		Ripping of stockpile area upon closure of prospecting right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control		Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the prospecting right.

			Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Workshop and Wash bay	Construction Commissioning Operational Decommissioning Closure	300m² Concrete and Steel	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the prospecting right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m²	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the prospecting right.

e) Impact Management Outcomes

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

ACTIVITY Whether listed or not listed.	**POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**ASPECTS AFFECTED**	**PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**STANDARD TO BE ACHIEVED (impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Processing Plant 2 X 16 feet pans	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels;	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

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

	Surface water contamination			surface run-off into the prospecting area. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met.

				Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

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

				Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Prospecting activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental	

				Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.	

				Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint. The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; Snares & traps removed and destroyed; and Maintenance of firebreaks. It will be necessary to divert storm water around dump areas by construction of a temporary berm that will prevent surface run-off into the drainage lines. The re-vegetation of disturbed areas is	

				important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Gravel Stockpile area	Dust Noise Removal and disturbance of vegetation cover and	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

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

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

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

f) Impact Management Actions

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

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.**	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: 2 x 16ft rotary pan plants	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover	Removal of processing plant upon closure of Prospecting right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

	Surface disturbance	Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible.		Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Ablution Facilities Chemical Toilets.	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of facility on closure	Removal of facility upon closure of the Prospecting Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

				Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Clean & Dirty water systems: Berms	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	It will be necessary to divert storm water around prospecting areas by construction of a berm that will prevent surface run-off into the prospecting area. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels	Upon cessation of the individual activity (continuous rehabilitation) Levelling of stormwater berms upon closure of Prospecting Right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

		that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Effluents and waste should be recycling and re-use as far as possible.		Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Prospecting Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

Prospecting Area.	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Effluents and waste should be recycling and re-use as far as possible. Prospecting activities must be planned, where possible in order	Upon cessation of the individual activity (continuous rehabilitation)	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the prospecting area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.		

		The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall prospecting footprint. The Footprint areas of the prospecting activities must be scanned for Red Listed and protected plant species prior to prospecting; Snares & traps removed and destroyed; and Maintenance of firebreaks. It will therefore be necessary to divert storm water around dump areas by construction of a berm that will prevent surface run-off into the drainage channels.		

		The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.		
Salvage yard (Storage and laydown area)	Surface Water contamination Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the prospecting right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan.

				• Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Stockpile area	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination		Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints.	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts;

	Contamination of soil Surface water contamination	Removal of waste on regular intervals		• Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Roads (both access and haulage road on the prospecting site):	Dust Surface Water contamination	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control	Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the prospecting right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts;

	Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.		• Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	Surface Water contamination Removal and disturbance of vegetation cover	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of prospecting right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts;

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

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

				• Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

i) Financial Provision

(1) Determination of the amount of Financial Provision

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

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

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

General closure objectives include the following:

Adhere to all statutory and other legal requirements;

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

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

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

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

Physically stabilise remaining structures to minimise residual risks;

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

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

Promote biodiversity and ecological sustainability as far as practically possible;

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

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

Maintain required facilities and rehabilitated land until closure.

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

The process as described by NEMA for Environmental Authorisation was followed. See table 3 for the identification of Interested and Affected Parties to be consulted with. The landowners were consulted with a registered letter informing them that the application had been accepted and the scoping report were attached in which all activities were explained.

An Advert (Notice) was placed in the GEMSBOK on 23 July 2021 to notify all other interested and affected parties.

Notices were placed at the Police station in Port Nolloth and at the USave. Notices were also placed at the gravel road entering onto the property.

Registered consultation letters were sent on 12 July 2021 to all identified parties and government departments with the Scoping Report on disc included.

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

The document can also be viewed at the EAP address with prior arrangement to view the document.

The EIA EMP document was put on disc and was distributed to all the registered parties per registered mail on 12 July 2022.

Consultation process:

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

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

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

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

Dismantling of processing plant and related structures:

- The processing plant in total is expected to cover an area of 900 m2, of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and other items used during the processing activities, such as conveyor belts, pipelines and power lines.
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of steel buildings and structures:

- All steel buildings and structures are expected to amount to 2300 **m2**. These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.

- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of reinforced concrete buildings and structures

- All brick buildings and concrete structures are expected to amount **to 280 m2**. These include French drains, wash bays, refuelling depots and concrete floors. Those in disuse and which cannot be donated or used for future purposes should be demolished.
- The foundations of these buildings should also be demolished and to a depth of 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;

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

Rehabilitation of access roads

- Mine roads in total, is expected to cover an area of **13500** m2. After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition and rehabilitation of electrified railway lines

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

Demolition and rehabilitation of non-electrified railway lines

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

Demolition of housing and/or administration facilities

- There are no other housing or administration facilities associated with the Prospecting activities, other than those in the form of

mobile containers. These were however included in the section for demolition of steel buildings and structures.

Opencast rehabilitation including final voids and ramps

- Opencasts and ramps associated with the Prospecting activities are expected to cover 4ha at any one time.
- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the Prospecting activities.

Rehabilitation of overburden and spoils

- The total final overburden and spoils are estimated to amount to 0.25 ha and includes waste dumps as well as earth walls. Pre-planning should be conducted in order decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with pollution potential

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

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

- The processing waste deposits on the Prospecting area is estimated to cover an area of ± 0.25 ha. Pre-planning should be conducted in order decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.

- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;

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

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

Storm water management

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

(1) prevent uncontrolled runoff from the residue deposit, which in turn creates surface erosion and resultant damage to the cover material and could also expose deposited material;

(2) route the runoff arising from the rehabilitated residue deposit into the surrounding surface water drainage regime in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure; and

(3) allow for the control routing of the runoff collected on the rehabilitated residue deposit across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the residue deposit.

Rehabilitation of subsided areas

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

General surface rehabilitation

- Final surface rehabilitation of areas disturbed by prospecting and related activities should be aligned to the selected final land use. General surface rehabilitation encompasses the reinstatement of natural topography, the top soiling and the re-vegetation of all those areas where infrastructure have been dismantled and

removed or demolished. It also includes any industrial waste or scrap material that need to be removed from site. The total area that will need general surface rehabilitation at the time mine closure is estimated to be ± 0 ha.

River diversions
No river diversions are planned.

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

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

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

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

Specialist study

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

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

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

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

The current, preliminary mine closure and rehabilitation costs amounts to R 1 755 261 (Please see table 18 below for calculation).

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

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

Table 18: Financial Quantum

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
Remark:							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	900	18,42	1	1	16578
					1	1	
2 (A)	Demolition of steel buildings and structures	m2	2300	256,63	1	1	590249
2(B)	Demolition of reinforced concrete buildings and structures	m2	280	378,15	1	1	105882
3	Rehabilitation of access roads	m2	13500	2,29	1	1	30915
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	445,73	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	243,13	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	513,26	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	4	261224,38	0,04	1	41795,9008
7	Sealing of shafts adits and inclines	m3	0	137,77	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,25	179372,28	1	1	44843,07
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,25	223404,93	1	1	55851,2325
					1	1	
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	648873,81	1	1	0
					1	1	
9	Rehabilitation of subsided areas	ha	0	150197,24	1	1	0
10	General surface rehabilitation	ha	3	142093,10	1	1	426279,3
11	River diversions	ha	0	142093,1	1	1	0
12	Fencing	m	0	162,08	1	1	0
13	Water management	ha	0	54027,79	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	0	18909,73	1	1	0
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum	0			1	0
					Sub Total 1		1312393,503
1	Preliminary and General		78743,6102		weighting factor 2 1,05		82680,79071
2	Contingencies				131239,3503		131239,3503
					Subtotal 2		1526313,64
					VAT (15%)		228947,05
					Grand Total		**1755261**

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

g) Monitoring of Impact Management Actions

h) Monitoring and Reporting Frequency

i) Responsible persons

j) Time Period for Implementing Impact Management Actions

k) Mechanisms for Monitoring Compliance

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

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

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

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

m) Environmental Awareness Plan

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

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

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

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

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

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

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

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

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

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

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

duties, thereby eliminating negative impacts on their safety, health and environment.

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

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

Environmental awareness topics to be covered in training should include:

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

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

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

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

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

n) Specific information required by the Competent Authority

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

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

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

An environmental audit report will be done biennially (every second year).

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

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

2) UNDERTAKING

The EAP herewith confirms

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

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

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

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

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Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting Pty Ltd

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Name of Company:

Date: 27 June 2022

- END –